ARCADIS U.S., Inc.
10352 Plaza Americana Drive
Baton Rouge
Louisiana 70816
Tel 225 292 1004
Fax 225 218 9677
www.arcadis-us.com

ENVIRONMENT

Ms. D. Karen Knight
Chief, Corrective Action Section
Restoration and Underground Storage Tank Branch
RCRA Division
U.S. Environmental Protection Agency, Region 4
61 Forsyth Street, S.W.
Atlanta, Georgia 30303-3104

Subject:
Vapor Intrusion Evaluation and Proposed Sampling Plan
USEPA RCRA 3013(a) - Administrative Order
Hercules Incorporated, Hattiesburg Facility
Hattiesburg, Forrest County, Mississippi
USEPA ID No. MSD 008 182 081
Docket No. RCRA-04-2011-4251

Date:
27 November 2012

Contact:
John Ellis

Extension:
208

Email:
john.ellis@arcadis-us.com

Our ref:
LA002999.0012.301B4
2999.12/C/3/kp

Dear Ms. Knight:

ARCADIS U.S., Inc. (ARCADIS), on behalf of its client Hercules Incorporated (Hercules), is pleased to submit this Vapor Intrusion Evaluation and Proposed Sampling Plan. This Plan was prepared to address the August 23, 2012, U.S. Environmental Protection Agency (USEPA) comments regarding the need to conduct additional sampling at the residence located at 135 West 8th Street, across from the Hercules-Hattiesburg facility (site). In addition, this work is being conducted in response to the USEPA RCRA 3013(a) Administrative Order (AO).

The vapor intrusion aspects of this project and proposed path forward were discussed during an October 29, 2012, conference call between USEPA Region 4, Hercules ARCADIS, and the Mississippi Department of Environmental Quality (MDEQ).

Background

On August 30, 2012, Hercules requested an extension to respond to the August 23, 2012, USEPA letter and requested a meeting with USEPA to discuss the need to collect a time-integrated indoor air sample from the first floor living space at 135 West 8th Street, across the street from the site.

A conference call was held among USEPA, Hercules, ARCADIS, and MDEQ representatives in September to discuss the USEPA letter. It was decided during the call that an online presentation would be performed in lieu of a meeting. The Hercules and ARCADIS presentation to USEPA and MDEQ covered the following topics:

1. Review of current USEPA guidance on evaluating the vapor intrusion pathway;

2. Summary of groundwater, soil gas, crawl space, and ambient air sampling conducted under the USEPA AO; and

3. Discussion of multiple lines of evidence regarding the vapor intrusion pathway at the site and neighboring properties.

The presentation confirmed that the sampling activities conducted at the site were consistent with current USEPA (2011, 2012a,b) vapor intrusion guidance and sufficient lines of evidence are available to determine that the vapor intrusion pathway is incomplete at 135 West 8th Street. As described in the presentation, the groundwater and soil gas data confirm that chemicals of potential concern related to historical operations are not present in either groundwater or soil gas at the location closest to the residence. In addition, the ambient air and crawl space data indicate that crawl space concentrations are consistent with both ambient air background and USEPA (2011) background concentrations. This finding is consistent with the building construction, which is designed to allow for air flow (i.e., ventilation) underneath the building.

Of the chemicals detected in the crawl space and ambient air, benzene, carbon tetrachloride, and chloroform can be found in many household products as noted below. In addition, all detections in ambient air and the crawl space are well within the 50th percentile range for background studies.

Chemical	Typical Use
Benzene	Gasoline, motor oil, paint, spray adhesive
Carbon tetrachloride	Household specialty cleaners, paint and varnish removers, bug sprays
Chloroform	Chlorinated drinking water, laundry starch, automotive chemicals.

Finally, a review of site geology indicates that the soil type above the water table is comprised of silty sand to clayey sand and that this soil layer likely limits the movement of volatile organic compounds that may be present in groundwater into soil gas present within the unsaturated soil zone.

Based on the presentation and subsequent discussion, the following activities will be conducted:

1. Continue with the off-site groundwater delineation. This activity will be completed once access agreements are executed with the private landowners;

2. Collect two additional sets of crawl space and ambient air data from the home located at 135 West 8th Street; and

3. Evaluate previously collected groundwater and soil gas data to determine if evaluation of the vapor intrusion pathway is needed in any other areas.

The proposed sampling plan and data evaluation is provided below.

Proposed Sampling Plan

As discussed with USEPA and MDEQ, Hercules will collect two additional sets of crawl space and ambient air samples from the home located at 135 West 8th Street. At least one sample will be collected during the colder winter months (i.e., January and February), as access allows. All samples will be collected consistent with approved methods as outlined in the Final *Phase I and Phase II Sampling and Analysis Work Plans*. Samples will be analyzed for volatile organic compounds via USEPA TO-15.

Vapor Intrusion Evaluation

As noted above, Hercules agreed to screen previously collected groundwater and soil gas data to determine if evaluation of the vapor intrusion pathway is needed in other areas surrounding the site. Consistent with the approved *Phase I Sampling and Analysis Work Plan*, Hercules collected groundwater samples from temporary monitor wells. Additionally, groundwater samples from the existing groundwater monitor well network were collected as part of the site's routine groundwater monitoring program. These data were presented in the *Constituents of Potential Concern Technical Report* (November 16, 2012) that was submitted to USEPA.

To further evaluate the potential for vapor intrusion, shallow groundwater data results were compared to calculated groundwater screening levels from the USEPA Vapor Intrusion Screening Level (VISL) Calculator for constituents considered to be "sufficiently volatile and toxic to pose an inhalation risk" (USEPA 2012a). Groundwater screening levels for the vapor intrusion pathway were calculated at a cancer risk level of 1x 10^{-6} or a total hazard quotient of 1 for a residential scenario. The calculator conservatively assumes that attenuation from the groundwater to indoor air pathway will be equal to 0.001. The groundwater screening concentrations were also adjusted to reflect an average groundwater temperature of 19 degrees Centigrade based on USEPA guidance for the continental United States (USEPA 2004).

Table 1 presents the groundwater screening level concentrations compared to the shallow groundwater data. Constituents detected in groundwater that exceed the groundwater screening levels include:

- Benzene;
- 1,1-biphenyl;
- Carbon tetrachloride;
- Chlorobenzene;
- Chloroform;
- Ethylbenzene;
- Naphthalene; and
- Trichloroethene.

Specific wells that exceed the groundwater screening levels are shown on Figure 1. Off-site buildings, if any, with 100 feet of these wells are also shown on Figure 1.

Figure 1 identifies twelve locations with groundwater concentrations that exceed the calculated groundwater screening levels. There are seven locations at or near the Hercules facility property boundary (AO-GP-03, AO-GP-21, AO-GP-24D, AO-GP-28S/D, AO-GP-31, MW-19, and MW-23). In addition, a review of existing soil gas sample results indicates that at least one constituent was detected in soil gas above the soil gas screening level in each soil gas sample (Table 2). For each of these groundwater and soil gas locations, the data were evaluated to determine if the constituents detected were likely site related, if a building was present within 100 feet, and, based on these criteria, if further evaluation was warranted. This evaluation is presented in Attachment A. Reference citations are provided in Attachment B.

Based on the information discussed with USEPA and MDEQ and summarized above, the vapor intrusion pathway does not appear to be complete at any off-site buildings at this time. To further evaluate the vapor intrusion pathway, Hercules will continue with the off-site groundwater delineation on the eastern portion of the site, conduct additional groundwater delineation activities around AO-GP-21, and collect additional ambient air and crawl space samples at 135 West 8th Street. The off-site and air sampling activities will be conducted once access agreements have been executed by the private landowners.

Closing

If there are any questions concerning this submittal, please contact the Hercules Project Coordinator, Mr. Timothy Hassett, at (302) 995-3456 or Mr. John Ellis with ARCADIS at (225) 292-1004.

Sincerely,

ARCADIS U.S., Inc.

