

# Georgia Department of Natural Resources

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## **Reply To:**

Response and Remediation Program  
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Chris Clark, Commissioner  
Environmental Protection Division  
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Land Protection Branch  
Mark Smith, Branch Chief

August 23, 2010

## **VIA E-MAIL AND REGULAR MAIL**

BWAY Corporation  
c/o Mr. Steve Diaz, EHS Manager  
1601 Valdosta Highway  
Homerville, GA 31634

Re: Voluntary Remediation Plan and Application, April 12, 2010: Notice of Deficiencies  
BWAY Drum Site (Tax Parcel No. 063-026)  
NW Quadrant, Intersection of Charley Smith Road (a.k.a., Woodlake Road) and U.S. Highway 84  
Homerville, Clinch County, Georgia

Dear Mr. Diaz:

The Georgia Environmental Protection Division (EPD) has reviewed the April 12, 2010 Voluntary Remediation Plan (VRP) submitted pursuant to the Georgia Voluntary Remediation Program Act (the Act). In addition, EPD has received a copy of the Warranty Deed and a Chain of Ownership for the subject property under cover dated May 6, 2010 that was missing from the referenced VRP. EPD has noted the following deficiencies:

### **Application/Checklist**

- 1) The outlines shown for the qualifying property tax parcel on Figure 1-3 (*Receptor Map*) and the tax parcel map provided in Appendix B of the VRP do not correspond with the property outlines shown on Figures 2-2, 3-1, 3-2, and 3-5. The property boundaries for the qualifying property must be accurately shown on all applicable figures. Furthermore, please indicate whether the Parcel 063-041 is to be included as a qualifying property as delineation locations for the groundwater plume are included on this parcel.

### **Conceptual Site Model**

- 2) **Regulated Substances Released:** Please note, all regulated substances detected in soil and/or groundwater must be evaluated along with their degradation products; therefore, please include methyl ethyl ketone (MEK) in Table 1-1 (*Table of Regulated Substances*) and appropriate narrative and tables and figures as needed.
  - a) Due to the past injection of magnesium sulfate, please include a discussion of potential metabolites (e.g., acetaldehyde, etc.) (see EPD's letters dated July 17, 2007 and October 21, 2009). Future groundwater sampling events must include any expected metabolites that are regulated substances as analytes.

- b) Groundwater samples collected from monitoring well MW-ERM-3 were analyzed for vinyl chloride only during two monitoring events in 2003 and 2004 and it was detected at a concentration of 2.0 µg/L, which is equal to its Type 1 groundwater RRS, during one of those two events. Future groundwater sampling events must include vinyl chloride to confirm that vinyl chloride remains in compliance with Type 1 groundwater RRS.
- 3) **Source(s):** Groundwater in the source area does not appear to have been adequately characterized.
- a) While the buried drums and soil contaminated above Type 1 RRS have been removed from the property, shallow groundwater between the excavation area and monitoring well ERM-MW-3, a distance of over 200 ft, has not been evaluated for shallow groundwater conditions and the only monitoring well located in the referenced area, ERM-MW-7, is screened within a deeper aquifer zone (the deepest of three zones shown on the cross sections provided in the VRP). In order to properly calibrate groundwater contaminant fate and transport modeling (see Comment 8 below), a shallow groundwater monitoring well straddling the groundwater table must be installed at the excavation area and a representative groundwater sample obtained and analyzed for all regulated substances released.
- b) In addition, all of the monitoring wells installed at the site, with the exception of monitoring well ERM-MW-7, appear to have been screened within the uppermost aquifer zone shown on the cross sections. Therefore, the intermediate aquifer zone located from approximately 25 to 40 ft bgs between two clay layers has not been investigated to determine if it has been impacted and/or is acting as a potential source and/or migration pathway for groundwater contamination. A groundwater monitoring well screened within said aquifer zone must be installed within the excavation area for this purpose and a representative groundwater sample obtained and analyzed for all regulated substances released. If found to be impacted, contamination within said aquifer zone must be delineated and considered when assessing potential exposure pathways and future modeling efforts.
- 4) **Contaminant Delineation:** EPD does not concur that horizontal delineation of the groundwater contaminant plume has been achieved as follows:
- a) Analytical results acquired from the 12 direct push tool borings (DPT) advanced in April 2006, are not acceptable for demonstrating delineation of groundwater contamination (as indicated on Figures 2-2 and 3-2 of the VRP) as DPT groundwater sampling points do not meet the standards of a groundwater monitoring well and is considered a field screening method.
- b) As previously stated in Comment #2 of EPD's comment letter dated October 21, 2001, the groundwater contaminant (naphthalene) plume has not been delineated to the west/northwest of ERM-MW-3. In addition, the plume has not been delineated to the west/northwest of the excavation area.
- c) The location of Cross Section D to D', Figure 3-4 of the VRP, is not appropriate for demonstrating the current status/extent of the groundwater contaminant plume since it is located outside the area of the plume. Cross sections should include the central portion of the plume using the monitoring well demonstrating the highest contaminant levels in groundwater as a data point. In addition, monitoring wells installed to address plume delineation deficiencies addressed in Comment 4 should be incorporated into revised cross-sections.
- 5) **Potential Receptors/Exposure Pathways:** The soil exposure pathway has been adequately addressed as soil complies with Type 1 RRS. However, EPD does not concur that there are no human or environmental receptors for contaminants in groundwater at the qualifying and adjacent non-qualifying properties. An exposure assessment that is consistent with US EPA's *Guidance for*

