GEORGIA
DEPARTMENT OF NATURAL RESOURCES
ENVIRONMENTAL PROTECTION DIVISION

Richard E. Dunn, Director

Land Protection Branch
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February 10, 2017

Colonial Terminals, Inc.
c/o Mr. Jim Baker
Manager, Environmental Compliance
Colonial Terminals, Inc.
PO Box 576
Savannah, GA 31402

Exxon Mobil Corp.
c/o Mr. Mike Skinner
Michael J. Skinner Consulting, LLC
230 Kings Highway East STE #300
Haddonfield, NJ 08333

Estech, Inc.
c/o Mr. Thomas C. McGowan
McGrath, North, Mullin & Kratz, PC LLO
1601 Dodge Street STE 3700
Omaha, NE 68102

Re: 2016 VRP Documents
HSI # 10098
Colonial Terminals Plant # 2
Savannah, Chatham County
Tax Parcel ID #s:
1-0549-01-002
1-0549-01-002A
1-0550-02-004

Dear Messrs. Baker, Skinner, and McGowan:

The Environmental Protection Division (EPD) has received the following reports and correspondence (hereinafter referred to as reports) that have been submitted pursuant to the Georgia Voluntary Remediation Program (VRP) Act, O.C.G.A. 12-8-100, as regards Colonial Terminals Plant # 2, in Savannah, Chatham County:

- by Ramboll Environ on behalf of Colonial Terminals Inc. (Colonial):
  - May 2016 Semi-Annual Progress Report No. 6
  - May 27, 2016 BOD Ultimate Sampling Locations
- by Colonial:
  - November 2, 2016 Response to Item No.1 of February 16, 2016 EPD Letter and Conference Call of July 15, 2016.

After completing a review of these reports, EPD continues to have concerns over the dissolved oxygen (DO) impact of groundwater being discharged from Plant #2 to the Savannah River, and has prepared the following comments in response to the issues raised by Colonial in its November 2, 2016 letter:

Requirement that Colonial address dissolved oxygen under the HSRA and VRP Acts

In its November 2nd response, Colonial expressed concerns that when it entered the Voluntary Remediation Program, "there was no requirement to examine dissolved oxygen content" and that "dissolved oxygen was not and is not specifically regulated under [the Hazardous Site Response Act (HSRA)] and the VRP Act."

EPD recognizes that Colonial did not directly address dissolved oxygen (DO) in its initial application. However, in that application Colonial stated that "the predicted concentrations of these constituents [chlorinated volatile organic compounds (CVOCs), metals] in the river that might result from groundwater discharge are significantly less than the available and appropriate ecological criteria…" In EPD's view DO is one of the ecological criteria that should be met when evaluating the discharge of CVOCs, therefore assessment of DO is appropriate as part of Colonial's participation in the VRP.

At the time of acceptance into the VRP, EPD expressed its concerns that the discharge of CVOCs to the river constitutes a "release" under HSRA, and continued to express concerns over the adequacy of the surface water sampling locations for determining the impact to the river of the CVOCs. More recently, EPD has expressed concerns over the impact that a release of these CVOCs might have upon the river, including effects on DO. EPD has determined that the Savanah River is a potential receptor and that a release of CVOCs to the Savannah River has a potential to impact such receptor. EPD has the authority to regulate such release under O.C.G.A. § 12-8-94 of HSRA. Additionally, in accordance with O.C.G.A. 12-8-105(3) and 12-8-107(e) & (f) of the VRP statute, EPD cannot concur with a VRP compliance status report which fails to demonstrate that regulated substances are not impacting a potential receptor.

Colonial's argument that PCE and TCE do not exert any oxygen demand

In its November 2nd response, Colonial argues "[t]etrachloroethylene (PCE) and high concentrations of trichloroethylene (TCE) do NOT break down when oxygen is present… Based on the redox chemistry at the Plant #2 site, aerobic conditions exist in the shallow aquifer, as measured during the years of groundwater sampling at the site." Colonial goes on to state "[s]ince PCE and high concentrations of TCE are stable under aerobic groundwater conditions and will not naturally degrade, no oxygen demand is being exerted by these Compounds in the shallow groundwater at the Colonial Terminals Plant #2 property."