John Ellis, P.G.
Principal Scientist/Hydrogeologist

Nadine Weinberg
Technical Expert

JE:NW:kp

Attachments

Copies:
Larry Lamberth – USEPA Region 4, Atlanta, GA
Meredith C. Anderson – USEPA Region 4, Atlanta, GA
Javier E. Garcia – USEPA Region 4, Atlanta, GA
Willie McKercher – MDEQ, Jackson, MS
Chris Sanders – MDEQ, Jackson, MS
Melissa Collier-McGee – MDEQ, Jackson, MS
The Hattiesburg Library – Hattiesburg, MS
Hercules Incorporated – Hattiesburg, MS
Timothy Hassett – Ashland/ Hercules, Wilmington, DE
Rodney Bolton – Ashland/ Hercules, Milwaukee, WI
Kristina Woods – Ashland/ Hercules, Dublin, OH
Mark Metcalf – Ashland/ Hercules, Dublin, OH

ARCADIS

Tables

Table 1. Summary of Temporary Well and Permanent Monitor Well Groundwater Analytical Results, Screen Against Calculated Vapor Intrusion Screening Levels, USEPA RCRA 3013(a) Administrative Order, Hercules Incorporated, Hattiesburg, MS.

		TEMPORARY MONITOR WELLS																							
Sample Name: **Date Collected:** **Location ID:**	**OSWER Vapor Assessment VISL Calc TR=1E-6; HI=1 GW Temp=19°C**	**GW-AO-GP-01 (040312) 04/03/12 AO-GP-01**	**GW-AO-GP-03 (040212) 04/02/12 AO-GP-03**	**GW-AO-GP-04 (033012) 03/30/12 AO-GP-04**	**GW-AO-GP-19D (032812) 03/28/12 AO-GP-19D**	**GW-AO-GP-19S (032812) 03/28/12 AO-GP-19S**	**GW-AO-GP-20 (040212) 04/02/12 AO-GP-20**	**GW-AO-GP-21 (040312) 04/03/12 AO-GP-21**	**GW-AO-GP-22 (040312) 04/03/12 AO-GP-22**	**GW-AO-GP-23 (040212) 04/02/12 AO-GP-23**	**GW-AO-GP-24D (03912) 03/29/12 AO-GP-24D**	**GW-AO-GP-24S (033012) 03/30/12 AO-GP-24S**	**GW-AO-GP-25 (032812) 03/28/12 AO-GP-25**	**GW-AO-GP-26 (040212) 04/02/12 AO-GP-26**	**GW-AO-GP-27 (032912) 03/29/12 AO-GP-27**	**GW-AO-GP-27 (040212) 04/02/12 AO-GP-27**	**GW-AO-GP-28D (033012) 03/30/12 AO-GP-28D**	**GW-AO-GP-28S (032712) 03/27/12 AO-GP-28S**	**GW-AO-GP-29D (032712) 03/27/12 AO-GP-29D**	**GW-AO-GP-29S (032712) 03/27/12 AO-GP-29S**	**GW-AO-GP-30D (032812) 03/28/12 AO-GP-30D**	**GW-AO-GP-30S (032912) 03/29/12 AO-GP-30S**	**GW-AO-GP-31 (032812) 03/28/12 AO-GP-31**	**GW-AO-GP-32 (032912) 03/29/12 AO-GP-32**	**GW-AO-GP-33 (040312) 04/03/12 AO-GP-33**
Constituent																									
1,1,1,2-Tetrachloroethane	4.77E+00	<1.0	<1.0	<1.0 [<1]	<1.0	<1.0	<1.0	<1.0 [<1]	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NA	<1,300	<500	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,1,1-Trichloroethane	9.72E+03	<1.0	<1.0	<1.0 [<1]	<1.0	<1.0	<1.0	<1.0 [<1]	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NA	<1,300	<500	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,1,2,2-Tetrachloroethane	4.02E+00	<1.0	<1.0	<1.0 [<1]	<1.0	<1.0	<1.0	<1.0 [<1]	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NA	<1,300	<500	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,1,2-Trichloroethane	6.28E+00	<1.0	<1.0	<1.0 [<1]	<1.0	<1.0	<1.0	<1.0 [<1]	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NA	<1,300	<500	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,1-Dichloroethane	8.54E+00	<1.0	<1.0	<1.0 [<1]	<1.0	<1.0	<1.0	<1.0 [<1]	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NA	<1,300	<500	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,1-Dichloroethene	2.44E+02	<1.0	<1.0	<1.0 [<1]	<1.0	<1.0	<1.0	<1.0 [<1]	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NA	<1,300	<500	<1.0	<1.0	<1.0	<1.0	**0.28 J**	<1.0	<1.0
1,2,3-Trichloropropane	3.27E+01	<1.0	<1.0	<1.0 [<1]	<1.0	<1.0	<1.0	<1.0 [<1]	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NA	<1,300	<500	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,2,4-Trichlorobenzene	5.67E+01	<1.0	<1.0	<1.0 [<1]	<1.0	<1.0	<1.0	<1.0 [<1]	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NA	<1,300	<500	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,2-Dibromo-3-chloropropane	4.08E-02	<1.0	<1.0	<1.0 [<1]	<1.0	<1.0	<1.0	<1.0 [<1]	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NA	<1,300	<500	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,2-Dibromoethane	2.17E-01	<1.0	<1.0	<1.0 [<1]	<1.0	<1.0	<1.0	<1.0 [<1]	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NA	<1,300	<500	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,2-Dichlorobenzene	3.97E+03	<1.0	<1.0	**1.4 [1.5]**	<1.0	<1.0	<1.0	<1.0 [<1]	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NA	<1,300	<500	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,2-Dichloroethane	2.60E+00	<1.0	<1.0	<1.0 [<1]	<1.0	<1.0	<1.0	<1.0 [<1]	<1.0	<1.0	**0.33 J**	<1.0	<1.0	<1.0	<1.0	NA	<1,300	<500	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,2-Dichloropropane	2.84E+00	<1.0	<1.0	<1.0 [<1]	<1.0	<1.0	<1.0	<1.0 [<1]	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NA	<1,300	<500	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,4-Dichlorobenzene	3.31E+00	<1.0	<1.0	**0.33 J [0.29 J]**	<1.0	<1.0	<1.0	<1.0 [<1]	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NA	<1,300	<500	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
2-Butanone	2.99E+06	<10	<10	<10 [<10]	<10	<10	<10	<10 [<10]	<10	<10	<10 J	<10	<10	<10	<10	NA	<13,000	<5,000	<10	<10	<10	**1.1 J**	<10	<10	<10
2-Chloro-1,3-butadiene	4.77E-03	<1.0	<1.0	<1.0 [<1]	<1.0	<1.0	<1.0	<1.0 [<1]	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NA	<1,300	<500	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
2-Hexanone	1.17E+04	<10	<10	<10 [<10]	<10	<10	<10	<10 [<10]	<10	<10	<10	<10	<10	<10	<10	NA	<13,000	<5,000	<10	<10	<10	<10	<10	<10	<10
3-Chloropropene	1.16E+00	<1.0	<1.0	<1.0 [<1]	<1.0	<1.0	<1.0	<1.0 [<1]	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NA	<1,300	<500	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
4-Methyl-2-pentanone	7.78E+05	<10	<10	<10 [<10]	<10	<10	<10	<10 [<10]	<10	<10	<10	<10	**1.3 J**	<10	<10	NA	<13,000	<5,000	<10	<10	<10	**2.1 J**	<10	<10	<10
Acetone	2.93E+07	<25	<25	**6.7 J [8.1 J]**	**52**	<25	<25	<25 [26]	**50**	<25	**11 J**	<25	**21 J**	**9.2 J**	**14 J**	NA	<31,000	<13,000	<25	**20 J**	**27**	**32**	<25	<25	<25
Acetonitrile	5.76E+04	<40	<40	<40 [<40]	<40	<40	<40	<40 [<40]	<40	<40	<40	<40	<40	<40	<40	NA	<50,000	<20,000	<40	<40	<40	<40	<40	<40	<40
Acrolein	5.36E+00	<20	<20	<20 [<20]	<20	<20	<20	<20 [<20]	<20	<20	<20	<20	<20	<20	<20	NA	<25,000	<10,000	<20	<20	<20	<20	<20	<20	<20
Acrylonitrile	8.59E+00	<20	<20	<20 [<20]	<20	<20	<20	<20 [<20]	<20	<20	<20	<20	<20	<20	<20	NA	<25,000	<10,000	<20	<20	<20	<20	<20	<20	<20
Benzene	1.82E+00	<1.0	**140**	<1.0 [<1]	<1.0	<1.0	<1.0	**1,300 D [1,300 D]**	<1.0	<1.0	<1.0	<1.0	**0.36 J**	<1.0	<1.0	NA	**1,600**	**930**	<1.0	<1.0	<1.0	<1.0	**2.5**	<1.0	<1.0
Bromodichloromethane	1.02E+00	<1.0	<1.0	<1.0 [<1]	<1.0	<1.0	<1.0	<1.0 [<1]	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NA	<1,300	<500	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Bromomethane	2.11E+01	<1.0	<1.0	<1.0 [<1]	<1.0	<1.0	<1.0	<1.0 [<1]	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NA	<1,300	<500	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Carbon Disulfide	1.56E+03	<2.0	**1.5 J**	**1.3 J [1.3 J]**	<2.0	<2.0	<2.0	<2.0 [<2]	**7.9**	**1.4 J**	<2.0	<2.0	<2.0	<2.0	**1.9 J**	NA	<2,500	**610 J**	<2.0	<2.0	<2.0	**11**	<2.0	<2.0	<2.0
