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4 October 2017

Mr. Scott Miller
U.S. Environmental Protection Agency, Region 4
Atlanta Federal Center
61 Forsyth Street S.W.
Atlanta, Georgia 30303-8960

Subject: Response to comments from GRU on the Cabot Remedial Design and Predesign Investigation Work Plans, Cabot Carbon/Koppers Superfund Site, Gainesville, Florida

Dear Mr. Miller:

This letter provides Geosyntec Consultant's (Geosyntec's) responses to Gainesville Regional Utilities' (GRU) comments (dated September 15, 2017) on the August 2017 Remedial Design Work Plan (RDWP), and the Predesign Investigation Work Plan (PDI Work Plan).

The comments below retain their original comment number from the GRU letters. However, comments are organized as two sections. The first section includes comments that we are responding to in writing as well as the responses to each of them, and the second section is a list of comments that will be discussed with stakeholder before providing a response.

GRU COMMENTS ON THE RDWP:

RDWP comment responses in writing:

Comment 1: *Section 1.1 – It should be acknowledged that, even with optimization, attaining GW cleanup goals in the surficial aquifer will be a very long-term process.*

> **Response:** This may be true in certain portions of the Site; continued groundwater monitoring data, especially after the Hawthorn remedy has been implemented, will be the best way of assessing the time required for achieving cleanup goals.

Comment 2a: *Section 2.2 – The RD Work Plan states that one RAO is to "Restore groundwater quality in the downgradient plume to achieve health-based criteria, as appropriate". The paragraph following the bullets includes the statement "The effectiveness of the remedy in the context of groundwater RAOs will be evaluated based on its ability to reduce the footprint of the groundwater plume over time and decrease concentrations within the plume to eventually attain health-based criteria and meet GCTLs at the downgradient Site boundary". GRU asks:*

a. What does the qualifying language "as appropriate" mean?

Response (2a): The phrase "as appropriate" is included since a hierarchy of health-based criteria has been established for the COCs based on availability of standards and/ or benchmarks.

Comment 3: Section 2.1.5 – *It can be said that removal and natural attenuation of COCs in much of the surficial aquifer was rapid relative to the rate of removal and natural attenuation in the HG; however, it was not rapid. COC concentrations in the surficial still exceed GCTLs and DNAPL has recently been observed in the surficial aquifer vadose zone at the west side of the Chevrolet dealership property.*

Response: Acknowledged, this is a discussion of relative time frames and groundwater concentrations.

Comment 5: Section 2.2.4, Part II: Groundwater Extraction – *The RD Work Plan states, "Extraction within the containment system will mitigate the vertical migration from the UHG into underlying aquifers..." The word "mitigate" is ambiguous. It should be understood that GW extraction from within the containment will reduce but not eliminate the 25–30 ft head difference and downward migration between the UGH and the LHG.*

Response: Acknowledged.

Comment 6b: Section 2.2.4, Part II: Groundwater Extraction – *The RD Work Plan states "The extraction system will operate until it meets performance metrics that will be established during the RD" and LHG groundwater extraction and treatment will be used as a contingency measure in the unlikely event that concentrations in the LHG do not attenuate in response to the UGH remedy. GRU asks:*

b. Given that the MHG clay may significantly retard vertical migration from the UHG to the LHG, how long does Cabot propose waiting to evaluate the response of LHG COC concentrations to the UHG remedy?

Response (6b): The Lower Hawthorn Group (LHG) groundwater will be monitored after remedial action to observe effects of the slurry wall, cap, and pumping on LHG groundwater quality. As noted in your comment, the site is complex, so a timeframe for monitoring cannot be specified. Appropriate monitoring will be performed as determined by Cabot and United States Environmental Protection Agency (USEPA).

Comment 8. Section 3.3 – *The PDI Work Plan will included details regarding borings for the vertical barrier wall design. When will the alignment/footprint of the slurry wall be determined? Can Cabot share that with stakeholders now?*

Response: Refer to the PDI Work Plan for anticipated vertical barrier wall alignments and boring locations. Actual alignments will be contingent upon PDI activity results. Results

from the investigation will be shared with stakeholders between the completion of field work and issuance of the 50% design.

Comment 9: Section 3.4.1, Part I: Containment – *How will the geotechnical borings be drilled? At what interval will soil samples be collected? Are these the same as the SPT borings discussed in the 3rd sub-bullet? (This comment may be more appropriately addressed in the PDI Work Plan; however, certain details regarding the borings are provided in this RD Work Plan so GRU is providing these comments now so they can be recorded.)*

Response: Details regarding geotechnical borings and sampling intervals are addressed in the PDI Work Plan.

