

# Georgia Department of Natural Resources

## Environmental Protection Division

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Judson H. Turner, Director

Land Protection Branch

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### Reply To:

Response and Remediation Program  
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Office 404/657-8600 Fax 404/657-0807

January 31, 2013

# COPY

### VIA E-MAIL AND U.S. MAIL

CSX Real Property, Inc.  
c/o Mr. Samuel Ross, P.E.  
Manager Environmental Remediation  
6737 Southport Drive South, Suite 100  
Jacksonville, FL 32216

Re: Voluntary Investigation and Remediation Plan (VIRP) and Application, June 7, 2012  
Notice of Deficiencies  
CSX Real Property,  
Hutchinson Island, HSI #10101  
Savannah, Chatham County, Georgia 30312  
(Tax Parcel No. 1-0436-01-017)

Dear Mr. Ross:

The Georgia Environmental Protection Division (EPD) has reviewed the June 7, 2012 Voluntary Investigation and Remediation Plan (VIRP), submitted pursuant to the Georgia Voluntary Remediation Program Act (the VRP Act) for the subject parcel, which are listed on the Georgia Hazardous Sites Inventory (HSI) as HSI 10101. Said VIRP was submitted in *lieu* of a Groundwater Monitoring/Progress Report required by the corrective action plan (CAP) that was approved April 27, 2006. The CAP was submitted pursuant to the requirements of Administrative Orders EPD-HSR-234 issued to Chevron Products Company, EPD-HSR-235 issued to Powell Duffryn Terminals, Inc., and EPD-HSR-232 issued to CSX Transportation, Inc. EPD has the following comments, which must be addressed pursuant to Condition # 2 of the January 31, 2013 VIRP/VRP Application Acceptance Letter issued by EPD for the qualifying property:

### **Application**

#### **Conceptual Site Model (CSM):**

1. **Site Description:** The subject HSI site, HSI No. 10101, includes all property parcels impacted by soil and/or groundwater contamination at concentrations greater than background concentrations. Said parcels are subject to applicable Georgia Hazardous Site Response Rules (the Rules), Chapter 391-3-19, including corrective action requirements, unless said measures are addressed as qualifying properties pursuant to the VRP Act. Therefore, as the full extent of groundwater (and potentially surface water) contamination is delineated at the site, it may become necessary for the participant to either: 1) propose additional non-qualifying properties for acceptance into the VRP and proceed with appropriate corrective measures pursuant to the approved VIRP or 2) submit a Corrective Action Plan (CAP) for contaminated media at impacted non-qualifying properties.
  - a. Only a single property parcel owned by CSX Transportation Inc., Tax Parcel 1-0436-01-017, is the only "qualifying property" pursuant to the VRP Act at this time based on the VRP application form prepared for and submitted on behalf of CSX Real Property, Inc.

- b. All property parcels considered to be part of an HSI site are subject to applicable Georgia Hazardous Site Response Rules (the Rules), Chapter 391-3-19, including contaminant delineation and corrective action requirements, unless said measures are addressed as qualifying properties pursuant to the VRP Act. Review of Figure 5 (*Ammonia Isoconcentration Map – June 2011*) of the VIRP, indicates that in addition to the qualifying property, groundwater at: 1) the property owned by Spartan Hutchinson Island Investments, LLC (Tax Parcel 2-0436-01-027) to the northwest, 2) the property parcel owned by Hutchinson Island Ventures, LLC (Tax Parcel 1-0436-01-011) to the southeast, and 3) the adjacent HSI sublisted property parcel owned by Savannah Economic Development Authority (SEDA; Tax Parcel 2-0436-01-026, *a.k.a.* SEDA Parcel B) to the north/northeast are currently impacted by the release of ammonia at the subject CSX property at concentrations exceeding background standards. Therefore, said additional parcels, at a minimum, must be identified as part of the subject HSI site unless additional groundwater analytical results are acquired that demonstrate said parcels are not impacted above background standards.
- c. The term site is used inappropriately throughout the VIRP to refer to the qualifying property (Tax Parcel 1-0436-01-017) and excludes the three impacted properties referenced above. For instance, Figure 1 (*Site Vicinity Map*) identifies the current qualifying property as the site and the three additional properties referenced above are not identified as part of the site. Figures, tables, and narratives must be revised in future submittals to accurately define, reference, and depict the boundaries of the site *and* the specific VRP qualifying property(ies).