*Exposure Assessment* (57FR104: 20888-22938; May 29, 1992) will be required. Several potential exposure pathways (current and/or likely future) on the qualifying and non-qualifying properties cannot currently be eliminated from consideration until comments regarding: 1) contaminant delineation 2) groundwater contaminant fate and transport and vapor intrusion modeling, 3) surface water body locations, and 4) likely future property usage have been adequately addressed. EPD notes that Parcel 063-041 includes an active manufacturing facility, which will need to be included in the exposure assessment.

Due to the divergent groundwater flow pattern in the upper aquifer the following potential points of exposure (POEs) must be considered at a minimum (other POEs may exist) unless it is fully demonstrated that associated exposure pathways are incomplete:

a) **Human Receptors:**

- i) The city drinking water supply well, located approximately 350 ft south of the southwestern corner of the qualifying property, and
- ii) A hypothetical drinking water supply well located to the west and north/northwest of the qualifying property.

- b) **Surface Water/Ecological:** Section 1.4 and Figure 1-3 of the VRP indicate there are no surface water bodies located within the area occupied by the ground water plume or in the downgradient direction. However, based on a review of the portion of the USGS topographic quadrangle map provided as Figure 1-1 and online Digital National Wetlands Inventory Maps maintained by the US Fish and Wildlife Service, the following surface water bodies may also be located within 1,000 ft downgradient of the onsite contaminant plume and its source: 1) creeks and wetlands located on and to the northwest of the qualifying property, and 2) Bateman's Pond located on the property immediately south of the qualifying property. Please note that although historical maximum concentrations of regulated substances listed on Table 1-1 in groundwater at the qualifying property are less than Georgia In-Stream Water Quality Standards, the referenced surface water bodies cannot be eliminated as potential POEs until comments regarding groundwater contaminant delineation and fate and transport modeling are adequately addressed.