Comment 10: Section 3.4.2, Part 2: Groundwater Extraction – *The RD Work Plan proposes conducting a step-drawdown test at HG-28S. Was the pre-sampling purge rate in that well sufficient to conduct a step-drawdown test?*

Response: Yes, the pre-sampling purge rate in that well is sufficient for a step-drawdown test.

Comment 12: Section 3.4.2, Part 2: *In order to design a groundwater extraction system that will operate after the Cabot and Koppers containment systems are in place – Cabot must know what the future flow fields look like. Current flow directions in the Surficial and the UHG, and potentially in the LHG will be highly altered from that observed today. As GRU stated previously - Cabot must conduct appropriate modeling of groundwater flow in the surficial aquifer, and the Upper and Lower Hawthorn Group. The model should take into account the upgradient barriers to flow that will be caused by the Cabot barrier wall and the much larger Koppers barrier wall. The model should also account for vertical flow through the Upper, Middle, and Lower Hawthorn Clays. Understanding flow fields downgradient of the slurry wall will be important in remediating and monitoring the dissolved plume outside the containment wall.*

Response: Cabot plans to perform groundwater modeling to evaluate the impact of the proposed barrier walls on the groundwater flow regime.

Comment 13: Section 4.2.1 – *GRU strongly believes that results of the PDI must be available to stakeholders before Cabot submits the 50% design document. Periodic updates and meetings/conference calls should be part of the plan and schedule.*

Response: Results from the investigation will be shared with stakeholders between the completion of field work and issuance of the 50% design.

Comment 14a: Schedule

a. *GRU suggests a decision point where Cabot, EPA, and stakeholders agree on slurry wall alignment and other details before reaching 50% design stage.*
b. *The schedule contains no provision for additional characterization of groundwater contamination at the site. As stated previously, GRU strongly believes this must be completed before the groundwater remedy can be designed.*

Response 14a: See response to comment #13. Vertical barrier wall alignment will be discussed during the meeting after PDI activity results are available and before the 50% design stage.

RD Work Plan comments to be discussed on conference call:

Comment 2b: *Section 2.2 – The RD Work Plan states that one RAO is to "Restore groundwater quality in the downgradient plume to achieve health-based criteria, as appropriate." The paragraph following the bullets includes the statement "The effectiveness of the remedy in the context of groundwater RAOs will be evaluated based on its ability to reduce the footprint of the groundwater plume over time and decrease concentrations within the plume to eventually attain health-based criteria and meet GCTLs at the downgradient Site boundary." GRU asks:*

b. *Is the RAO to achieve health-based criteria at the property boundary – and is it acceptable to exceed health-based criteria up to the property boundary?*

Response 2b: To be discussed on conference call.

Comment 4: Section 2.1.5 – *The RD WP states, "Groundwater quality effects associated with the Former Processing and Storage Area are localized and attenuate within a short distance." The remedy employed at the Cabot Site must address full extent of groundwater contaminants in all aquifers. Figures in the FFS confirm that contaminant plumes have not been adequately constrained. See the naphthalene and benzene plume maps in particular. GRU believes that additional characterization of groundwater contamination is required before the groundwater remedy can be designed. We do not see additional groundwater characterization described in this RD Work Plan.*

Response: To be discussed on conference call.

Comment 6a: Section 2.2.4, Part II: Groundwater Extraction – *The RD Work Plan states "The extraction system will operate until it meets performance metrics that will be established during the RD" and LHG groundwater extraction and treatment will be used as a contingency measure in the unlikely event that concentrations in the LHG do not attenuate in response to the UGH remedy. GRU asks:*

a. *When will Cabot's proposed performance metrics be shared with stakeholders? GRU believes that waiting until the 50% design stage is too late.*

Response 6a: To be discussed on conference call.

Comment 7: Section 3.3 – *One of the Preliminary Design Investigation objectives must be to finalize groundwater characterization at the site.*

Response: To be discussed on conference call.

Comment 11: *In making our comments to the FFS, GRU agreed that there was sufficient knowledge to complete that document. However, GRU took the position that additional groundwater investigation will be required to meet two objectives for the remedial design and long-term monitoring of remedial performance:*

a. Delineation of the dissolved-plume boundaries and characterization of additional sources to facilitate remedial design.

b. Installation of additional permanent wells for monitoring of plume migration and the attainment of remedial actions goals. Some of these well locations could also satisfy the objective 1, above.

It is now time to plan for that investigation.

Response: To be discussed on conference call.