## **2. Regulated Substances Released/Constituents of Concern:**

- a. Future submittals under the VRP must include a table(s) summarizing/listing all regulated substances historically detected in soil, groundwater, and/or surface water above background concentrations at the site. The table embedded in Section 4.0 (page 4-1) of the VIRP, summarizing regulated substances detected at the site, does not include substances detected in surface water. Those substances no longer considered to be constituents of concern (COCs) must be identified with notations regarding the justification for the elimination of said substances as COCs.
- b. All regulated substances historically detected in groundwater or surface water above background levels at the site are considered to be COCs and subject to delineation and cleanup requirements pursuant to the Act until it can be demonstrated that specific substances do not contribute to unacceptable exposure to receptors at the site. Note that compliance of a regulated substance in groundwater with applicable Type 1 through 4 RRS for groundwater does not necessarily demonstrate said substance is not a COC for surface water if the applicable surface water cleanup standard is less than the referenced groundwater RRS.
- c. Since narrative associated with the above-referenced embedded table does not specify the criterion used to determine if an environmental media has been “impacted” by a regulated substance, please review the referenced embedded table to ensure that “impact” to said media reflects the detection of a substance at concentrations greater than background levels in the respective media.

## **3. Groundwater Conditions:**

- a. **Geology/Hydrogeology (Aquifer Parameters):**
  - i. EPD cannot concur, based on the information provided in the VIRP, that the canal on the SEDA Parcel B property north of the qualifying property is a complete hydraulic barrier preventing the northward migration of contaminants in groundwater.

Groundwater monitoring wells must be installed immediately north of the referenced canal to determine groundwater flow regimes/patterns and dissolved COC concentrations to determine if the potential for migration of contaminants in the surficial aquifer at depths greater than the bottom of the canal exists. Note that EPD cannot fully evaluate groundwater contaminant delineation efforts, the completeness of the human ingestion of groundwater exposure pathway, groundwater contaminant fate and transport efforts, future proposed site-specific cleanup levels, *etc.* without the results of said investigative efforts.

- ii. It appears that the effective porosity (approximately equal to specific yield) of 0.25 (25%) was used in calculating groundwater seepage velocity for both the upper sand aquifer and the immediately underlying clay aquitard based on the narrative provided in Section 6.2 of the VIRP. While 25% is a reasonable value for an average effective porosity in a sand aquifer, values of 0 to 5%<sup>1</sup> are more likely to be representative of effective porosity in clays. Please revise the groundwater seepage velocity calculations for the clay aquitard based on more reasonable effective porosities or justify the use of the 25% value that was apparently used in the original calculation.
- iii. Major groundwater flow pathways, specifically those to be used in groundwater contaminant fate and transport modeling, must be depicted using arrows on future potentiometric surface maps in support of conclusions regarding groundwater divides, discharge areas, fate and transport modeling pathways, *etc.*
- iv. A tabulated historic summary of groundwater depth and elevation measurements used to construct potentiometric surface maps under the VIRP, must be provided in future submittals.