Carbon Tetrachloride	4.71E-01	<1.0	<1.0	<1.0 [<1]	<1.0	<1.0	<1.0	<1.0 [<1]	<1.0	<1.0	**0.52 J**	<1.0	<1.0	<1.0	<1.0	NA	**120,000**	**68,000**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Chlorobenzene	5.75E+02	<1.0	**6.5**	**15 [16]**	<1.0	<1.0	<1.0	<1.0 [<1]	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NA	**400 J**	**210 J**	<1.0	<1.0	<1.0	**3.9**	<1.0	<1.0	<1.0
Chloroethane	2.81E+04	<1.0	<1.0	<1.0 [<1]	<1.0	<1.0	<1.0	<1.0 [<1]	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NA	<1,300	<500	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Chloroform	9.14E-01	<1.0	<1.0	<1.0 [<1]	<1.0	<1.0	<1.0	<1.0 [<1]	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NA	**23,000**	**5,200**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Chloromethane	3.06E+02	<1.0	<1.0	<1.0 [<1]	<1.0	<1.0	<1.0	<1.0 [<1]	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NA	<1,300	<500	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Dibromochloromethane	3.53E+00	<1.0	<1.0	<1.0 [<1]	<1.0	<1.0	<1.0	<1.0 [<1]	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NA	<1,300	<500	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Dibromomethane	1.68E+02	<1.0	<1.0	<1.0 [<1]	<1.0	<1.0	<1.0	<1.0 [<1]	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NA	<1,300	<500	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Dichlorodifluoromethane	9.86E+00	<1.0	<1.0	<1.0 [<1]	<1.0	<1.0	<1.0	<1.0 [<1]	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NA	<1,300	<500	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Ethyl Methacrylate	2.09E+04	<1.0	<1.0	<1.0 [<1]	<1.0	<1.0	<1.0	<1.0 [<1]	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NA	<1,300	<500	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Ethylbenzene	4.28E+00	<1.0	**2.9**	<1.0 [<1]	<1.0	<1.0	<1.0	**440 D [440 D]**	<1.0	<1.0	**0.12 J**	<1.0	<1.0	<1.0	<1.0	NA	<1,300	<500	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**0.12 J**
Methacrylonitrile	9.73E+01	<20	<20	<20 [<20]	<20	<20	<20	<20 [<20]	<20	<20	<20	<20	<20	<20	<20	NA	<25,000	<10,000	<20	<20	<20	<20	<20	<20	<20
Methyl Methacrylate	7.98E+04	<1.0	<1.0	<1.0 [<1]	<1.0	<1.0	<1.0	<1.0 [<1]	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NA	<1,300	<500	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Methylene Chloride	9.20E+02	<5.0	<5.0	<5.0 [<5]	<5.0	<5.0	<5.0	<5.0 [<5]	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	NA	<6,300	<2,500	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Naphthalene	6.21E+00	<5.0	<5.0 *	<5.0 [<5]	<5.0	<5.0	<5.0 *	**500 D [570 D]**	<5.0	<5.0 *	<5.0	<5.0	<5.0	<5.0	<5.0	NA	<6,300	<2,500	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	**2.4 J**
Styrene	1.33E+04	<1.0	<1.0	<1.0 [<1]	<1.0	<1.0	<1.0	<1.0 [<1]	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NA	<1,300	<500	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Tetrachloroethene	1.80E+01	<1.0	<1.0	<1.0 [<1]	<1.0	<1.0	<1.0	<1.0 [<1]	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NA	<1,300	<500	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Toluene	2.63E+04	<1.0	**160**	<1.0 [<1]	<1.0	<1.0	<1.0	**130 [140]**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NA	<1,300	<500	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
trans-1,2-Dichloroethene	4.81E+02	<1.0	<1.0	<1.0 [<1]	<1.0	<1.0	<1.0	<1.0 [<1]	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NA	<1,300	<500	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
trans-1,4-Dichloro-2-butene	3.12E-02	<2.0	<2.0	<2.0 [<2]	<2.0	<2.0	<2.0	<2.0 [<2]	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	NA	<2,500	<1,000	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Trichloroethene	1.44E+00	<1.0	<1.0	<1.0 [<1]	<1.0	<1.0	<1.0	<1.0 [<1]	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NA	**250 J**	<500	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Trichlorofluoromethane	2.27E+02	<1.0	<1.0	<1.0 [<1]	<1.0	<1.0	<1.0	<1.0 [<1]	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NA	<1,300	<500	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Vinyl Acetate	1.35E+04	<2.0	<2.0	<2.0 [<2]	<2.0	<2.0	<2.0	<2.0 [<2]	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	NA	<2,500	<1,000	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Vinyl Chloride	1.68E-01	<1.0	<1.0	<1.0 [<1]	<1.0	<1.0	<1.0	<1.0 [<1]	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NA	<1,300	<500	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Xylenes (total)	7.00E+02	<2.0	**4.5**	<2.0 [<2]	<2.0	<2.0	<2.0	**520 [550]**	<2.0	<2.0	**0.39 J**	<2.0	<2.0	<2.0	<2.0	NA	<2,500	<1,000	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
1,2-Dibromo-3-chloropropane	4.08E-02	<0.020	<0.020	<0.020 [<0.02]	<0.021	<0.021	<0.021	<0.020 [<0.021]	<0.020	<0.020	<0.021	<0.021	<0.021	<0.020	<0.021	NA	<0.021	<0.020 J	<0.021 J	<0.020 J	<0.021	<0.021	<0.020	<0.021	<0.020
1,2-Dibromoethane	2.17E-01	<0.020	<0.020	<0.020 [<0.02]	<0.021	<0.021	<0.021	<0.020 [<0.021]	<0.020	<0.020	<0.021	<0.021	**0.015 J**	<0.020	<0.021	NA	<0.021	<0.020	<0.021	<0.020	<0.021	<0.021	<0.020	<0.021	<0.020
1,1'-Biphenyl	5.37E+01	<0.99	<0.95	**4.3 J [0.14 J]**	<0.95	<0.95	<0.95	<95 J [<9.5 J]	<0.95	<0.96	<0.96	<0.95	<0.96	<0.96	<0.96	NA	<0.99	**1,600,000 J**	**1,100 J**	<0.96	<0.96	<0.95	<0.95	**0.097 J**	<0.95	<0.95
1,2,4-Trichlorobenzene	5.67E+01	<0.99	<0.95	<0.96 [<0.95]	<0.95	<0.95	<0.95	<95 J [<9.5 J]	<0.95	<0.96	<0.96	<0.95	<0.96	<0.96	NA	<0.99	<190,000 J	<96 J	<0.96	<0.96	<0.95	<0.95	<0.95	<0.95	<0.95
1,2-Dichlorobenzene	3.97E+03	<0.99	<0.95	**1.0 [1.2]**	<0.95	<0.95	<0.95	<95 J [<9.5 J]	<0.95	<0.96	<0.96	<0.95	<0.96	<0.96	NA	<0.99	<190,000 J	<96 J	<0.96	<0.96	<0.95	<0.95	<0.95	<0.95	<0.95
1,4-Dichlorobenzene	3.31E+00	<0.99	<0.95	**0.19 J [0.22 J]**	<0.95	<0.95	<0.95	<95 J [<9.5 J]	<0.95	<0.96	<0.96	<0.95	<0.96	<0.96	NA	<0.99	<190,000 J	<96 J	<0.96	<0.96	<0.95	<0.95	**0.097 J**	<0.95	<0.95
2,2'-Oxybis(1-Chloropropane)	1.21E+02	<0.99	<0.95	<0.96 [<0.95]	<0.95	<0.95	<0.95	<95 J [<9.5 J]	<0.95	<0.96	<0.96	<0.95	<0.96	<0.96	NA	<0.99	<190,000 J	<96 J	<0.96	<0.96	<0.95	<0.95	<0.95	<0.95	<0.95
bis(2-Chloroethyl)ether	1.69E+01	<0.99	<0.95	<0.96 [<0.95]	<0.95	<0.95	<0.95	<95 J [<9.5 J]	<0.95	<0.96	<0.96	<0.95	<0.96	<0.96	NA	<0.99	<190,000 J	<96 J	<0.96	<0.96	<0.95	<0.95	<0.95	<0.95	<0.95
Naphthalene	6.21E+00	<0.20	<0.19	<0.19 [<0.19]	<0.19	<0.19	<0.19	**380 J [360 J]**	<0.19	<0.19	<0.19	<0.19	<0.19	<0.19	<0.19	NA	<0.20	<39,000 J	**12 J**	<0.19	<0.19	<0.19	<0.19	<0.19	<0.19
Nitrobenzene	9.83E+01	<0.99	<0.95	<0.96 [<0.95]	<0.95	<0.95	<0.95	<95 J [<9.5 J]	<0.95	<0.96	<0.96	<0.95	<0.96	<0.96	NA	<0.99	<190,000 J	<96 J	<0.96	<0.96	<0.95	<0.95	<0.95	<0.95	<0.95
N-Nitroso-di-n-butylamine	2.82E+00	<0.99	<0.95	<0.96 [<0.95]	<0.95	<0.95	<0.95	<95 J [<9.5 J]	<0.95	<0.96	<0.96	<0.95	<0.96	<0.96	NA	<0.99	<190,000 J	<96 J	<0.96	<0.96	<0.95	<0.95	<0.95	<0.95	<0.95