Comment 14b: *Schedule*

b. The schedule contains no provision for additional characterization of groundwater contamination at the site. As stated previously, GRU strongly believes this must be completed before the groundwater remedy can be designed.

Response: To be discussed on conference call.

COMMENTS REGARDING PDI WORK PLAN:

PDI Work Plan comments answered in writing:

Comment 1: Section 3.3.1, pdf page 11 – *The work plan cites SOG-011 as a guidance the field crew will follow. The SOGs included in this work plan are very general in nature and usually provide much less detail than the work plan. For instance, SOG-001 provides a list of drilling methods that could be used. The work plan specifies hollow stem augers with SPT and Shelby tube. (The same general comment is true of the well development SOG.)*

Response: The SOGs include instructions for the expected drilling approach (i.e., augers) and include other approaches to retain flexibility if an alternative drilling approach is needed in the field. Specifics regarding the selected type of drilling and sampling are provided in the PDI Work Plan.

Comment 2: Section 3.3.1, pdf page 11 – *Regarding SPT samples at odd-numbered boring locations: please confirm that SPT split spoon samples will be collected continuously from ground surface to boring total depth.*

Response: Correct, in odd-numbered boring locations, SPTs tests will be performed continuously from the ground surface to the bottom of exploration.

Comment 4b: Section 3.3.1 pdf page 11 – *The work plan states "If evidence of pooled pine tar is observed, the boring will be abandoned where such tar is observed, the boring will be grouted and another boring (i.e., step-out) will be performed approximately 25 ft outward from the initial boring."*

b. Regarding step-out borings: When Geosyntec proposes to move borings "outward" we assume that means perpendicular to the original orientation of the cutoff wall and farther from the Cabot Lagoons (source). Please confirm.

Response 4b: This is correct, as long as there is no physical obstruction preventing a perpendicular offset.

Comment 6: Section 3.3.1, pdf page 12 – *The work plan states "The Geosyntec field engineer/geologist will collect soil samples from every split spoon sample by placing soil from each split spoon (i.e., discrete samples) into a 1-gallon resealable bag." What is the target volume from each split spoon? How many discrete samples will be collected from each split spoon?*

Response: The goal is to obtain 100% recovery (i.e., all 2 ft of the drive length) for SPT tests. Actual recovery is dependent on in situ condition. It is anticipated that typically one sample will be collected from each split spoon, except where stratigraphic changes occur, then two samples may be taken (one for each stratum).

Comment 7: Section 3.3.1, pdf page 12 – *The work plan states "The driller will mix all drill cuttings (i.e., all subsurface layers) from one boring to make a uniform composite of the soil for the location." And "The field engineer/geologist will collect a composite soil sample into a 1-gallon resealable bag." How will Geosyntec assure reproducibility of sampling? How will cuttings from 65 ft of borehole be uniformly homogenized?*

Response: The work plan will be revised to include the following procedure:

1) Place one shovel-full of auger cuttings for every 5-foot drilling interval onto plywood covered with plastic. These cutting represent a composite sample from the 5-foot interval that is homogenized by the augers.
2) After completing 65 ft of drilling, the soil will be mixed (the volume will be ~10 gallons so it can be mixed using a shovel).
3) Collect a 5-gallon composite sample and a 1-gallon composite sample from the mix.

Comment 8: Section 3.3.1, pdf page 12, Last paragraph. – *Geotechnical analyses are proposed at only four locations. Is that sufficiently close spacing?*

Response: Geotechnical field analyses (i.e., Standard Penetration Tests) will be performed at each boring location. Also, samples will be collected at all locations and laboratory analyses will be performed on samples from many more than 4 boring locations. A minimum of 36 samples for the vertical barrier wall, cap, and pond will be collected. The attached matrix of samples provides a summary of these samples. More samples may be collected and tested at the discretion of the field engineer/geologist.

Comment 9: Section 3.3.1, pdf page 13 – *The work plan states "The laboratory tests as described in PDI-3 will be the determining factor regarding which of these samples are carried forward for additional testing." What lab results/criteria will qualify a sample for additional testing? What criteria will disqualify a sample? How does that relate to suitability for a slurry wall?*

Response: Samples are being collected for soil characterization, and as indicated in the response to comment #8, soils at various locations and depths are being examined for their geotechnical properties. Samples will be chosen (where applicable) based on careful consideration of multiple criteria including grain size, fines content and plasticity. For the vertical barrier wall samples, the goal is to identify samples that can be tested for mix design and represent typical and worst-case conditions for achieving a lower hydraulic conductivity. There is no specific, or linear criteria, that can be specified a priori for selecting which sample to test. Rather, selection requires an assessment of grain size and type of soil, plus engineering judgement once results for soils collected from throughout the site are evaluated. However, we anticipate carrying soil samples with lower fines content forward for treatability testing since such soils typically represent the worst case for achieving a low

hydraulic conductivity. However, soils with low fines content does not necessarily equate to the greatest difficulty in achieving the target hydraulic conductivity because the plasticity of the fines in the sample must also be considered.