**b. Cross Sections:**

- i. Cross-sections provided in the VIRP must be revised to depict:
  - Known historical COC source/release areas and the horizontal and vertical extents of excavated areas,
  - Monitoring locations used to demonstrate the delineated vertical extent of groundwater contamination. Note that neither PDMW-29D or PDMW-40R, referenced in the narrative discussing vertical extent of the ammonia plume (Section 5.1.3 of the VIRP) are not shown on either cross section provided in the VIRP.
  - Exposure points for all potential receptors and POD well locations.
  - Isoconcentration contour lines depicting (labeled): 1) the horizontal and vertical delineated extent of COCs in groundwater and surface water, and 2) the extent of COCs greater than cleanup levels in groundwater and surface water.
  - Stratigraphic information acquired from *all* historical soil, groundwater, and surface water sampling locations (including abandoned wells), and piezometers located along, or immediately adjacent to, the lines of cross-sections. For example:
    - Cross Section A-A' (Figure 8) does not include information from the boreholes of:
      - 1) existing or abandoned monitoring wells MW-202, EW-1, PDPZ-3, PDMW-17T or 2) extraction wells PW-15, PW-14, or PW 10 and
      - Cross Section B-B' (Figure 9) does not include information from the boreholes of:
        - 1) existing or abandoned monitoring wells or piezometers PDMW-21T, PZ-104, PZ-105, PDMW-35P, and TMW-1 (in an assumed source area), or 2) extraction

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<sup>1</sup> Table 4.2, *Applied Hydrogeology*, C.W. Fetter, Jr., Charles E. Merrill Publishing Company, Columbus, OH, 1980.

wells PW-18, PW-17, PW-04, PW-03, PW-02; nor was it extended to include either abandoned monitoring well MW-4 or abandoned monitoring well PDMW-34T on the SEDA Parcel B property.

- Property boundaries.
- ii. It is preferred that cross sections oriented along *each* groundwater contaminant flow path used in contaminant fate and transport modeling efforts be provided in future progress reports in support of several modeling input values and conclusions. Since specific modeled pathways were not depicted on a potentiometric surface map in the VIRP, EPD cannot determine if the cross sections provided in the VIRP meet said criterion.
- iii. Revised cross-sections must be submitted as part of an updated CSM in *each* required future VRP progress report. Cross-sections must be extended to include newly installed monitoring locations, to depict the delineated extent of groundwater contamination, *etc.* as additional investigation is completed.

**c. Contaminant Sources**

- EPD noted that although a reported spill of liquid fertilizer, said to have occurred between 1972 and 1982, is referenced as a potential source for the elevated concentrations of ammonia in groundwater in Section 2.3 of the VIRP, there are no specific references to the former urea storage tanks, assumed to be a primary source of the detected ammonia during past meetings with EPD, nor is said source location clearly identified/depicted on any figure in the VIRP.
- Figure 5 of the VIRP indicates ammonia concentrations  $\geq 750$  mg/L in groundwater, significantly greater than the proposed delineation standard of 30 mg/L, to the west/northwest of monitoring well TMW-1, which has not been verified through the use of groundwater analytical results. A monitoring well must be installed and sampled for COCs to determine groundwater conditions in said area. *If groundwater analytical results from the new monitoring well confirm the mapped concentrations, said location must be used as a source area for at least one modeled contaminant flow path and analytical results used as current source concentrations in revising future groundwater contaminant fate and transport modeling efforts.*

**d. Contaminant Delineation**

- *Both* the vertical and horizontal extent of all COCs (see Comment 2) in groundwater and/ surface water must be depicted on figures summarizing the most recent available surface water and groundwater analytical results, *including cross sections*, using isoconcentration contour lines representative of their delineation standards. Each of said isoconcentration contour lines must be clearly labeled (on the line or in the figure legend) as to the COC and concentration it represents.
- Figure 5 of the VIRP represents the configuration of the ammonia groundwater plume only. Groundwater plumes for the additional COCs in groundwater are not depicted on it or any other figures provided in the VIRP.
- Figure 5 of the VIRP does not clearly identify the contours to be used to define the horizontal extent of groundwater COCs exceeding delineation and cleanup criteria nor were the required isoconcentration contours included on the cross sections.
- Figure 5 of the VIRP indicates the groundwater ammonia plume(s) has not been delineated, assuming Type 1 RRS are the delineation standards to be proposed, in the following areas: 1) west-northwest of monitoring well PDMW-20T between monitoring wells PDMW-33R2 and PDMW-32R on the adjacent property to the west,

