GEORGIA
DEPARTMENT OF NATURAL RESOURCES
ENVIRONMENTAL PROTECTION DIVISION

Richard E. Dunn, Director

Land Protection Branch
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Suite 1054, East Tower
Atlanta, Georgia 30334
404-657-8600

March 10, 2017

CSX Real Property, Inc.
c/o Mr. Coley Campbell, P.E.
Manager Environmental & Property Management
6737 Southpoint Drive South
Jacksonville, Florida 32216

Subject: Voluntary Remediation Program Compliance Status Report dated August 1, 2016
CSX Transportation - Powell Duffryn (HSI 10101)
Hutchinson Island, Savannah, Chatham County, Georgia

Dear Mr. Campbell:

The Georgia Environmental Protection Division (EPD) has reviewed the Voluntary Remediation Program Compliance Status Report (CSR) dated August 1, 2016 for the referenced site. This report was submitted by your consultant Amec Foster Wheeler in accordance with the Voluntary Investigation and Remediation Plan (VIRP) and Application dated June 7, 2012 as approved by EPD on January 31, 2013 and the Updated Milestone Schedule contained in the 6th Semi-Annual Progress Report dated January 27, 2016 (Progress Report #6). EPD has the following comments:

1. EPD provided several comments on groundwater modeling via email on December 28, 2016. A copy of those comments is enclosed.
2. On Figures 12 and 13, the isoconcentration lines for naphthalene and benzene are shown in the legend as having units of milligrams per liter (mg/L). However, groundwater concentrations in Table 5 indicate that the isoconcentration lines should have units of micrograms per liter (µg/L). Please verify the correct units and update these figures accordingly.
3. The vapor intrusion pathway has not been sufficiently evaluated for future buildings. The generally shallow depths to impacted groundwater (less than 5 feet) along with the historical presence of petroleum source material and light non-aqueous phase liquid indicate that the potential for vapor intrusion should be evaluated based on soil gas sampling. Although this pathway is currently incomplete because there are no buildings present, it must be evaluated prior to future building construction. At a minimum, soil gas should be sampled for ammonia and volatile organic compounds. The pathway evaluation should be based on the United States Environmental Protection Agency (USEPA) *Technical Guide for Assessing and Mitigating the Vapor Intrusion Pathway from Subsurface Vapor Sources to Indoor Air* dated June 2015.
4. In Section 10.2, the CSR states that groundwater concentrations are below risk reduction standards for construction and utility workers. However, an evaluation of the groundwater exposure scenario for construction and utility workers was not presented. Please present an

evaluation of this exposure scenario and/or include appropriate controls (e.g., digging restrictions) in the Uniform Environmental Covenant (UEC). Management of excavation dewatering should also be considered.

5. Section 8.2.4 of the CSR states that soil containing petroleum source material was left in place around four (4) utility poles to provide structural support. Leaving this source material in place requires the use of Type 5 risk reduction standards. The certification of compliance with risk reduction standards should be updated accordingly. Please verify that the petroleum source material is not present from 0 – 2 feet below the ground surface. The locations of petroleum source material remaining in place should be clearly identified in the UEC. A monitoring and maintenance plan should provide for periodic evaluation of these areas and annual reporting to EPD.

6. In accordance with §12-8-107(f) of the Voluntary Remediation Program Act and §391-3-19-.06(5) of the Rules for Hazardous Site Response, please provide copies of the CSR public notice published in the local legal organ and provided to the local city and county governments.

Please submit a response to these comments by May 10, 2017. If you have any questions, please contact Larry Kloet at 404-463-7505.

Sincerely,

David Hayes
Unit Coordinator
Response and Remediation Program

Encl: EPD Comments on Groundwater Modeling

c: Matt Grostick, Amec Foster Wheeler (via email)
Chuck Ferry, Amec Foster Wheeler (via email)
Steve Foley, Amec Foster Wheeler (via email)

File: 242-0187 (HSI 10101)

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EPD Comments on Groundwater Modeling
Compliance Status Report dated August 1, 2016
CSX Transportation – Powell Duffryn Site (HSI 10101)

1. Table C-1 of the CSR is not adequate to address Comment #1.a. in EPD's February 26, 2016 letter addressed to CSX c/o Mr. Samuel Ross.