Comment 10: Section 3.3.2, pdf page 13 – *The work plan calls for two borings for low-permeability cap design (load-bearing capacity). GRU suggests a minimum of one boring in each of the three former Cabot Lagoons because the ponds were constructed sequentially with the eastern lagoon being the oldest, the western lagoon being the youngest, and materials discharged to the lagoons may have changed over the years.*

Response: Agreed. The work plan will be modified to include one Shelby tube sample per lagoon.

Comment 11: Section 3.3.2, pdf page 14 – *The work plan states "For the Shelby tube sample, use a flat-edged spatula or equivalent to create a smooth, competent face on the bottom of the sample, conduct three field torvane tests on this face, and record the results of the torvane test on the field forms:*

a. *Does this assume that the bottom of the Shelby tube is within the lagoon-bottom sediment? What if the Shelby tube has fully penetrated the lagoon fill and terminates in underlying surficial sands?*

b. The depth at which the Shelby tube sample will be collected will presumably be determined based on nearby borings. Please plot those in Figure 4.

c. Is it possible to conduct multiple torvane tests on a single surface? Won't the first test alter the sediment and thereby alter the results of subsequent tests?

Response:

a. Shelby tubes will be advanced in the lagoon sediment only, to the extent practicable. The PDI Work Plan calls for performing continuous split spoon sampling (i.e., SPT tests) at the locations where Shelby tubes are collected. The Shelby tube sample will require a second boring adjacent to where SPT testing is performed because you cannot collect a Shelby Tube when also doing continuous SPT. Thus, the protocol will be to perform two borings at the specified locations. SPT testing will be performed in the first boring to define the depth to the top of sediments. The driller will then auger to the top of sediments at an adjacent location and then advance the Shelby Tube.

b. See previous response.

c. The torvane is a hand-held instrument that has a sufficiently small diameter so the test can be performed up to three times, without overlap, on the cross section of a Shelby Tube.

Comment 12: Section 3.3.3, pdf page 15 – *The work plan states "The objective of this PDI activity is to assess subsurface conditions above the water table in the proposed location for the relocated stormwater pond. …The driller will advance a boring into the surficial aquifer using 4.25-inch HSAs to a depth of approximately 25 ft bgs…"*

a. GRU encourages drilling to the top of the UHG clay at the proposed stormwater pond to determine the presence/absence of contaminants there. GRU notes that the water table is much shallower than 25 ft.

b. What specific "subsurface conditions" are Cabot investigating?

c. Is the stormwater pond intended to be a retention pond or detention pond (lined?) and what is the proposed depth?

Response:

a. Delineation of slurry wall alignment is done using the VBW borings. There is no need to drill 40 ft deeper at the SPD boring locations.

b. Geotechnical-related conditions such as soil grain size distribution, strength parameters and soil particle type are being investigated. These will be used during the design.

c. The stormwater pond will likely be constructed similarly to the existing storm water pond. The volume and depth of the pond will be determined during design.

Comment 13: Section 3.3.3, pdf page 15 – *SOG-006 should include, by reference(?), SOG-010 (Description of Pooled DNAPL - as amended). All soil sample descriptions for the Cabot Site should include observations of odors, staining by DNAPL (whether indicative of mobile pine tar or other NAPL impacts), color changes on exposure to air, etc.*

Response: Observations, including odor, nonaqueous phase liquid (NAPL) presence, and mobility, are part of the visual-manual procedure. These observations will be recorded on the field forms.

Comment 14: Section 3.3.3, pdf page 15 – *The work plan states "The field engineer/geologist will composite soil samples from all split spoon samples at a given location by placing the soil onto plastic sheeting, a plywood board, or in a bucket, and then mixing the soil into a single composite sample for each borehole.? Twenty-five feet of split spoon sample is a large volume of soil to homogenize. How will Geosyntec produce a homogeneous sample from that large volume? If the objective is to determine the potential infiltration rate for soils, should two or more samples be*

generated from each boring—one between the proposed bottom of the stormwater pond and the water table and one or more below that?

