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ENVIRONMENT

Subject:  
Voluntary Investigation and Remediation Plan, Semiannual Progress Report #9  
Hercules Savannah Facility, HSI Site No. 10696  
3000 Louisville Road  
Savannah, Chatham Co., Georgia

Date:  
September 29, 2017

Contact:  
Andrew Davis

Dear Ms. Daniels:

Phone:  
864.987.3917

Arcadis U.S., Inc. (Arcadis), on behalf of Hercules LLC (Hercules), is pleased to submit the enclosed Voluntary Investigation and Remediation Plan (VIRP), Semiannual Progress Report #9 (PR#9) for your review. One paper copy and two electronic copies on compact disc are enclosed.

Email:  
andrew.davis@arcadis.com

This letter report has been prepared to fulfill the semiannual reporting requirement of the VIRP. Activities completed during this reporting period include the continued implementation of the VIRP primarily through the preparation of responses to the June 28, 2017 EPD comment letter documenting their review of Progress Report #8 and associated Response to Comment (PR#7). It should be noted that no groundwater monitoring activities were performed during this reporting period.

Our ref:  
OH01000.GA61

Ms. Carolyn Daniels  
September 29, 2017

Thank you in advance for your review of the enclosed document. Please contact Mr. Tim Hassett at (302) 995-3456 or me with any questions or comments that you have regarding this report or project site.

Sincerely,

Arcadis U.S., Inc.



Andrew Davis  
Project Manager

Copies:

Mr. Tim Hassett, Hercules LLC (electronic only)  
Johnnie Quiller, Solenis, LLC (electronic only)

Enclosures:

**Attachments**

- 1 Response to Comment Form

# ATTACHMENT 1

Response to Comment Form



## Attachment #1

Response to EPD Comments received June 28, 2017  
Voluntary Remediation Program  
Semi-Annual Progress Report #8 (March 15, 2017)  
Hercules Incorporated, Savannah Plant, HIS Site No 10696, VRP Site 1332420701  
3000 Louisville Road, Savannah, Chatham County, Georgia 31415  
Tax Parcel Nos. 2-0734-01-001 and 2-0734-03-001

### Response to Comment #1 of January 5, 2017 EPD Letter: Ecological Risk Assessment

1. **GA EPD Response to Comment #1 of May 11, 2016 EPD Letter:** The response to the referenced May 11, 2016 comment is acceptable. EPD accepts the 2015 Region 4 EPA sediment quality benchmark (SQB) of 0.0003 mg/kg for dioxin TEQ based on the regional equilibrium partitioning (EqP) approach and concurs that based on comparison of sediment dioxin TEQ detections to the updated SQB further chemical refinement is not warranted.

**Response:** *Comment noted, no action needed.*

2. **GA EPD Response to Comment #2 of May 11, 2016 EPD Letter:** EPD concurs with the proposed revision and the response to the referenced comment is acceptable.

**Response:** *Figure 7 will be revised accordingly so that the TEQs match those presented in Table G-3.*

3. **GA EPD Response Comment #3 of May 11, 2016 EPD Letter:**

a) 3a: Please refer to Part a. of this comment.

**Response:** *No action needed.*

- b) The supporting chemical-specific parameter values were modified appropriately; however, the EqP equation presented differs from Region 4 EPA's recommended EqP model-based approach to developing alternate sediment quality benchmarks for organic constituents (EPA 2015). The difference appears to be due to the determination of porosity. EPD derived an SQB of 0.552 mg/kg using the following default equation from Region 4 EPA's Draft Ecological Risk Assessment Guidance (2015; see Equation 3):

$$SQB_{sed} = WQB \times [Koc \times f_{oc} + (8 \text{ m/pw})]$$

Where:

SQB<sub>sed</sub> = EqP-based sediment SQB normalized to 1% organic carbon (µg/kg 1% OC)

WQB = water quality benchmark (µg/L)

Koc = organic carbon partitioning coefficient

(L/kg) f<sub>oc</sub> = fraction of organic carbon (0.01)

for 1% OC)