Notes:
All concentrations reported in micrograms per liter (µg/L).
Tan shading indicates an exceedance of the Calculated Vapor Intrusion Screening Level.
°C - Degrees Centigrade.
J - Indicates an estimated value.
GW - Groundwater.
HI - Hazard Index.
OSWER - Office of Solid Wasate and Emergency Response.
TR - Target Risk.
VISL - Vapor Intrusion Screening Level.

Table 1. Summary of Temporary Well and Permanent Monitor Well Groundwater Analytical Results, Screen Against Calculated Vapor Intrusion Screening Levels, USEPA RCRA 3013(a) Administrative Order, Hercules Incorporated, Hattiesburg, MS.

	PERMANENT MONITOR WELLS																						
Sample Name:	**MW-02**	**MW-03**	**MW-04**	**MW-05**	**MW-06**	**MW-07**	**MW-08**	**MW-09**	**MW-10**	**MW-11**	**MW-12**	**MW-13**	**MW-14**	**MW-15**	**MW-16**	**MW-17**	**MW-18**	**MW-19**	**MW-20**	**MW-21**	**MW-22**	**MW-23**	**MW-24**
Date Collected:	**07/27/11**	**07/27/11**	**07/27/11**	**07/28/11**	**07/28/11**	**07/28/11**	**07/26/11**	**07/28/11**	**07/27/11**	**07/27/11**	**07/27/11**	**07/26/11**	**07/28/11**	**07/28/11**	**07/28/11**	**07/26/11**	**07/27/11**	**07/26/11**	**07/27/11**	**07/26/11**	**07/27/11**	**07/26/11**	**07/27/11**
Location ID:																							
Constituent																							
1,1,1,2-Tetrachloroethane	<1	<1	<1	<1	<1	<1	<50 [<50]	<1 [<1]	<1	<1 [<1]	<1	<10	<1	<1	<1	<200	<1	<1	<1	<50	<1	<100	<1
1,1,1-Trichloroethane	<1	<1	<1	<1	<1	<1	<50 [<50]	<1 [<1]	<1	<1 [<1]	<1	<10	<1	<1	<1	<200	<1	<1	<1	<50	<1	<100	<1
1,1,2,2-Tetrachloroethane	<1	<1	<1	<1	<1	<1	<50 [<50]	<1 [<1]	<1	<1 [<1]	<1	<10	<1	<1	<1	<200	<1	<1	<1	<50	<1	<100	<1
1,1,2-Trichloroethane	<1	<1	<1	<1	<1	<1	<50 [<50]	<1 [<1]	<1	<1 [<1]	<1	<10	<1	<1	<1	<200	<1	<1	<1	<50	<1	<100	<1
1,1-Dichloroethane	<1	<1	<1	<1	<1	<1	<50 [<50]	<1 [<1]	<1	<1 [<1]	<1	<10	<1	<1	<1	<200	<1	<1	<1	<50	<1	<100	<1
1,1-Dichloroethene	<1	<1	<1	<1	<1	<1	<50 [<50]	<1 [<1]	<1	<1 [<1]	<1	<10	<1	<1	<1	<200	<1	<1	<1	<50	<1	<100	<1
1,2,3-Trichloropropane	<1	<1	<1	<1	<1	<1	<50 [<50]	<1 [<1]	<1	<1 [<1]	<1	<10	<1	<1	<1	<200	<1	<1	<1	<50	<1	<100	<1
1,2,4-Trichlorobenzene	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
1,2-Dibromo-3-chloropropane	<1	<1	<1	<1	<1	<1	<50 [<50]	<1 [<1]	<1	<1 [<1]	<1	<10	<1	<1	<1	<200	<1	<1	<1	<50	<1	<100	<1
1,2-Dibromoethane	<1	<1	<1	<1	<1	<1	<50 [<50]	<1 [<1]	<1	<1 [<1]	<1	<10	<1	<1	<1	<200	<1	<1	<1	<50	<1	<100	<1
1,2-Dichlorobenzene	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
1,2-Dichloroethane	<1	<1	<1	<1	<1	<1	<50 [<50]	<1 [<1]	<1	<1 [<1]	<1	<10	<1	<1	<1	<200	<1	<1	<1	<50	<1	<100	<1
1,2-Dichloropropane	<1	<1	<1	<1	<1	<1	<50 [<50]	<1 [<1]	<1	<1 [<1]	<1	<10	<1	<1	<1	<200	<1	<1	<1	<50	<1	<100	<1
1,4-Dichlorobenzene	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
2-Butanone	<10	<10	<10	<10	<10	<10	<500 [<500]	<10 [<10]	<10	<10 [<10]	<10	<100	<10	<10	<10	<2,000	<10	<10	<10	<500	<10	<1,000	<10
2-Chloro-1,3-butadiene	<1	<1	<1	<1	<1	<1	<50 [<50]	<1 [<1]	<1	<1 [<1]	<1	<10	<1	<1	<1	<200	<1	<1	<1	<50	<1	<100	<1
2-Hexanone	<10	<10	<10	<10	<10	<10	<500 [<500]	<10 [<10]	<10	<10 [<10]	<10	<100	<10	<10	<10	<2,000	<10	<10	<10	<500	<10	<1,000	<10
3-Chloropropene	<1	<1	<1	<1	<1	<1	<50 [<50]	<1 [<1]	<1	<1 [<1]	<1	<10	<1	<1	<1	<200	<1	<1	<1	<50	<1	<100	<1
4-Methyl-2-pentanone	<10	<10	<10	<10	<10	<10	<500 [<500]	<10 [<10]	<10	<10 [<10]	<10	<100	<10	<10	<10	<2,000	<10	<10	<10	<500	21	**1,100**	<10
Acetone	<25	<25	<25	<25	<25	<25	<1,300 [<1,300]	<25 [<25]	<25	<25 [<25]	<25	<250	<25	<25	<25	<5,000	<25	<25	<25	<1,300	<25	<2,500	<25
Acetonitrile	<40	<40	<40	<40	<40	<40	<2,000 [<2,000]	<40 [<40]	<40	<40 [<40]	<40	<400	<40	<40	<40	<8,000	<40	<40	<40	<2,000	<40	<4,000	<40
Acrolein	<20	<20	<20	<20	<20	<20	<1,000 [<1,000]	<20 [<20]	<20	<20 [<20]	<20	<200	<20	<20	<20	<4,000	<20	<20	<20	<1,000	<20	<2,000	<20
Acrylonitrile	<20	<20	<20	<20	<20	<20	<1,000 [<1,000]	<20 [<20]	<20	<20 [<20]	<20	<200	<20	<20	<20	<4,000	<20	<20	<20	<1,000	<20	<2,000	<20
Benzene	<1	<1	<1	<1	<1	<1	**4,600 [5,100]**	<1 [<1]	<1	<1 [<1]	<1	**390**	<1	<1	<1	**3,600**	<1	**54**	<1	**3,200**	**10**	**8,800**	<1
Bromodichloromethane	<1	<1	<1	<1	<1	<1	<50 [<50]	<1 [<1]	<1	<1 [<1]	<1	<10	<1	<1	<1	<200	<1	<1	<1	<50	<1	<100	<1
Bromomethane	<1	<1	<1	<1	<1	<1	<50 [<50]	<1 [<1]	<1	<1 [<1]	<1	<10	<1	<1	<1	<200	<1	<1	<1	<50	<1	<100	<1