### Groundwater Fate and Transport Modeling

- 6) Section 2.3.3 of the VRP states that the groundwater fate and transport model was not calibrated to field observations, but was run to steady state assuming a cleanup standard of 2,900 µg/L of naphthalene. While EPD acknowledges that this is a conservative number that exceeds the highest concentration of naphthalene detected on the property, the results indicate that the plume will extend onto property owned by Rayonier Forest Resources LP and a power substation (property owner unknown). In order for EPD to concur with a cleanup standard of 2,900 µg/L, a uniform environmental covenant, in addition to the one required for the subject property, restricting groundwater use and potential future development on these properties would be required.
- 7) Given Comment 7 above, EPD recommends the model be: 1) calibrated based on site conditions and 2) validated with an appropriate number of groundwater sampling results over time in order to be valid for proposing site-specific groundwater cleanup standards pursuant to the Act. At a minimum, EPD recommends the following model simulation runs must be conducted for all potential human and ecological receptor exposure pathways/POEs (see Comment 6):
  - a) **Calibration Run:** An initial calibration run should be conducted based on the following site information:

- i) The drum burial area as the source of groundwater contamination. Although the source area has been removed, its contributions to the groundwater plume between the initial release date and source removal date cannot be ignored,
  - ii) The simulation time equal to the time elapsed between the estimated time of release of regulated substances to groundwater and sampling event used as the calibration date. Due to the inherent uncertainty in determining dates of undocumented releases, EPD suggests using the estimated date of drum burial, estimated to be August 1984 (or slightly earlier) based on labels observed on the drums as stated in the November 18, 2003 Compliance Status Report prepared for the subject property, as the release date, and
  - iii) An infinite source with a concentration equal to contaminant solubility in water (worst case condition) or maximum contaminant concentration detected at the source. If maximum observed concentrations at the source are less than those observed elsewhere on the qualifying property, contaminant solubility should be used as the source concentration.
- b) **Validation Runs:** A minimum of two (2) validation runs should be conducted once the model has been calibrated. The validation runs should use the same input values with the exception of the simulation time. Simulation times should approximate actual groundwater sampling dates and modeling results should be compared with the actual groundwater data acquired during those dates. If model predictions are not consistent with actual groundwater analytical data, the model should be recalibrated and/or the validity of the modeling software used should be re-evaluated.
  - c) **Projected Plume Extent Runs:** Assuming the model was validated, simulation time should be increased to determine the projected maximum extent of the groundwater contaminant plume and the time projected to reach its maximum extent to determine if additional remedial efforts will be necessary based on established POEs for the groundwater plume.
  - d) **Target Clean Up Concentration Run:** An additional model run should be conducted to estimate maximum acceptable source concentrations which are protective of each downgradient POE based on the validated model runs, by varying the source concentration and simulation time (use the project plume extent run times as a basis for selection of simulation times.) In addition, maximum acceptable concentrations (contingency plan "trigger" concentrations) during sampling events at each Point of Determination (POD) should also be proposed based on this simulation run. Note that a POD must be proposed/selected for each complete exposure pathway; potentially resulting in multiple PODs at a site and must be clearly identified on all figures depicting site conditions.

Please note that based on a review of the groundwater analytical data, the magnesium sulfate injection events conducted at the subject property do not appear to have had a significant effect on contaminant concentrations and it appears that only one groundwater monitoring event was conducted prior to source removal. Therefore, EPD is not requiring both pre- and post-remedial simulation runs. Simulation runs based on worst case/conservative values are acceptable.

- 8) EPD cannot concur with the following site-specific model input parameters used in the groundwater contaminant fate and transport modeling efforts presented in the VRP and as summarized on Table 2-2 at this time:
  - a) **Hydraulic gradient:** As several years of groundwater elevation measurements have been accumulated, an average of historical hydraulic gradients based on onsite groundwater elevation measurements is preferred as a model input value as opposed to an input value based on a single monitoring event.

- b) **Contaminant half life/ first order decay constant:** EPD prefers the use of site-specific decay constants based on decay rates observed since the estimated release date rather than a calculated decay constant based on published values.
- c) **Plume length and source zone widths and concentrations:** These input parameters must be based on the results of additional activities required to address contaminant delineation and Comment 8 above.
- d) **Contaminant plume dispersivity (longitudinal, transverse, and vertical):** The modeler chose to allow Bioscreen, which is programmed to use certain commonly used relationships representative of typical and low-end dispersivities. Please note that although EPD does not disagree with the use of said values in the model, it has been EPD's experience that other acceptable, commonly used relationships to plume length (as outlined in the model users manual) may better fit site conditions. If these parameters are revised based on site conditions, they should be included in the sensitivity analysis.
- e) **Simulation time:** Simulation times should be based on time elapsed since the estimated release date (see Comment 8a above).