$8m = 0.3$  (assumed 30% moisture of sediment by mass)  
 $pw = 0.9982$  density of water at 20°C

Acetone SQBsed =  $1.7 \text{ mg/L} \times [(2.4 \text{ L/kg} \times 0.01) + (0.3/0.9982)] = 0.552 \text{ mg/kg}$

**Response:** *As stated, the EPD derived value of 0.552 mg/kg was based on the use of the default equation from Region 4 EPA's Draft Ecological Risk Assessment Guidance (2015). Arcadis' calculated value of 1.7 mg/kg, as detailed in Progress Report #8, was calculated using the USEPA Region 4 chronic freshwater screening value.*

*Based on the EPD comments, the acetone SQB will be modified to be 0.552 mg/kg.*

- 4. GA EPD Response to Comment #4 of May 11, 2016 EPD Letter:** EPD concurs with the proposed revision and the response to the referenced comment is acceptable.

**Response:** *Agreed. Table G-15 will be revised so that the correct fluoride ESV of 2.119 mg/L is presented.*

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- 2. GA EPD Response to Comment #2 of January 5, 2017 EPD Letter:** Soil concentrations must be protective of groundwater to comply with cleanup standards under the Rules for Hazardous Site Response (Rules) and the VRP Act. Section 12-8-108(6) of the VRP Act provides that any cleanup standard promulgated pursuant to Code Section 12-8-93 may be used. Code Section 12-8-93 refers to the Hazardous Site Response Act (O.C.G.A §12-8-90 *et seq.*). The cleanup standards promulgated pursuant to the Hazardous Site Response Act are the Risk Reduction Standards (RRS) of Section 391-3-19-.07 of the Rules. Part of the criteria for evaluating RRS for soil involves protection of groundwater, in addition to criteria for direct contact. Section 12-8-108(5) of the VRP Act further provides that compliance with site-specific cleanup standards for soil may be based on soil concentrations for protection of groundwater criteria at an established point of exposure for groundwater defined under the VRP Act. While controls such as groundwater use restrictions can be used to restrict exposure on VRP properties, the location of the groundwater point of exposure is defined in Section 12-8-102(b)(11) of the VRP Act. Options for evaluating protection of groundwater criteria were discussed during our meeting on March 30, 2017. EPD expects that protection of groundwater criteria will be addressed in subsequent reporting.

**Response:** In accordance with the VRP Act, a POE may be established at the nearest of the following locations:

1. The closest existing downgradient drinking water supply well;
2. The likely nearest future location of a downgradient drinking water supply well where public supply water is not currently available and is not likely to be made available within the foreseeable future; or

3. The hypothetical point of drinking water exposure located at a distance of 1,000 feet downgradient from the delineated site contamination under this part.

As no drinking water supply wells have been identified downgradient of the site within 1,000 feet, nor is one identified as being potentially installed, a hypothetical point of exposure has been established at the farthest downgradient on-site monitoring well from the location of the highest level of contamination in soil, for PCBs and 1,1-biphenyl, respectively.

Using the established POE and the Type 1 / 2 RRS as the drinking water standards for PCBs and biphenyl, a model will be completed to show the groundwater concentration and the maximum allowable soil concentration in the source area that would correspond to a level that remains protective of groundwater at the POE. Once calculated, this number will be compared to the previously calculated Direct Contact criteria. The proposed RGs will be the lesser of the Direct Contact criteria and the Protection of Groundwater Criteria.

**3. Response to Comment #3 of January 5, 2017 EPD Letter: Risk Reduction Standards**

- a. **3a and 3b:** Proposed revisions to the tables and analytical suite referenced in your responses are acceptable as long as 3c of the January 5, 2017 EPD comment is adequately addressed (see below). Please provide the updated tables referenced in your responses in the next regularly scheduled submittal.

