UF | UNIVERSITY of FLORIDA

Center for Environment & Human Toxicology

PO Box 110885
Gainesville, FL 32611-0885
352-392-2243 Tel
352-392-4707 Fax

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Brian Dougherty, PhD
Office of District and Business Support
Division of Waste Management
Florida Department of Environmental Protection
2600 Blair Stone Road
Tallahassee, FL 32399-2400

Re: Review of the Technical Memorandum on the RI results and FFS for the Cabot Superfund site

Dear Dr. Dougherty:

At your request, we have reviewed the *Technical Memorandum: Interim Report on Remedial Investigation Results and Focused Feasibility Study, Cabot Carbon/Koppers Superfund Site, Gainesville, Florida*. This document was prepared by Gradient and is dated November 20, 2015. This document states that the main source of soil and groundwater contamination at the Cabot Superfund site is due to the previous production of pine tar related products, which were stored in three lagoons on-site. As of the 2015 sampling event, the pine tar related groundwater plume associated with the lagoons has been delineated. This document screens soil and groundwater samples taken from 2011 to 2015 for chemicals of concern (COCs). The document also recommends a containment remediation strategy for soil and groundwater that includes excavation of impacted soils, installation of a soil cap and slurry wall, continued use of groundwater institutional controls, and monitored natural attenuation (MNA). Our review focuses on the proposed screening levels for soil and groundwater, including the proposed alternative groundwater cleanup target levels.

Remedial Action Objectives

1. Section 2.1.2 states that for both soil and groundwater datasets, analytes that were detected at a frequency of 5% or greater and exceeded the relevant health based criteria were retained as COCs. This suggests that chemicals with a detection frequency below 5% were eliminated as COCs. Although used in past risk assessments, USEPA Region 4 does not currently allow for the elimination of chemicals based on a low frequency of detection (FOD) (USEPA, 2014a). Any contaminant detected at a concentration in excess of the most relevant health-based screening criterion should be retained as a site COC and evaluated quantitatively and/or qualitatively within the risk characterization section of a human health risk assessment. Elimination based on FOD does not affect the list of soil COCs (Table 11); however seven chemicals detected at a frequency of less than 5% in groundwater have exceedances of their criteria and should be

retained as COCs: 2,4-dinitrotoluene, 2,6-dinitrotoluene, 4-chloroaniline, benzo(a)pyrene, nitrobenzene, pentachlorophenol, and methylene chloride.

2. Section 2.1.2 also states that leachability-based soil cleanup targets are not included in the FFS, as groundwater quality monitoring provides a more direct measure of leachability. In addition the document states that pine tar constituents have attenuated significantly over the past 20 years. While we agree with these statements, many chemicals presently exceed their health based screening values for groundwater. Therefore, leaching from soil should not be discounted as a source of continuing contamination. If the proposed containment based remedial strategy (impermeable cap and slurry wall) is chosen for the site, the issue of leachability will be moot.

3. The direct exposure commercial/industrial soil cleanup target levels (SCTLs) were used for screening COCs in soil. Tables 2 and 6 state that there is no available criterion for screening fluoride; however a direct exposure commercial/industrial SCTL of 130,000 mg/kg is listed in Chapter 62-777, FAC. This does not alter the conclusion that fluoride is not a COC in soil.

4. For groundwater, a combination of groundwater cleanup target levels (GCTLs), maximum contaminant levels (MCLs), USEPA RSLs, and proposed alternative GCTLs (AGCTLs) were used for screening. We have the following comments on the screening levels presented in this document. Groundwater COCs should be rescreened using applicable criteria.

   a. Secondary drinking water standards are enforceable in Florida and should be used as screening criteria if they are lower than the MCL or a risk-based value (see Appendix A). This applies to ethylbenzene, toluene, xylenes (total), copper, isopropylbenzene (or cumene), methyl acetate, aluminum, iron, manganese, and zinc (Tables 4, 5, 8, and 9). Further discussions with the FDEP may be necessary to determine if health-based criteria (or primary standards) are appropriate for this site.

   b. Tables 5 and 9 state that there are no available criteria for screening chloride, total nitrate and nitrite, or sulfate. However, either MCLs or secondary standards exist for each of these chemicals (Chapter 62-777, FAC; see Appendix A).