Please note that several parameters automatically calculated by the modeling software (Bioscreen) and dependent upon site-specific input parameters (e.g., seepage velocity, etc.) are not included above. In the case of contaminant longitudinal, transverse and vertical dispersivity input parameters, the default relationships to plume lengths used by Bioscreen may not reflect actual site conditions. The modeler may wish to explore the use of other dispersivity vs plume length relationships, which are provided in the model user manual, when calibrating future model simulation runs.

- 9) The model input parameter summary table (Table 2-1) must be revised to include variations in input values (and their sources) for each of the required model simulation runs (and pathways modeled).
- 10) The VRP must include paper copies of data input and output (centerline and plume output) worksheets for each model run used in support of conclusions and/or recommendations presented in the VRP. Please complete the field data comparison section (Section 7) on the input worksheet of each required model simulation run as appropriate (Figure 2-1 of the subject VRP). At a minimum, actual contaminant field concentrations should be shown for the source area and POD(s) monitoring well locations. Proposed maximum acceptable concentrations for regulated substances at POD(s) that will demonstrate that corrective actions are protective of potential receptors must be specified.
- 11) Complete bibliographic references were not provided in Section 5.0 (*References*) for the resources used to estimate several model input values referenced on Tables 2-2 and 2-3 of the VRP.

### Investigation and Remediation Plan

- 12) **Proposed Corrective Actions:** The applicant is requesting removal of the qualifying property from the HSI after submittal of a Compliance Status Report (CSR) demonstrating soil and groundwater compliance with applicable cleanup standards. EPD cannot concur with the request until all deficiencies noted in this letter have been adequately addressed. Revised proposed corrective actions must also include, but not necessarily limited to, in addition to those proposed in the subject VRP:
  - a) Required groundwater contaminant plume delineation investigation activities, including the installation of additional groundwater monitoring wells and groundwater sampling and analysis (see Comment 5);

- b) Groundwater contamination fate and transport modeling calibration and validation activities, including additional groundwater monitoring and reporting, as necessary (see Comment 8); and
- c) Implementation of institutional controls restricting the future uses of the properties relying on controls for the purpose of certifying compliance with site-specific cleanup standards [O.C.G.A. §12-8-107(3)(h) of the Act requires the execution of a covenant restricting property use that conforms with O.C.G.A. §44-16-1, *et seq*, the Georgia Uniform Environmental Covenants Act]. A model environmental covenant that conforms to the above standard may be accessed online at: [http://www.gaepd.org/Files\\_DOC/forms/hwb/modelcovenant.doc](http://www.gaepd.org/Files_DOC/forms/hwb/modelcovenant.doc) (see Comment 7);

### **Delineation and Cleanup Standards**

- 13) **Delineation Standards/Criteria:** Table 1-2 (*Table of Site Delineation Concentrations*) should be revised to include references to the respective delineation criteria (Type 1 RRS) for all regulated substances detected in soil and groundwater including degradation products.
- 14) **Cleanup Standards:** EPD concurs that Type I (residential default) RRS are acceptable clean up standards for regulated substances in soil at the qualifying property pursuant to §12-8-108(6) of the Act and that certification of compliance with said soil RRS were achieved pursuant to EPD's letter dated February 16, 2005. However, EPD cannot concur with groundwater cleanup standards currently proposed until deficiencies regarding: 1) contaminant delineation, 2) vapor intrusion modeling (if applicable), and 3) groundwater contaminant fate and transport modeling have been adequately addressed. Please specify the specific site-specific cleanup standard to which BWAY intends to certify the qualifying and non-qualifying properties.