2) along the northern edges of each of the two lobes of the plume(s), or 3) southeast of monitoring well PDMW-14TR southwest of PDMW-30P on the adjacent property to the east/southeast of the qualifying property at a minimum.

e. **Contaminant Plume Trends**

Section 5.1.2 of the VIRP asserts that the shallow groundwater ammonia plume has shown a generally decreasing trend in both areal extent and concentrations relative to maximum historical values. Please provide the following as support for said conclusions in future submittals:

- Log water quality versus time graphs for monitoring wells within source areas and along the major flow pathways: Include a best-fit linear trend line for contaminant concentrations on each graph. The dates of major remediation activities (i.e., soil excavation, operational dates of pump and treat systems, etc.) should be indicated on said trend graphs.
- A figure summarizing the most recent groundwater and surface water analytical results together: The figures must include isoconcentration contour lines, clearly labeled, showing the delineated extent of the contaminant plumes and extent of contaminant concentrations exceeding cleanup levels for the most recent two to four monitoring events. The contour lines should represent applicable groundwater delineation and cleanup standards (concentrations).

4. **Surface Water Conditions:**

- a. Current conditions in surface water bodies acting as discharge points/receptors for groundwater contamination at the site must be established and said locations must be included as part of the proposed monitoring network for semi-annual progress reports. Since the entire reach of a surface water body subject to discharge of contaminants from groundwater is considered to be a point of exposure (POE), analytical results for surface water samples collected upstream and downstream of the contaminant plume discharge area as proposed are not adequate for establishing current surface water conditions. At a minimum, one sampling location per projected groundwater contaminant flow path (one per plume lobe) on the northern portion of the site must be included. If COC concentrations in groundwater south of the hydraulic divide referenced in the VIRP are greater than applicable surface water cleanup standards, then one or more sampling locations must also be established along the Savannah River for this purpose.
- b. Naturally-occurring background concentrations of COCs must be established for surface water bodies acting as contaminant receptors at the site to assist in determining site-specific surface water contaminant delineation and cleanup standards.

5. **Potential Receptors/Exposure Pathways/Exposure Domains:**

- a. **Figure:** A figure depicting (labeled) *all* exposure domains and POEs, current and future, for all potentially complete contaminant exposure pathways related to the release(s) of regulated substances at the qualifying property must be provided to EPD. Said figure must show the nearest water wells and their use as well as the nearest surface water bodies within 1,000 ft of the delineated edge of the groundwater contaminant plume.
- b. **Human Exposure:** Evaluation of the human exposure to groundwater pathways must assume the following are complete exposure pathways and proposed site-specific cleanup standards and/or corrective measures, which may consist of institutional and/or engineering controls in full or in part, be adjusted accordingly:
  - i. The impacted aquifer could be used as a drinking water source at or near the site in the future. Therefore, one or more POEs, based on groundwater flow and contaminant plume configuration, must be established consistent with the options

defined in §12-8-102(b)(11) of the Act for evaluation of the referenced pathway unless it is demonstrated that surface water bodies act as complete barriers to continued downgradient contaminant migration as discussed in Comment 3aii.

- ii. Exposure *via* incidental ingestion and/or inhalation of COCs in shallow groundwater by construction workers in the future since depth to groundwater is very shallow at the site.
- c. **Ecological Pathways and Receptors:** An ecological risk assessment (as described in the Supplemental Guidance to Rags: Region 4 Bulletins Ecological Risk Assessment, at a minimum) must be conducted to determine if aquatic organisms in surface water bodies receiving contaminated groundwater from the site (and sediment within them) are current or future potential receptors. *Both the Savannah River and the canal on the SEDA Parcel B property must be evaluated as potential receptors.*
  - i. Cleanup standards for surface water in receptor surface water bodies at or near the site cannot be determined without said assessment.
  - ii. In addition, sediments *potentially* impacted by contaminated surface or groundwater must be assessed to determine if they pose an unreasonable risk for ecological receptors should they exist.