   a. Sources of several input values are not sufficiently detailed enough as follows:

      i. Hydraulic Conductivity and Gradient: Please provide the range (maximum and minimum) of site specific values acquired from field observations at the site for comparison with the final value input into the calibrated model. EPD acknowledges that Section 10.2.7 of the CSR indicates average hydraulic conductivity values from slug tests were used in the "calibration run" of the model, but the table should indicate this as well. Furthermore, it may be more appropriate to use an average of historically measured hydraulic gradient values rather than a value representing data acquired on a single day.

      ii. Effective Porosity, Aquifer Matrix Bulk Density, Koc: Please provide the bibliographic literature reference used to estimate the input values used and provide the published range if available for comparison with the final value input into the calibrated model.

      iii. First Order Decay Coefficient: Please provide the range of published values from your literature source for comparison with the final value input into the calibrated model. Furthermore, first order decay coefficients used for "degradation products" should be included on the table.

      iv. Source Decay Constant: Please add this input value to the table and indicate the value calculated from site-specific data if the value in the model was manipulated.

      v. Biotransformation yields: Please include the values used in the model along with the source of the values on a revised input table. Furthermore, graphs and/or calculations used to determine them should also be provided as backup documentation.

      vi. Source Concentrations: Please include the source concentrations used for ammonia and its "degradation" products in the model on the referenced table. Furthermore, the table indicates that the initial source concentration for the southern lobe of the groundwater contaminant was estimated based on current concentration and estimated release date. Please include a note that includes the maximum concentrations of the contaminants of concern detected at that source location.

      vii. Several model input values (hydraulic gradients, dispersion factors, etc.) posted on Table C-1 are not the same as those shown on the paper printouts of the model input sheets or the digital copies of the modeling runs provided in Appendix C of the CSR. EPD recommends that the referenced table be revised to include the actual input values used to "calibrate" the model with comments providing the ranges of field measured and/or literature values. Please see the example table below, which does not include all model input parameters:

Parameter	Input Value Used with Units[1]	Source of Value[2]	Range of Observed or Published Values[1]	Bibliographic Reference[1]
Hydraulic Conductivity (K)	5.6E-04 cm/s	Average of Slug Test Results	3.5E-04 to 4.1E-03 cm/s	Section 5.1 in VIRP for Site (Date)
Hydraulic Gradient (*i*)	0.005 ft/ft	Average derived from historical potentiometric surface maps for Site	0.001 to 0.006 ft/ft	Calculations in Appendix IV, VIRP (July 19, 2011)
Effective Porosity (n_e)	0.2 (dimensionless)	Literature based on field observed soil type (Sandy Clay) and literature lookup table	0.279 to 0.511 (dimensionless)	Boring logs in Appendix V VIRP (July 19, 2011) and Rawls, *et.al.*, 1983

b. Please provide copies of graphs and calculations used to determine the base value for the source decay constant, before manipulation, during calibration referenced in Section 10.2.6 of the CSR and as requested in Comment #1.e. of the February 26, 2016 EPD letter referenced above. These must be provided as justification for the source decay constant used in the model, even if the calculated value was manipulated during model calibration.

2. The model has not been validated in the CSR as requested in Comment #2 of the referenced February 2016 EPD letter. The "calibration run" predictions were compared to the data set used to "calibrate" the model in Table C-4 of the CSR, but comparison of additional data sets vs predicted values was not provided to validate the model as requested. Please revise Table C-4 using a minimum of one data set collected prior to the 2015 data set used in the initial "calibration run". Note that validation should be conducted prior to the extended model runs predicting contaminant plume behavior into the future as provided in the CSR, and requested in Comment #3.a. of the February 2016 EPD letter.

3. Please respond to Comment #3.b. of the February 2016 EPD letter after validating the model results as referenced in Comment #2 above.

4. Comment #4 of the February 2016 EPD letter has not been adequately addressed. Please see Comment #1.a.v. above.

Please address these comments in Response to Comment format and provide revised tables, figures, and other documentation as requested by no later than January 31, 2017. The model should not be revised unless the model results cannot be validated as requested in Comment #2. EPD will defer further evaluation of the modeling effort provided in the CSR until these comments have been adequately addressed.

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[1] Value on model input sheet copies in the subject submittal.

[2] Example only, fictitious values or random references provided.