### **Miscellaneous Comments:**

- 15) As groundwater monitoring well MW-6 has been damaged, it must be properly abandoned and replaced in accordance with Section 2.8 of U.S. EPA Region 4, Science and Ecosystem Support Division Standard Operating Procedure *SESDGWD-101-R0* (February 18, 2008). In addition, since said monitoring well is an "upgradient" delineation point for the onsite groundwater plume, please include it in the monitoring network for future monitoring events.
- 16) Please ensure that both written (*i.e.*, 1 inch = 150 ft) and bar scales on provided on all figures depicting site conditions.
- 17) The groundwater purging and sample collection procedures used during the March 2010 sampling event were not adequately described in the narrative of the VRP:
  - a) Section 3.3 of the VRP does not state which low flow purging method was used at monitoring wells immediately prior to collection of groundwater samples on the referenced date. Please note that the EPA Region 4 Field Branches Quality System and Technical Procedures (FBQSTP) Groundwater Sampling Operating Procedure document (SESDPROC-301-R1, dated November 1, 2007), provides guidance for two (2) different low flow purging methods, low flow-low stress and low flow-low volume, each of which have differing requirements for implementation,
  - b) Neither the narrative nor the sampling field logs in Appendix D of the VRP described sample collection procedures. Pursuant to Section 4.3.1.2 of the SEDSPROC-301-R1, groundwater samples collected for volatile organic compounds (VOCs; including naphthalene) analysis using a peristaltic pump (as indicated in field sampling records provided) should be collected using the "soda straw" method, and

- c) Samples for VOC analysis, naphthalene is a VOC, must be collected using either stainless steel or Teflon® equipment pursuant to Section 2.1 of the SESDPROC-301-R1, rather than the polyethylene tubing (as described in Section 3.3 and on field sampling records in Appendix D of the VRP), if sample results are to be used to certify compliance with groundwater RRS.
  - d) Please note that deviations from the above standard operating procedures could result in compromised samples that are not acceptable for demonstrating compliance with groundwater standards and/or achievement of groundwater contaminant delineation.
- 18) Please note that the date of the EPD letter summarizing acceptable RRS and background concentrations was stated as February 16, 2006 in Section 1.3.1 of the VRP. However, the correct date for said letter is February 16, 2005. In addition, the date of the progress report referenced as the source of hydraulic conductivity values for groundwater contaminant fate and transport modeling presented in the VRP was incorrectly referenced as June 2, 2008. EPD records show the referenced report as dated August 28, 2008.
- 19) It appears that a corrected monitoring well construction diagram, or an explanation for the installation of 10 ft of sand pack for a one (1)-ft screen interval, for monitoring ERM-MW-7 has not been provided to EPD as requested in Comment #2 of the April 9, 2007 Conditional Approval of the Revised Corrective Action Plan (CAP; dated September 8, 2006) and Comment #5 in the October 21, 2009 EPD letter. Accurate well construction information for the referenced well is critical for evaluating adequacy of contaminant delineation efforts, *etc.*
- 20) Please provide a well construction table for all monitoring wells installed/monitored in response to the release of regulated substances at the site (or revise Table 3-1 of the VRP to include depths of well screen intervals measured from the same datum as depths to groundwater) as requested in Comment #10 of the above referenced letter. This is necessary for reviewing potentiometric surface maps and/or adequacy of groundwater contaminant delineation.
- 21) It is unclear from EPD's review of the VRP whether you are requesting provisional acceptance into the program or seeking full acceptance into the program. If you are seeking provisional approval, please include a milestone schedule for submittal of the items to complete the application by December 31, 2010. If you are not requesting provisional acceptance into the program, please provide a revised milestone schedule that conforms with the checklist.

Based on the above comments EPD has determined the VRP to be incomplete. In order to be considered for the voluntary remediation program, please submit a revised VRP within 30 days of the date of this letter. If you have any questions, please contact Carolyn L. Daniels, P.G. of the Response and Remediation Program at (404) 657-8600.

Sincerely,



Mark Smith, Chief  
Land Protection Branch