Please contact Mr. Robert Stryker of the EPD Risk Assessment Unit at (404) 656-7802 for questions regarding ecological risk assessment procedures as necessary.

**6. Point of Determination (POD) Locations:**

- a. Proposed or existing POD locations must be shown on a figure depicting: 1) the extent of the current groundwater contaminant plume with concentrations posted on it, and the 2) modeled contaminant migration pathways with source and POE locations clearly labeled. Pursuant to §39112-8-102(b)(9) of the Act, Point of demonstration (POD) wells must be installed between the source(s) of site groundwater contamination and the actual or estimated downgradient human and ecological POEs. Therefore, the previously established surface water monitoring points in the canal are not acceptable as PODs for groundwater impacts to surface water and aquatic organisms as proposed in Section 6.3.3 of the VIRP, as they are not located between the source of contamination and the surface water bodies of concern (the POEs). POD locations must be proposed, and installed, if not currently existing, for each "lobe" (contaminant flow pathway) of the contaminant plume(s) at the site. A minimum of three PODs will be necessary for monitoring the groundwater to surface water pathway: 1) one for each of the two lobes of the contaminant plume in the northern half of the qualifying property (a total of two) immediately south and adjacent to the canal and 2) at least one for the migration pathway to the Savannah River to the south of the qualifying property. Delineation wells proposed to be installed adjacent to the northern canal may, if located appropriately, be used as POD wells for the canal on the SEDA Parcel B property.
- b. If the additional investigation required by Comment 3ai indicates the canal is not a complete barrier to contaminant migration, then POD wells must be proposed for the human exposure via ingestion pathway based on the hypothetical drinking water well location(s) established in response to Comment 5bi. Said POD wells may coincide with those proposed to monitor the groundwater to surface water exposure pathway if appropriate.
- c. A figure depicting the locations (or proposed locations) of the above POD wells must be provided to EPD. Note that said figure was not provided to depict the proposed POD well locations referenced in the VIRP and the narratives did not clearly identify the exact locations proposed for said wells.

## GROUNDWATER/SURFACE WATER CONTAMINATION FATE AND TRANSPORT MODELING

7. EPD will defer a full evaluation of the groundwater contamination fate and transport model presented in the VIRP until comments regarding; 1) groundwater contamination source areas and source contaminant concentrations, 2) POD well locations, and 3) current surface water conditions and applicable cleanup levels have been adequately addressed; the additional stream flow gauging data, *etc.* referenced in Sections 6.4.3 and 7.0 have been acquired; and the fate and transport model has been rerun and resubmitted using the newly acquired information. EPD does however have the following general comments to be considered when conducting future modeling efforts:
- a. Section 7.0 of the VIRP states that the intent (objective) of groundwater contaminant fate and transport modeling is to demonstrate that no adverse effects to the surface water environment are likely to be encountered in the future. The objective of groundwater contaminant fate and transport modeling should not be a predetermined result. Rather, the objectives of the modeling effort should include predictions regarding if a receptor will be exposed to unacceptable risks if further groundwater remedial efforts are not conducted at the site and establishment of site-specific groundwater cleanup levels to mitigate and prevent unacceptable risks if predicted. Multiple predictive simulations for each contaminant flow path that has a potential receptor.
  - b. Please review EPD's guidance regarding groundwater contaminant fate and transport modeling at sites regulated by the Georgia Hazardous Site Response Rules outlining minimum *required* documentation for future modeling efforts, much of which was missing from the VIRP, before submitting groundwater contaminant fate and transport results in the future. Failure to submit any of the listed documentation elements, without acceptable justification, may result in invalidation of the model without further review. The referenced EPD guidance may be accessed *via* the worldwide web at: <http://www.gaepd.org/Documents/hsraguideFate.html>.
  - c. If Biochlor or a similar analytical modeling software is used in future modeling efforts, the model must be calibrated and validated, using contaminant concentrations at the source(s) and several established locations along groundwater flow paths through time, in order to ensure a level of confidence in predictions and /or conclusions based on predictive model simulations *or if calibration cannot be achieved* the model must be run using input parameters that will result in conservative simulations (*i.e.*, overestimating the rate or extent on constituent movement) for comparison to site conditions through time. The model submitted in the VIRP did not appear to have been validated or calibrated, nor was sufficient documentation provided to demonstrate input parameters used will result in conservative simulation results.
8. **Delineation Criteria and Standards:**
- a. **Groundwater:** The use of the higher of Type 3 or Type 4 risk reduction standards (RRS) as groundwater delineation criteria as proposed in Section 4.0 (page 4-2) of the VIRP is not acceptable. The applicant must select groundwater delineation criterion that is consistent with §12-8-108(1)(A) through (E) of the Act and revise narratives, tables, and figures as applicable in future submittals. (Note that only one of the three groundwater standards summarized on Table 1 of the VIRP, background concentrations, is deemed to be an acceptable delineation criterion pursuant to the Act.)
  - b. **Surface Water:** Naturally occurring background concentrations for regulated substances in surface water due to the release at the site must be the delineation criterion/standards for COCs in surface water.