5. This document also included AGCTLs developed for chemicals that are major pine tar-related constituents: 2-methylphenol, 3-methylphenol, 4-methylphenol, 2,4-dimethylphenol, and phenol (Table C.1). These alternative cleanup levels were calculated using the GCTL equation for non-carcinogens promulgated in Chapter 62-777, FAC, updated USEPA exposure factors, and alternative toxicity values (for some chemicals). We have the following comments regarding the calculation of the AGCTLs.

   a. The proposed AGCTLs were developed using an adult body weight of 80 kg and an adult water consumption rate of 2.5 L/day as recommended by OSWER Directive 9200.1-120 (USEPA, 2014b). Currently, GCTLs are calculated in Florida using an adult body weight of 70 kg and a water consumption rate of 2 L/day. Though USEPA exposure assumptions don't match Chapter 62-777, FAC, they represent current USEPA recommendations and we consider AGCTLs developed with them to also be protective.

b. The proposed 2-methylphenol and 3-methylphenol AGCTLs (640 µg/L for each) were calculated using an Agency for Toxic Substances and Disease Registry (ATSDR) minimal risk level (MRL) of 0.1 mg/kg-day (ATSDR, 2008). However, both 2- and 3-methylphenol have USEPA Integrated Risk Information System (IRIS) reference doses (RfDs) of 0.05 mg/kg-day (USEPA, 1988). Due to the fact that IRIS has a more extensive vetting process than ATSDR, there is more confidence in the IRIS toxicity values and they are preferred (Chapter 62-780, FAC). Additionally, these chemicals are considered class C carcinogens. Currently in Chapter 62-777, FAC, the promulgated GCTLs for class C carcinogens that do not have cancer slope factors are derived by dividing the reference dose by a factor of 10. Using the IRIS toxicity values and updated exposure factors would result in an AGCTL of 32 µg/L for both 2- and 3-methylphenol. This value is below the promulgated GCTL of 35 µg/L in Chapter 62-777, FAC for both chemicals. We see no need to apply the lower AGCTL for these chemicals.

c. Table C.1 incorrectly lists a withdrawn IRIS value as the basis for the 2005 FDEP GCTL for 4-methylphenol. The toxicity value for 4-methylphenol was obtained from HEAST. The proposed 4-methylphenol AGCTL (640 µg/L) was calculated using an Agency for Toxic Substances and Disease Registry (ATSDR) minimal risk level (MRL) of 0.1 mg/kg-day (ATSDR, 2008). Both HEAST and ATSDR are tier 2 toxicological sources (Chapter 62-780, FAC), therefore, the most recent toxicity value is chosen for development of the AGCTL. The ATSDR MRL is more recent than the HEAST RfD (2008 versus 1997). Therefore, we agree with the proposed AGCTL of 640 µg/L for 4-methylphenol.

d. The AGCTL for 2,4-dimethylphenol was derived using the IRIS RfD of 0.02 mg/kg-day (currently used as the basis for 2005 GCTL) and the updated USEPA adult body weight and water consumption rate. The proposed AGCTL is 128 µg/L. We agree with the derivation of this value.

e. The ACGTL for phenol was developed using a risk-based approach. Currently, the GCTL for phenol is 10 µg/L, based on organoleptic effects. An IRIS RfD of 0.3 mg/kg-day was used with USEPA exposure assumptions for adult body weight and water consumption rate. The proposed AGCTL calculated using these assumptions is 1920 µg/L. Further discussions with the FDEP may be necessary to determine if health-based values are appropriate for this site.