In this argument, Colonial fails to address the source or presence of PCE and TCE breakdown products, particularly *cis*-1,2-dichloroethene, seen in groundwater sampling during this same time period. In fact, the detection of *cis*-1,2-dichloroethene is of special interest because unlike PCE and TCE, where dechlorination is favored under anaerobic conditions, *cis*-DCE and VC are favorably dechlorinated under aerobic conditions. Thus, the groundwater being discharged to the Savannah River includes oxygen demanding substances and must be evaluated.

In addition, other degradation pathways for CVOCs are ignored such as co-metabolic degradation which can occur in both aerobic and anaerobic conditions and may exert an impact on oxygen demand. In the end, this argument is theoretical in nature and can easily be measured via the long-term BOD testing requested by EPD.

Colonial's contention that measurement of BOD in the groundwater (or river) would only reflect naturally occurring compounds not the CVOCs

Colonial argues that BOD is not an appropriate measure of organic compound contamination for several reasons, the primary one being that other natural occurring compounds in groundwater would likely dominate the BOD values that would be measured. Since compounds in groundwater such as nitrogen, sulfur, ammonia, nitrite, iron, sulfide, and sulfate contribute to the BOD measurement, there would be no way to relate the groundwater PCE and TCE impacts in the groundwater to the BOD.

In order to account for potential affects by naturally occurring compounds, EPD recommended the inclusion of a BOD sample from a background well. If, as suggested by Colonial, naturally occurring compounds would dominate any measurable DO impacts, then the contribution from CVOCs would be negligible and no remedial action would be needed. Once again, this can easily be measured via the long-term BOD testing requested by EPD.

Colonial's assertion that site geology prevents the constituents of concern in groundwater from reaching the river

EPD acknowledges that site geology may inhibit the rate of contaminant migration; however, groundwater discharge to the Savannah River is inevitable. The fact that surface water testing to-date has not yet detected CVOCs above detection limits is unsurprising given the logistical difficulties of collecting samples near the groundwater-surface water interface (EPD has previously commented that information provided by Colonial was not sufficient to demonstrate the data was representative of the conditions of surface water at the most probable point of shallow groundwater discharge to the Savannah River). Nevertheless, transport models show contaminated groundwater on-site migrating and eventually discharging to the Savannah River. In fact, the presence of CVOCs in monitoring wells outside the source area confirms that migration is occurring, albeit slowly.

Additionally, while Colonial argues that the site geology serves to slow transport of contaminants in groundwater, and that the high concentrations of PCE and TCE remaining in the subsurface decades after their initial release without similar concentrations found in the river demonstrates the stability of the plume, Colonial has not yet submitted proposal(s) for remedial action(s) associated with the identified free phase source material(s) already identified at the property.

EPD trusts that the above response addresses Colonial's questions focused on whether or not the BOD testing requested by EPD is appropriate and necessary. At this time, EPD recommends Colonial provide the requested information on the BOD issue and move forward with determining how to address the free phase source material that remain at the site. To that end, EPD provides the following comment regarding the BOD Ultimate Sampling Locations submitted by Colonial on May 27, 2016:

- EPD agrees with the well locations (MW-11R, MW-16, MW-26) and for obtaining and analyzing the long term oxygen demand test (biological oxygen demand, chemical oxygen

demand, total organic carbon, ammonia, etc.) that Colonial proposed in its May 27, 2016 email with the following modifications:

1. Add MW-08 as a background location, and
2. A duplicate sample should be obtained and analyzed from one of the three wells proposed by Colonial.

Colonial then has the option of providing a fate and transport model and assumptions used to determine what dilution, if any, occurs between the monitoring wells and discharge to the river for EPD's evaluation and concurrence. Alternatively, due to proximity to the river, EPD will assume that there is no dilution and that the long term oxygen demand measured at the monitoring well equals the long term oxygen demand at the point of discharge to the river.

The above listed comment must be addressed to EPD's satisfaction in order to demonstrate compliance with the provisions, purposes, standards and policies of the Act. Please provide a response to the above listed comments as part of the next scheduled Progress Report submittal on May 30, 2017. If you should have any questions regarding this matter, please call Tom Brodell of the Response and Remediation Program at (404) 657-8600.

Sincerely,

Jason Metzger
Program Manager
Response and Remediation Program

c: Elizabeth Booth, Watershed Protection Branch
Jeff Margolin, Ramboll Environ <jmargolin@ramboll.com>

File: VRP – Colonial Terminals Plant # 2, HSI # 10098

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