- c. **Sediment:** Background concentrations must be the delineation standards for sediments in surface water bodies impacted by regulated substances released at the site if ecological receptors are determined to be present.
  - d. **Summary Table:** Table 1 of the VIRP must be revised to include columns specifying the specific concentrations to be used as delineation standards for *each* regulated substance detected above background levels in surface water and possibly sediment. Column headers must clearly identify, by environmental media, the summarized values as proposed "delineation standards". Notations may be used to identify the basis (criterion) for the proposed delineation standard values.
  - e. **Correct Type 3 and 4 RRS:**
    - i. In the CSR, EPD did not approve a Type 4 RRS for benzene or lead in soil. Type 4 RRS for these two substances in soil should be deleted.
    - ii. The Type 3 and Type 4 RRS for arsenic in groundwater was approved at 0.018 mg/l, which is the background concentration.
    - iii. It is also noted in Table 1 that the groundwater concentrations for PAHs and VOCs are three orders of magnitude too high. Appropriate changes should be made in Table 1-Summary of Risk Reduction Standards and Constituents of Concern.
    - iv. The Type 4 RRS for benzene and toluene in groundwater should be recalculated, using updated toxicity factors contained in IRIS. In lieu of this, the Type 4 RRS for these two regulated substances can simply be deleted in Table 1 if they serve no purpose in the VIRP.
- 9. Cleanup Criteria and Standards:**
- a. **Groundwater:**
    - i. Section 6.4.2 of the VIRP states that site-specific Type 4 RRS will be developed for contaminants, in groundwater at the site based on groundwater contaminant fate and transport modeling. Please note that said groundwater cleanup standards are considered to be Type 5 RRS since they will not be based on criteria listed in §391-3-19-.07(9)(c) of the Rules for Type 4 groundwater RRS *and* an environmental covenant is proposed to restrict groundwater use on the qualifying property for the protection of potential future human receptors from unacceptable risks.
    - ii. Note that groundwater non-residential Type 3 or 4 RRS values for one or more COCs (in addition to ammonia) may be greater than the acceptable exposure concentrations at POEs for potential ecological receptors. Therefore, it must be determined if compliance with groundwater Type 3 or 4 RRS for said COCs will be protective of said receptors or if alternative Type 5 RRS must be applied.
  - b. **Surface Water:** The VIRP did not provide the specific cleanup standards for surface water bodies identified as potential POEs for groundwater contamination at the site. Specific cleanup standards and the criteria used to establish each standard [*i.e.*, freshwater or saltwater Georgia In-Stream Water Quality Standards (ISWQS), EPA ecological screening values, background concentrations, *etc.*] must be clearly identified in both narrative and tabular format.
  - c. **Sediment:** Cleanup values must be proposed for sediment if impacted by groundwater or surface water contaminants *and* ecological receptors are identified in the canal on the SEDA Parcel B and/or the Savannah River.
- 10. Proposed Additional Investigation and Corrective Actions:**
- a. If groundwater contamination is determined to pose an imminent or substantial danger to human health and the environment based on additional groundwater and surface water investigation or monitoring results, corrective measures must be implemented