Preferred Remedy – Containment-Based Approach

6. The document states that the preferred remedy for contamination management at this site will include removal of impacted shallow soil during removal of the storm water pond, installation of a soil cap on the middle and east lagoon (Figure

14), installation of a slurry wall through the Upper Hawthorn Group (65 ft bgs) (Figure 14), contingent use of groundwater extraction for hydraulic control within the slurry wall, institutional controls to limit groundwater exposure on site, and monitoring and natural attenuation (MNA) for the down gradient groundwater plume and the Lower Hawthorn Group. We have the following comments regarding the preferred remediation strategy.

a. Figures A.7, A.8, and A.9 model groundwater contamination plume evolution for scenarios including no slurry wall, a small slurry wall, and large slurry wall, respectively. The large slurry wall is proposed to contain a large portion of the contamination plume associated with the lagoons, including the peak of the plume. The larger wall area is preferable, as the model suggests a decrease in plume longevity. Additionally we agree that institutional controls will still be necessary to prevent exposures to the contaminated groundwater plume in areas not captured by the slurry wall.

b. Figure 14 shows the location of the proposed cap and slurry walls (both small and large). The proposed installations cover the middle and eastern lagoon but are not planned for the western lagoon. As benzene was found elevated in the soil (sample SB-2) and elevated levels of VOCs and SVOCs were found in the groundwater (WS-1 and WS-2), we recommend including the western lagoon in the containment remedy.

c. Contaminated surface soils that exceed commercial/industrial SCTLs outside of the proposed cap area remain an issue for the protection of human health. Additional information is needed regarding the fate of impacted surface soils found outside the cap.

As requested, we have reviewed the reference citations, tables, figures, Table of Contents, List of Tables, and List of Figures for accuracy. All of these elements were correctly represented in the document. Typographical, formatting, or other editorial errors (if any) were noted above. Conclusions and recommendations were inherent in the document and are addressed in the above comments. Please let us know if you have any questions regarding this review.

Sincerely,

Hannah M. Neeley, MPH

Leah D. Stuchal, Ph.D.

Stephen M. Roberts, Ph.D.

References:

ATSDR (2008) *Toxicological Profile for Cresols.* U.S. Department of Health and Human Services, Public Health Service, Agency for Toxic Substances and Disease Registry, Atlanta, Ga.

NJDEP (2004) *Basis and Background for Criteria Derivation and Practical Quantitation Levels, Ground Water Quality Standards Rule Recodification and Readoption with Amendments.* N.J.A.C. 7:9C. 38p., September.

USEPA (2014a). *Draft Final Region 4 Human Health Risk Assessment Supplemental Guidance.* Technical Services Section Superfund Division EPA Region 4.

USEPA (2014b) *Human Health Evaluation Manual, Supplemental Guidance: Update of Standard Default Exposure Factors.* United States Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, DC.

Appendix A

Recommended Screening Levels for Groundwater COCs

I. Recommended Screening Levels for Groundwater COCs

Chemical	Screening Concentration (µg/L) Tables 4, 5, 8, & 9	Source	Recommended Screening Concentration (µg/L)	Source
Ethylbenzene	700	MCL	30	Secondary Standard
Toluene	1,000	MCL	40	Secondary Standard
Xylenes (total)	10,000	MCL	20	Secondary Standard
Isopropylbenzene	450	RSL	0.8	Secondary Standard
Methyl acetate	20,000	RSL	3,000	Secondary Standard
Copper	1,300	MCL	1,000	Secondary Standard
Aluminum	20,000	RSL	200	Secondary Standard
Iron	14,000	RSL	300	Secondary Standard
Manganese	430	RSL	50	Secondary Standard
Zinc	6,000	RSL	5,000	Secondary Standard
Chloride	NA		250,000	Secondary Standard
Sulfate	NA		250,000	Secondary Standard
Total Nitrate + Nitrite	NA		10,000	MCL