Carbon Disulfide	<2	<2	<2	<2	<2	<2	<100 [<100]	<2 [<2]	<2	<2 [<2]	<2	<20	<2	<2	<2	<400	<2	<2	<2	<100	<2	390	<2
Carbon Tetrachloride	<1	<1	<1	<1 *	<1	<1	**2,600 [2,700 *]**	<1 [<1]	<1	<1 * [<1]	<1	**620**	<1 *	<1	<1	**25,000 ***	<1	**3.5**	<1	<50	<1 *	<100	<1
Chlorobenzene	<1	<1	<1	<1	<1	<1	**220 [240]**	<1 [<1]	<1	<1 [<1]	<1	24	<1	<1	<1	**770**	21	9.9	<1	**150**	8.7	**140**	<1
Chloroethane	<1	<1	<1	<1	<1	<1	<50 [<50]	<1 [<1]	<1	<1 [<1]	<1	<10	<1	<1	<1	<200	<1	<1	<1	<50	<1	<100	<1
Chloroform	<1	<1	<1	<1	<1	<1	**640 [640]**	<1 [<1]	<1	<1 [<1]	<1	**210**	<1	<1	<1	**3,000**	<1	**3.3**	<1	**4,300**	<1	**3,200**	<1
Chloromethane	<1	<1	<1	<1	<1	<1	<50 [<50]	<1 [<1]	<1	<1 [<1]	<1	<10	<1	<1	<1	<200	<1	<1	<1	<50	<1	<100	<1
Dibromochloromethane	<1	<1	<1	<1	<1	<1	<50 [<50]	<1 [<1]	<1	<1 [<1]	<1	<10	<1	<1	<1	<200	<1	<1	<1	<50	<1 *	<100	<1
Dibromomethane	<1	<1	<1	<1	<1	<1	<50 [<50]	<1 [<1]	<1	<1 [<1]	<1	<10	<1	<1	<1	<200	<1	<1	<1	<50	<1	<100	<1
Dichlorodifluoromethane	<1	<1	<1	<1	<1	<1	<50 [<50]	<1 [<1]	<1	<1 [<1]	<1	<10	<1	<1	<1	<200	<1	<1	<1	<50	<1	<100	<1
Ethyl Methacrylate	<1	<1	<1	<1	<1	<1	<50 [<50]	<1 [<1]	<1	<1 [<1]	<1	<10	<1	<1	<1	<200	<1	<1	<1	<50	<1	<100	<1
Ethylbenzene	<1	<1	<1	<1	<1	<1	**55 [61]**	<1 [<1]	<1	<1 [<1]	<1	<10	<1	<1	<1	<200	<1	1.3	<1	<50	<1	<100	<1
Methacrylonitrile	<20	<20	<20	<20	<20	<20	<1,000 [<1,000]	<20 [<20]	<20	<20 [<20]	<20	<200	<20	<20	<20	<4,000	<20	<20	<20	<1,000	<20	<2,000	<20
Methyl Methacrylate	<1	<1	<1	<1	<1	<1	<50 [<50]	<1 [<1]	<1	<1 [<1]	<1	<10	<1	<1	<1	<200	<1	<1	<1	<50	<1	<100	<1
Methylene Chloride	<5	<5	<5	<5	<5	<5	**340 [350]**	<5 [<5]	<5	<5 [<5]	<5	<50	<5	<5	<5	<1,000	<5	<5	<5	<250	<5	<500	<5
Naphthalene	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Styrene	<1	<1	<1	<1	<1	<1	<50 [<50]	<1 [<1]	<1	<1 [<1]	<1	<10	<1	<1	<1	<200	<1	<1	<1	<50	<1	<100	<1
Tetrachloroethene	<1	<1	<1	<1	<1	<1	<50 [<50]	<1 [<1]	<1	<1 [<1]	<1	<10	<1	<1	<1	<200	<1	<1	<1	<50	<1	<100	<1
Toluene	<1	<1	<1	<1	<1	<1	<50 [<50]	<1 [<1]	<1	<1 [<1]	<1	<10	<1	<1	<1	<200	<1	2.4	<1	**2,600**	1.1	**1,300**	<1
trans-1,2-Dichloroethene	<1	<1	<1	<1	<1	<1	<50 [<50]	<1 [<1]	<1	<1 [<1]	<1	<10	<1	<1	<1	<200	<1	<1	<1	<50	<1	<100	<1
trans-1,4-Dichloro-2-butene	<2	<2	<2	<2	<2	<2	<100 [<100]	<2 [<2]	<2	<2 [<2]	<2	<20	<2	<2	<2	<400	<2	<2	<2	<100	<2	<200	<2
Trichloroethene	<1	<1	<1	<1	<1	<1	<50 [<50]	<1 [<1]	<1	<1 [<1]	<1	<10	<1	<1	<1	<200	<1	<1	<1	<50	<1	<100	<1
Trichlorofluoromethane	<1	<1	<1	<1	<1	<1	<50 [<50]	<1 [<1]	<1	<1 [<1]	<1	<10	<1	<1	<1	<200	<1	<1	<1	<50	<1	<100	<1
Vinyl Acetate	<2	<2	<2	<2	<2	<2	<100 [<100]	<2 [<2]	<2	<2 [<2]	<2	<20	<2	<2	<2	<400	<2	<2	<2	<100	<2	<200	<2
Vinyl Chloride	<1	<1	<1	<1	<1	<1	<50 [<50]	<1 [<1]	<1	<1 [<1]	<1	<10	<1	<1	<1	<200	<1	<1	<1	<50	<1	<100	<1
Xylenes (total)	<2	<2	<2	<2	<2	<2	<100 [<100]	<2 [<2]	<2	<2 [<2]	<2	<20	<2	<2	<2	<400	<2	<2	<2	<100	<2	<200	<2
1,2-Dibromo-3-chloropropane	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
1,2-Dibromoethane	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
1,1'-Biphenyl	<9.9	NA	<10	NA	NA	NA	<1,000 [<510]	NA	NA	NA	<12	<49	NA	NA	NA	<1,000	NA	**770**	NA	NA	NA	<97	NA
1,2,4-Trichlorobenzene	<9.9	NA	<10	NA	NA	NA	<1,000 [<510]	NA	NA	NA	<12	<49	NA	NA	NA	<1,000	NA	<99	NA	NA	NA	<97	NA
1,2-Dichlorobenzene	<9.9	NA	<10	NA	NA	NA	<1,000 [<510]	NA	NA	NA	<12	<49	NA	NA	NA	<1,000	NA	<99	NA	NA	NA	<97	NA
1,4-Dichlorobenzene	<9.9	NA	<10	NA	NA	NA	<1,000 [<510]	NA	NA	NA	<12	<49	NA	NA	NA	<1,000	NA	<99	NA	NA	NA	<97	NA
2,2'-Oxybis(1-Chloropropane)	<9.9	NA	<10	NA	NA	NA	<1,000 [<510]	NA	NA	NA	<12	<49	NA	NA	NA	<1,000	NA	<99	NA	NA	NA	<97	NA
bis(2-Chloroethyl)ether	<9.9	NA	<10	NA	NA	NA	<1,000 [<510]	NA	NA	NA	<12	<49	NA	NA	NA	<1,000	NA	<99	NA	NA	NA	<97	NA
Naphthalene	<9.9	NA	<10	NA	NA	NA	<1,000 [<510]	NA	NA	NA	<12	<49	NA	NA	NA	<1,000	NA	<99	NA	NA	NA	<97	NA
Nitrobenzene	<9.9	NA	<10	NA	NA	NA	<1,000 [<510]	NA	NA	NA	<12	<49	NA	NA	NA	<1,000	NA	<99	NA	NA	NA	<97	NA
N-Nitroso-di-n-butylamine	<9.9	NA	<10	NA	NA	NA	<1,000 [<510]	NA	NA	NA	<12	<49	NA	NA	NA	<1,000	NA	<99	NA	NA	NA	<97	NA

Notes:
All concentrations reported in micrograms per liter (µg/L).
Tan shading indicates an exceedance of the Calculate Vapor Intrustion Screening Level.
°C - Degrees Centigrade.
J - Indicates an estimated value.
GW - Groundwater.
HI - Hazard Index.
OSWER - Office of Solid Wasate and Emergency Response.
TR - Target Risk.
VISL - Vapor Intrusion Screening Level.