- immediately to prevent said danger. For instance if surface water is found to be impacted above applicable cleanup levels due to groundwater discharge, measures must be implemented to prevent further discharge of contaminants from groundwater.
- b. EPD does not concur that groundwater contamination has been delineated on the qualifying property (referenced as the site in Section 7.0 of the VIRP and further investigation is warranted as discussed in Comment 3d.
  - c. Sediment sampling and analysis for COCs may become necessary based on the results of the required ecological risk assessment.
  - d. EPD cannot evaluate the use of proposed wells as appropriate POD wells without a figure depicting their specific locations. Please see Comment 6 for further discussion of POD well locations.
  - d. Milestones listed in Section 8.0 of the VIRP are vague and not necessarily consistent with the specific required milestones listed as Items 5a through 5d of the VIRP Application Form & Checklist. Please revise the proposed milestone schedule to include the specific milestones (*i.e.*, achievement of complete vertical and horizontal delineation of groundwater contamination for the site, *etc.*) using appropriate language on the referenced checklist and provide a Gantt chart summary of said schedule. Achievement of the required milestones may occur earlier, but must occur not later than the timeframe established by the checklist.
  - e. **Monitoring Program:** Sections 7.0 and 8.0 of the VIRP proposes conducting a three year semi-annual groundwater monitoring program, groundwater monitoring locations not specified, that includes surface water sampling at the existing SW-1 and SW-2 monitoring locations.
    - i. The specific locations where groundwater and surface water are to be monitored must be proposed and depicted on a site map showing current groundwater contamination conditions. Selection of surface water monitoring locations must be consistent with the requirements discussed in Comment 4a.
    - ii. Section 8.0 proposes to only monitor ammonia, polynuclear aromatic hydrocarbons (PAHs), four petroleum associated VOCs [benzene, toluene, ethylbenzene, and xylenes (BTEX)], and two regulated metals (arsenic and lead); however:
      - All regulated metals detected in groundwater above the applicable groundwater or surface water cleanup values (whichever are lowest) must be monitored in both groundwater and surface water, which requires that surface water cleanup standards be established prior to elimination of metals detected in groundwater and/or surface water in the past from the proposed performance monitoring program.
      - In addition to the regulated metals referenced above, the following must be included as monitoring parameters:
        - pH in both groundwater and surface water since ammonia is very corrosive and RCRA and Georgia Water Quality Control Rules have established acceptable pH ranges for groundwater and surface water bodies, respectively. In addition, pH is a determining factor in ammonia degradation in groundwater.
        - Nitrate ( $\text{NO}_3^-$ ) in groundwater since it is a degradation product of ammonia. Although not regulated pursuant to the Rules, said substance does have a federal maximum contaminant level, which should be taken into consideration when evaluating threats to potential human receptors.
        - Salinity in surface water to determine if the surface water body receptors are freshwater or coastal/marine estuarine environments. This will affect the selection/calculation of the appropriate ISWQS values for regulated metals in

- surface water. Alkalinity will also be a required parameter for calculation of site-specific ISWQS for said metals if it is determined that freshwater conditions exist.
- Dissolved oxygen (DO) in surface water since the discharge of ammonia and/or nitrate could result in low DO levels outside acceptable ranges established by the Georgia Water Quality Control Rules.
  - A groundwater/surface water monitoring program may be required to extend beyond the proposed three year period. Please note:
    - The monitoring period must be sufficiently long enough to validate groundwater contaminant fate and transport modeling results/predictions. Note that there are some case studies that have indicated the migration rate for ammonia/ammonium can be significantly slower than calculated groundwater velocities and or the migration rate of other COCs,
    - Concentration trends for *all* COCs detected in groundwater must be evaluated when determining groundwater contaminant plume stabilization status,
    - The downgradient edge of the ammonia plume has not been delineated and source area investigations have not been completed; therefore, it cannot be assumed that the plume is currently stable nor can achievement of plume stability be projected by modeling at this time.
    - Compliance with all surface water cleanup values for *all COCs or other regulated parameters such as pH, DO, etc.*, not solely the ISWQS for benzene as proposed, must be established before monitoring can cease.