**Response:** *Comment noted. See response to 3C below.*

- b. **3c:** The EPD tables provided in the January 14, 2014 email referenced in your response to this comment did not include RRS for either bis (2-chloroethyl) ether or phenol as they were not included as substances detected at the site at that time. The May 11, 2016 EPD letter included only *groundwater* Type 1 through Type 4 RRS that could be used for bis (2-chloroethyl) ether and phenol. Any RRS values to be applied to these substances in soil based on your responses referenced in Part a. of this comment should include documentation for their derivation.

**Response:**

The soil RRS are presented in the following table:

Constituent	Type 1 RRS	Type 2 RRS	Type 3 RRS	Type 4 RRS
Bis(2-chloroethyl)ether	0.35	0.35	0.35	0.35
Phenol	400	400	400	400

All concentrations are in mg/kg.

Phenol was detected once at a concentration of 1.7 mg/kg and was not detected above the RRS. Bis(2-chloroethyl)ether was not detected in the soil.

4. **Response to Comment #4 of January 5, 2017 EPD Letter: Groundwater Sampling Procedures:** Arcadis is correct in stating that calculation of the volume of water standing in a well is not necessary for determining adequacy of purging efforts when using the purging method described in Section 3.2.2 of the USEPA Science and Ecosystem Support Division (SESD) guidance document SESDPROC-301-R3 (effective March 3, 2013). However, EPD usually requests that said calculations be conducted (and results recorded) by field personnel in the event the planned purging method at any single well has to be switched to the traditional multiple well volume purge method due to unforeseen field conditions.

**Response:** Arcadis field technicians have the ability to calculate the required purge volume at any time while on site. Well construction information is included on the sampling logs and standard volume factors are common in field books. To apply the level of effort necessary to calculate the volume for each well when not necessary is not warranted, however, technicians will have all information on hand to perform the calculation in the event that it is necessary.

5. **Response to Comment #5a of January 5, 2017 EPD Letter: Planned Delineation and Remedial Actions:** As indicated in the original EPD comment, historical groundwater analytical results may be used for vertical delineation of the extent of PCBs (Aroclors and congeners) and 1,1-biphenyl in soil if collected in the appropriate locations. Should Hercules wish to use said historical data, a table summarizing the data used for this purpose should be submitted with their conclusions. The area reportedly delineated by the historical groundwater data should be clearly noted/identified on the requested table and associated analytical summary figure(s).

**Response:**

In conjunction with soil delineation activities, temporary groundwater monitoring locations will be identified downgradient of locations where PCB's/biphenyl have been identified in soils. The temporary wells will be located no more than 100 feet from the location of the PCB/biphenyl detection.

A sample will be collected and analyzed for PCBs and/or biphenyl, based on the compound that is to be delineated. Results of the sampling will be presented in the subsequent report.

**Note:**

- a. Groundwater samples used for this purpose should be, or have been, collected at the soil sample locations being delineated or within approximately 100 ft hydraulically downgradient of the soil sampling locations. Therefore, since there is a significant groundwater " gap" (Dundee Canal) that hydraulically divides the eastern and western portions of the VRP properties, analytical results for groundwater samples collected east of the canal may not be used

to delineate soil contamination west of the canal.

**Response:** *Comment noted.*

- b. Based on the information provided in the progress reports to date, it does not appear that a significant number of groundwater samples were collected and analyzed for the referenced substances.

**Response:** *Additional PCB and biphenyl data will be collected downgradient of the previously identified areas. This information will be reported as part of the CSR.*

- c. Furthermore, implementation of institutional controls to prevent unacceptable human exposure to contaminants does not relieve Hercules from the duty to delineate the extent of contamination in both soil and groundwater.

**Response:** Comment noted

EPD recommends that the evaluation of the soil leaching to groundwater exposure pathway requested in Comment #2 of this letter be conducted before selection of groundwater sampling locations for vertical delineation of soil contamination, as the delineation standards (Type 1 and 2 RRS) for soil contamination are likely to change as a result and comparison with soil analytical results may not require the use of groundwater analytical results for delineation.

**Response:** *Comment noted.*