Table 2. Summary of Soil Gas and Corresponding Temporary Well Analytical Results, USEPA RCRA 3013(a) Administrative Order, Hercules Incorporated, Hattiesburg, MS.

Sample Name:	GW-AO-GP-19D (032812)	GW-AO-GP-19S (032812)	SG-AO-SG-03 (032812)	GW-AO-GP-24D (03912)	GW-AO-GP-24S (033012)	SG-AO-SG-05 (040212)	GW-AO-GP-28D (033012)	GW-AO-GP-28S (032712)	SG-AO-SG-01 (3/27/12)	GW-AO-GP-29D (032712)	GW-AO-GP-29S (032712)	SG-AO-SG-02 (03/27/12)	GW-AO-GP-30D (032812)	GW-AO-GP-30S (032912)	SG-AO-SG-04 (03/27/12)
Date Collected:	3/28/12	3/28/12	3/28/12	3/29/12	3/30/12	4/2/12	3/30/12	3/27/12	3/27/12	3/27/12	3/27/12	3/27/12	3/28/12	3/29/12	3/27/12
Location ID:	AO-GP-19D	AO-GP-19S	AO-SG-03	AO-GP-24D	AO-GP-24S	AO-SG-05	AO-GP-28D	AO-GP-28S	AO-SG-01	AO-GP-29D	AO-GP-29S	AO-SG-02	AO-GP-30D	AO-GP-30S	AO-SG-04
VOCs Method 8260															
1,1,1,2-Tetrachloroethane	<1.0	<1.0		<1.0	<1.0		<1,300	<500		<1.0	<1.0		<1.0	<1.0	
1,1,1-Trichloroethane	<1.0	<1.0	<1.5 [<1.5]	<1.0	<1.0	<1.6	<1,300	<500	<980	<1.0	<1.0	<1.6	<1.0	<1.0	<1.6
1,1,2,2-Tetrachloroethane	<1.0	<1.0	<3.8 [<3.8]	<1.0	<1.0	<4.2	<1,300	<500	<2,500	<1.0	<1.0	<4.2	<1.0	<1.0	<4.2
1,1,2-trichloro-1,2,2-trifluoroethane			<2.2 [<2.2]			<2.4			<1,400			<2.4			<2.4
1,1,2-Trichloroethane	<1.0	<1.0	<2.7 [<2.7]	<1.0	<1.0	<2.9	<1,300	<500	<1,800	<1.0	<1.0	<2.9	<1.0	<1.0	<2.9
1,1-Dichloroethane	<1.0	<1.0	<0.96 [<0.96]	<1.0	<1.0	<1.1	<1,300	<500	<630	<1.0	<1.0	<1.1	<1.0	<1.0	<1.1
1,1-Dichloroethene	<1.0	<1.0	<1.2 [<1.2]	<1.0	<1.0	<1.3	<1,300	<500	<760	<1.0	<1.0	<1.3	<1.0	<1.0	<1.3
1,2,3-Trichloropropane	<1.0	<1.0		<1.0	<1.0		<1,300	<500		<1.0	<1.0		<1.0	<1.0	
1,2,4-Trichlorobenzene	<1.0	<1.0	<6.6 [<6.6]	<1.0	<1.0	<7.3	<1,300	<500	<4,400	<1.0	<1.0	<7.3	<1.0	<1.0	<7.3
1,2,4-Trimethylbenzene			<2.8 [<2.8]			<3.1			<1,900			**8.1 J**			**15 est**
1,2-Dibromo-3-chloropropane	<1.0	<1.0		<1.0	<1.0		<1,300	<500		<1.0	<1.0		<1.0	<1.0	
1,2-Dibromoethane	<1.0	<1.0	<3.1 [<3.1]	<1.0	<1.0	<3.4	<1,300	<500	<2,000	<1.0	<1.0	<3.4	<1.0	<1.0	<3.4
1,2-Dichloro-1,1,2,2-tetrafluoroethane			<2 [<2]			<2.2			<1,300			<2.2			<2.2
1,2-Dichlorobenzene	<1.0	<1.0	<3.8 [<3.8]	<1.0	<1.0	<4.2	<1,300	<500	<2,500	<1.0	<1.0	<4.2	<1.0	<1.0	<4.2
1,2-Dichloroethane	<1.0	<1.0	<1.7 [<1.7]	**0.33 J**	<1.0	<1.9	<1,300	<500	<1,100	<1.0	<1.0	<1.9	<1.0	<1.0	<1.9
1,2-Dichloropropane	<1.0	<1.0	<2.2 [<2.2]	<1.0	<1.0	<2.4	<1,300	<500	<1,400	<1.0	<1.0	<2.4	<1.0	<1.0	<2.4
1,3,5-Trimethylbenzene			<2.9 [<2.9]			<3.2			<1,900			<3.2			**3.9 J est**
1,3-Dichlorobenzene	<1.0	<1.0	<3.6 [<3.6]	<1.0	<1.0	<3.9	<1,300	<500	<2,300	<1.0	<1.0	<3.9	<1.0	<1.0	<3.9
1,4-Dichlorobenzene	<1.0	<1.0	<3.5 [<3.5]	<1.0	<1.0	<3.8	<1,300	<500	<2,300	<1.0	<1.0	<3.8	<1.0	<1.0	<3.8
1,4-Dioxane	<50	<50		<50	<50		<63,000	<25,000		<50	<50		<50	<50	
2-Butanone	<10	<10		<10 J	<10		<13,000	<5,000		<10	<10		<10	**1.1 J**	
2-Chloro-1,3-butadiene	<1.0	<1.0		<1.0	<1.0		<1,300	<500		<1.0	<1.0		<1.0	<1.0	
2-Hexanone	<10	<10		<10	<10		<13,000	<5,000		<10	<10		<10	<10	
3-Chloropropene	<1.0	<1.0		<1.0	<1.0		<1,300	<500		<1.0	<1.0		<1.0	<1.0	
4-Methyl-2-pentanone	<10	<10		<10	<10		<13,000	<5,000		<10	<10		<10	**2.1 J**	
Acetone	**52**	<25		**11 J**	<25		<31,000	<13,000		<25	**20 J**		**27**	**32**	
Acetonitrile	<40	<40		<40	<40		<50,000	<20,000		<40	<40		<40	<40	
Acrolein	<20	<20		<20	<20		<25,000	<10,000		<20	<20		<20	<20	
Acrylonitrile	<20	<20		<20	<20		<25,000	<10,000		<20	<20		<20	<20	
Benzene	<1.0	<1.0	<1.6 [<1.6]	<1.0	<1.0	**5.4 J**	**1,600**	**930**	<1,100	<1.0	<1.0	<1.8	<1.0	<1.0	**35 est**
Benzyl Chloride			<3.7 [<3.7]			<4			<2,400			<4			<4
Bromodichloromethane	<1.0	<1.0		<1.0	<1.0		<1,300	<500		<1.0	<1.0		<1.0	<1.0	
Bromoform	<1.0	<1.0		<1.0	<1.0		<1,300	<500		<1.0	<1.0		<1.0	<1.0 J	
Bromomethane	<1.0	<1.0	<1.1 [<1.1]	<1.0	<1.0	<1.2	<1,300	<500	<740	<1.0	<1.0	<1.2	<1.0	<1.0	<1.2
Carbon Disulfide	<2.0	<2.0		<2.0	<2.0		<2,500	**610 J**		<2.0	<2.0		<2.0	**11**	
Carbon Tetrachloride	<1.0	<1.0	**55 [59]**	**0.52 J**	<1.0	<2.4	**120,000**	**68,000**	**490,000**	<1.0	<1.0	<2.4	<1.0	<1.0	<2.4
Chlorobenzene	<1.0	<1.0	<2.1 [<2.1]	<1.0	<1.0	<2.3	**400 J**	**210 J**	<1,400	<1.0	<1.0	<2.3	<1.0	<1.0	<2.3
Chloroethane	<1.0	<1.0	<0.84 [<0.84]	<1.0	<1.0	<0.92	<1,300	<500	<550	<1.0	<1.0	<0.92	<1.0	<1.0	**1.2 J est**
Chloroform	<1.0	<1.0	**5.9 J [4.7 J]**	<1.0	<1.0	**2.2 J**	**23,000**	**5,200**	**29,000**	<1.0	<1.0	**1.9 J**	<1.0	<1.0	**6.3 J est**
Chloromethane	<1.0	<1.0	<3 [<3]	<1.0	<1.0	<3.3	<1,300	<500	**5,000 J**	<1.0	<1.0	<3.3	<1.0	<1.0	**23 est**
cis-1,2-Dichloroethene			<2.2 [<2.2]			<2.4			<1,400			<2.4			<2.4
cis-1,3-Dichloropropene	<1.0	<1.0	<3.1 [<3.1]	<1.0	<1.0	<3.4	<1,300	<500	<2,000	<1.0	<1.0	<3.4	<1.0	<1.0	<3.4
Dibromochloromethane	<1.0	<1.0		<1.0	<1.0		<1,300	<500		<1.0	<1.0		<1.0	<1.0	
Dibromomethane	<1.0	<1.0		<1.0	<1.0		<1,300	<500		<1.0	<1.0		<1.0	<1.0	