#### **MISCELLANEOUS GENERAL COMMENTS**

11. **ISWQS for Metals:** ISWQS for the five metals (arsenic, cadmium, lead, nickel, and zinc) historically detected in groundwater and/or surface water at the *site* are expressed in terms of a “dissolved” fraction pursuant to §391-3-6-.03(5)(ii) of the Georgia Rules for Water Quality Control. Analytical results for *field-filtered and preserved* (dissolved metals) samples are the values to be directly compared to the ISWQS, not the unfiltered, total metals sample results. Section 6.4.3 of the VIRP indicates both total and dissolved metal surface water sample results were compared against ISWQS by the participant. In future submittals please use the “dissolved fraction” results when comparing analytical results for these metals in surface water samples against their corresponding ISWQS.
12. **Figures and Tables:**
  - a. When posting contaminant concentrations on figures and tables, please post the analytical result as (<XX.XX), where the XX.XX represents the detection limit consistent with the definition in §391-3-19-.02(2)(d) of the Rules, rather than stating that a result was not detected (ND) or below detection limit (BDL).
  - b. Since it is assumed that the upper portion of the shallow groundwater aquifer at the site is discharging to nearby surface water bodies, surface water analytical results must be posted on groundwater analytical summary figures to show the relationship between the groundwater COC plume(s) at the site and the surface water sampling locations. In addition, COC concentration values for the most recent monitoring event must be posted immediately adjacent to their corresponding sample locations on figures summarizing groundwater and surface water analytical results. Said values were not posted on Figure 5 of the VIRP.
  - c. Groundwater analytical result summary tables should include delineation and cleanup standard values with those results exceeding said standards appropriately flagged. To expedite EPD review of future submittals, it is suggested that tables summarizing groundwater and surface water analytical results for the four most recent monitoring

events be summarized on tables separate from comprehensive historical groundwater and surface water analytical summary tables for ease in assessing recent/current groundwater conditions and comparison of said conditions with projected modeled contaminant plume conditions. Comprehensive summary tables should be provided as attachments or appendices.

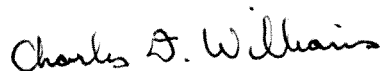
13. In general, in future submittals non-specific, subjective terms such as "low", as used in narratives throughout Sections 5.0 and 6.0 of the VIRP, should not be used when describing COC concentrations in various environmental media at the site. Rather, the specific detected maximum concentration value or a detected concentration range for a COC should be directly compared to applicable delineation and/or cleanup standards.

**FORMAT OF COMPACT DISCS (CD) SUBMITTALS**

14. All documents in electronic format should be converted into the searchable PDF format. The submitted compact disc containing the VIRP/VRP application was not in a searchable PDF format.
15. All Voluntary Remediation Program CD submittals should contain the entire document in a single PDF file, as well as the multiple searchable PDF files as indicated below:
- Table of Contents
  - Signature/Certification Pages
  - Main body of document
  - Each Attachment (Appendices, Tables, Figures, Reports, etc.)
16. A signed certification page must be included in the CD copies. The certification page states that the electronic copy is complete identical to the paper copy, and virus free.

Please respond to the above comments in a response-to-comment format with the submittal of the first semi-annual VRP progress report due no later than July 31, 2013. If you have any questions, please contact Carolyn L. Daniels, P.G. or Larry Kloet of the Response and Remediation Program at (404) 657-8600.

Sincerely,



Charles D. Williams  
Program Manager  
Response and Remediation Program

File: HSI No. 10101

c: Stephen Foley, PG, AMEC  
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