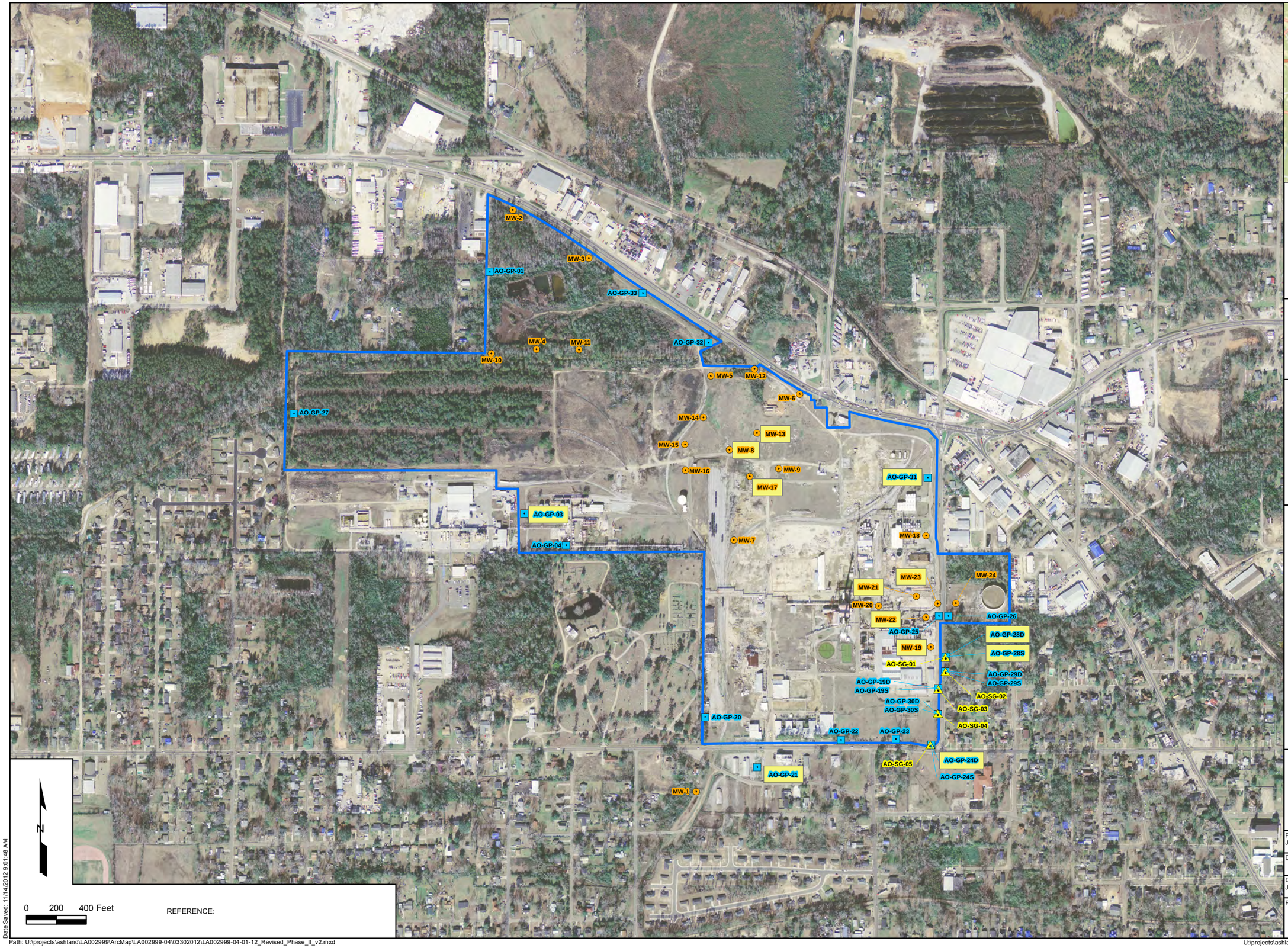
Table 2. Summary of Soil Gas and Corresponding Temporary Well Analytical Results, USEPA RCRA 3013(a) Administrative Order, Hercules Incorporated, Hattiesburg, MS.

Sample Name:	GW-AO-GP-19D (032812)	GW-AO-GP-19S (032812)	SG-AO-SG-03 (032812)	GW-AO-GP-24D (03912)	GW-AO-GP-24S (033012)	SG-AO-SG-05 (040212)	GW-AO-GP-28D (033012)	GW-AO-GP-28S (032712)	SG-AO-SG-01 (3/27/12)	GW-AO-GP-29D (032712)	GW-AO-GP-29S (032712)	SG-AO-SG-02 (03/27/12)	GW-AO-GP-30D (032812)	GW-AO-GP-30S (032912)	SG-AO-SG-04 (03/27/12)
Date Collected:	3/28/12	3/28/12	3/28/12	3/29/12	3/30/12	4/2/12	3/30/12	3/27/12	3/27/12	3/27/12	3/27/12	3/27/12	3/28/12	3/29/12	3/27/12
Location ID:	AO-GP-19D	AO-GP-19S	AO-SG-03	AO-GP-24D	AO-GP-24S	AO-SG-05	AO-GP-28D	AO-GP-28S	AO-SG-01	AO-GP-29D	AO-GP-29S	AO-SG-02	AO-GP-30D	AO-GP-30S	AO-SG-04
VOCs Method 8260															
Dichlorodifluoromethane	<1.0	<1.0	<3.1 [<3.1]	<1.0	<1.0	<3.4	<1,300	<500	<2,000	<1.0	<1.0	<3.4	<1.0	<1.0	**3.6 J est**
Ethyl Methacrylate	<1.0	<1.0		<1.0	<1.0		<1,300	<500		<1.0	<1.0		<1.0	<1.0	
Ethylbenzene	<1.0	<1.0	<2.7 [<2.7]	**0.12 J**	<1.0	<3	<1,300	<500	<1,800	<1.0	<1.0	<3	<1.0	<1.0	**16 est**
Hexachlorobutadiene	<1.0	<1.0	<7.6 [<7.6]	<1.0	<1.0	<8.3	<1,300	<500	<5,000	<1.0	<1.0	<8.3	<1.0	<1.0	<8.3
Iodomethane	<5.0 B	<5.0 B		<5.0	<5.0		<6,300	<2,500		<5.0	<5.0		<5.0 B	<5.0	
Isobutanol	<40	<40		<40	<40		<50,000	<20,000		<40	<40		<40	<40	
Methacrylonitrile	<20	<20		<20	<20		<25,000	<10,000		<20	<20		<20	<20	
Methyl Methacrylate	<1.0	<1.0		<1.0	<1.0		<1,300	<500		<1.0	<1.0		<1.0	<1.0	
Methylene Chloride	<5.0	<5.0	**3.7 J [3.1 J]**	<5.0	<5.0	**3.6 JB**	<6,300	<2,500	**5,500 J**	<5.0	<5.0	**3.0 J**	<5.0	<5.0	**10 JB est**
Naphthalene	<5.0	<5.0		<5.0	<5.0		<6,300	<2,500		<5.0	<5.0		<5.0	<5.0	
o,p-Xylene			<4.7 [<4.7]			**5.2 J**			<3,100			**7.3 J**			**33 est**
o-Xylene			<2.4 [<2.4]			<2.6			<1,600			**3.0 J**			**13 est**
Pentachloroethane	<5.0	<5.0		<5.0	<5.0		<6,300	<2,500		<5.0	<5.0		<5.0	<5.0	
Propionitrile	<20	<20		<20	<20		<25,000	<10,000		<20	<20		<20	<20	
Styrene	<1.0	<1.0	<2.2 [<2.2]	<1.0	<1.0	<2.5	<1,300	<500	<1,500	<1.0	<1.0	<2.5	<1.0	<1.0	**6.3 J est**
Tetrachloroethene	<1.0	<1.0	<2.5 [<2.5]	<1.0	<1.0	**5.4 J**	<1,300	<500	<1,600	<1.0	<1.0	<2.7	<1.0	<1.0	**21 est**
Toluene	<1.0	<1.0	<1.8 [<1.8]	<1.0	<1.0	**11**	<1,300	<500	<1,200	<1.0	<1.0	**5.0 J**	<1.0	<1.0	**79 est**
trans-1,2-Dichloroethene	<1.0	<1.0		<1.0	<1.0		<1,300	<500		<1.0	<1.0		<1.0	<1.0	
trans-1,3-Dichloropropene	<1.0	<1.0	<2 [<2]	<1.0	<1.0	<2.2	<1,300	<500	<1,300	<1.0	<1.0	<2.2	<1.0	<1.0	<2.2
trans-1,4-Dichloro-2-butene	<2.0	<2.0		<2.0	<2.0		<2,500	<1,000		<2.0	<2.0		<2.0	<2.0	
Trichloroethene	<1.0	<1.0	<1.8 [<1.8]	<1.0	<1.0	<1.9	**250 J**	<500	<1,200	<1.0	<1.0	<1.9	<1.0	<1.0	**2.5 J est**
Trichlorofluoromethane	<1.0	<1.0	**1.7 J [1.8 J]**	<1.0	<1.0	<1.3	<1,300	<500	<810	<1.0	<1.0	**1.6 J**	<1.0	<1.0	**3.3 J est**
Vinyl Acetate	<2.0	<2.0		<2.0	<2.0		<2,500	<1,000		<2.0	<2.0		<2.0	<2.0	
Vinyl Chloride	<1.0	<1.0	<1.6 [<1.6]	<1.0	<1.0	<1.8	<1,300	<500	<1,100	<1.0	<1.0	<1.8	<1.0	<1.0	<1.8
Xylenes (total)	<2.0	<2.0		**0.39 J**	<2.0		<2,500	<1,000		<2.0	<2.0		<2.0	<2.0	

Notes:
Temporary well data are micrograms per liter (µg/L).
Soil gas data are in micrograms per cubic meter (µg/m^3).
Orange shading indicates an exceedance of the MDEQ Tier I TRG for groundwater or the USEPA Tapwater Regional Screening Level.
Green shading indicates an exceedance of the USEPA adjusted Industrial Air or Residential Air Regional Screening Level.
B - Blank contamination.
J - Indicates an estimated value.
MDEQ - Mississippi Department of Environmental Quality.
TRG - Target Remediation Goal.
USEPA - U.S. Environmental Protection Agency.
VOC - Volatile Organic Compound.

ARCADIS

Figure



SAMPLE LOCATION MAP

HERCULES INCORPORATED
613 W. 7th Street
Hattiesburg, Mississippi

ARCADIS
10352 PLAZA AMERICANA DRIVE
BATON ROUGE, LA 70816
TEL: 225-292-1004
FAX: 225-218-9677
WWW.ARCADIS-US.COM

Legend

- Soil Gas Sample Location
- Monitor Well
- Temporary Groundwater Well (Phase I)
- Approximate Hercules Property
- MW-2: Location with a V.I. groundwater screening standard exceedance.

PROJECT MANAGER: JE	CHECKED BY: CD
DRAWING FILE:	GIS FILE:
DRAWING BY: JEC	DATE: 11/13/2012
PROJECT NUMBER: LA002999.0012	FIGURE NUMBER: 1

Date Saved: 11/14/2012 9:01:48 AM

Path: U:\projects\ashland\LA002999\ArcMap\LA002999-04\03302012\LA002999-04-01-12_Revised_Phase_II_v2.mxd

U:\projects\ashland\LA002999\output\LA002999-04\LA002999-04-01-12.pdf

ARCADIS

Attachment A

Vapor Intrusion Evaluation

ARCADIS

Vapor Intrusion Evaluation

AO-GP-03: Benzene was detected at this location above the calculated groundwater screening level; however, no residential buildings are located within 100 feet. This area is adjacent to the Zeon facility. There is a known groundwater plume in the area that is currently being monitored by Zeon. No further evaluation of the vapor intrusion pathway is warranted at this location at this time as it is likely the constituents are not site related and there are no homes within 100 feet.

AO-GP-21: Benzene, ethylbenzene, and naphthalene were detected above the calculated groundwater screening level at this location; however, no homes are located within 100 feet of this groundwater sample point. Additional groundwater delineation is planned downgradient of this well location and, based on the data obtained during the delineation activities, the need for a vapor intrusion evaluation will be assessed.

AO-GP-24 D / SG-05: Carbon tetrachloride was detected above the calculated groundwater screening level at the deep temporary well location (AO-GP-24D) but not at the shallow temporary well location (AO-GP-24S). Benzene and chloroform were detected in the sample obtained from the co-located soil gas probe (AO-SG-05) above the screening levels; however, carbon tetrachloride was not detected. There are residential buildings within 100 feet of this location; however, no further evaluation of the vapor intrusion pathway is warranted at this location at this time because the groundwater exceedance was from the deep temporary well (which is screened from 16 to 21 feet below land surface [ft bls]), there were no exceedances in shallow groundwater, and the soil gas probe did not detect the constituents present in groundwater. The soil gas data suggest that the constituents detected are not associated with groundwater, but are instead associated with a background source. Soil gas results for benzene and chloroform are well within typical indoor air background levels (USEPA 2011). Benzene concentrations may be associated with gasoline use and chloroform may be associated with chlorinated drinking water.

AO-GP 28 S/D / SG-01 and SG-02: The elevated detections at this well and nearby soil gas locations have already been evaluated. Additional sampling is planned for 135 West 8th Street if access can be obtained.

AO-GP-31: At this well, benzene was detected at 2.5 micrograms per liter (µg/L) compared to the residential groundwater screening level of 1.8 µg/L. No residential homes are located within 100 feet of this well; however, an industrial building that repairs cars is located within 100 feet of this well. Using the VISL Calculator, the benzene groundwater screening level for a commercial building is 9.2 µg/L. Benzene concentrations in groundwater are below this level, indicating that further evaluation of the vapor intrusion pathway is not needed at this location.

SG-03: Carbon tetrachloride and chloroform were detected in this soil gas point above soil gas screening levels; however, neither constituent was detected in the co-located temporary groundwater well (AO-GP-19). These data suggest that the constituents detected in soil gas may not be associated with groundwater, but may be instead associated with a background source. Additional groundwater wells were installed in this area in September 2012 as part of the off-site investigation. Upon reviewing these data, the need for a vapor intrusion evaluation will be assessed.

SG-04: No constituents were detected in groundwater samples from both the shallow and deep temporary wells (AO-GP-30S and AO-GP-30D) above groundwater screening levels; however, several chemicals were detected in the co-located soil gas sample above soil gas screening levels. These data suggest that the constituents detected in soil gas are not associated with groundwater, but are instead associated with a background source. The three constituents detected above the soil gas screening levels (benzene, chloroform, and ethylbenzene) are well known background contaminants (USEPA 2011) that are associated with many household products such as gasoline, motor oil, and chlorinated drinking water. Moreover, at this location, there is no building located within 100 feet.

MW-8, MW-13, MW-17, MW-19, MW-21, MW-22, MW-23: Constituents were detected in groundwater samples from these wells above screening levels; however, all locations are well within the site property. No further evaluation of the vapor intrusion pathway is warranted at these locations at this time.

Attachment B

References

ARCADIS

References

USEPA. 2004. Risk Assessment Guidance for Superfund, Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment), Final. Office of Superfund Remediation and Technology Innovation, Washington, DC. OSWER 9285.7-02EP. EPA/540/R/99/005. PB99-963312. July.

USEPA. 2011. Background Indoor Air Concentrations of Volatile Organic Compounds in North American Residences (1990-2005): A Compilation of Statistics for Assessing Vapor Intrusion. EPA 530-R-10-001. June.

USEPA. 2012a. Vapor Intrusion and the Superfund Program. Vapor intrusion Screening Level (VISL) Calculator. Available at: http://www.epa.gov/superfund/sites/npl/hrsaddition.htm.

USEPA. 2012b. Superfund Vapor Intrusion FAQs. February.