> **Response:** A standard split spoon is 1.5 inches in diameter, so 25 ft of split spoon samples equal 0.3 cubic ft of soil (assuming 100% recovery for all samples). This equates to <2.5 gallons of soil; therefore, the soil can be mixed into a composite sample using a garden shovel and a bucket. The upper 25 ft is expected to be the surficial aquifer, which is why the sample will be homogenized. One composite sample is sufficient.

Comment 15: *Section 3.4, pdf page 16 – Aquifer hydraulic testing is proposed for existing monitoring HG-29S and either SA-29 or ITW-8. GRU understands that HG-28S supports a flow rate of 0.1 gpm during sampling (water levels drew down at 0.25 gpm during well development), that SA-29 maintained flow rate of approximately 1.5 gpm during development, and that ITW-8 sustains a flow of 0.2 gpm during sampling with minimal drawdown. Are these low flow rates likely to be significantly increased by additional well development to the point that a step drawdown test can yield useful data?*

> **Response:** Low-flow groundwater sampling is intended to produce minimal drawdown and is therefore performed at a maximum rate of 500 milliliters per minute. This is different from the intent of the step test which is to stress the well and cause drawdown. If these wells yield results that the project team feel are not representative of the aquifer, which will not be known until the wells are pumped, then other wells may be tested.

Comment 16: Section 4, pdf page 26 – *The work plan states "…design information will be shared with US EPA and other stakeholders either in a report, as one or more technical memoranda, and/or in a technical workshop that would be held in Gainesville, FL so that US EPA and local Stakeholders can comment on the work and participate in the remedial design." GRU appreciates Cabot's continued collaborative approach to investigation and remediation at this site. GRU recommends that the reports, technical memoranda, etc. transmitting the findings of investigations and design information be conveyed as soon as possible after being generated and well in advance of the 50% design milestone.*

> **Response:** As indicted on the schedule, the plan is to obtain the results and disseminate the information, then have a meeting to discuss the results and plans, all prior to completion of the 50% design.

Comment 17: Section 4, pdf page 26 – *GRU suggests that Cabot and EPA convene a workshop at the earliest possible date to discuss the RD Work Plan, the PDI Work Plan and the Remedy Optimization WP – to allow Cabot to begin work as early as possible. However, GRU believes that, if our recommended improvements to the RD Work Plan are implemented, the proposed schedule is unrealistic.*

Response: Cabot is endeavoring to move this project through remedial design and remedial implementation as quickly as is reasonably possible. We recognize that schedule slippage may occur, but we have a strong desire to not have non-critical-path issues delay progress towards remedy implementation.

Comment 18: Figure 3

a. What is the rationale for extraction well locations and groundwater sample locations inside the containment area? Groundwater gradient will be flat inside the barrier wall after construction. UHG permeability is low. Should the extraction wells be distributed more uniformly?

b. Look at COC distribution in UHG. Other extraction wells to capture the plumes?

c. What will the flow field look like after the Cabot and Koppers slurry walls are constructed? Are the locations plotted for HR-EW-01 through HR-EW-03 appropriate for that flow field condition? GRU understands that the locations plotted are "conceptual" but the concept appears to relate to existing conditions and does not appear to consider the influence of the two slurry walls.

Response:

a. Locations shown on Figure 3 are conceptual. Distributing wells uniformly inside the slurry wall is a reasonable approach and will be considered, but so is placing extraction wells in areas of higher groundwater contamination (as shown in Figure 3). The actual locations of the wells will be determined during design.

b. Acknowledge. We will consider this comment during the design.

c. Cabot is planning to perform modeling to evaluate anticipated impact of the vertical barriers on groundwater flow fields.

Comment 19: Appendix B: SOG-001 Soil and Rock Boring – *SOG-006 should include, provisions of SOG-010 (Description of Pooled DNAPL–as amended). All soil sample descriptions for the Cabot Site should include observations of odors, staining by DNAPL (whether indicative of, color changes on exposure to air, etc. See Comment #13.*

Response: Observations, including odor, staining, color changes, and NAPL mobility, are part of the visual-manual procedure.

PDI Work Plan comments to be discussed on conference call:

General Comment: *GRU suggests that Cabot and USEPA convene a meeting to discuss the Cabot RD Work Plan, PDI Work Plan, and the Groundwater Remedy Work Plan simultaneously. GRU*

believes that all three documents are interrelated to the point that changes in one will likely result in impacts to work being conducted under the others. It is good that all three documents have been submitted essentially concurrently.

Response: This comment is being addressed via a conference call among the stakeholders.

Comment 3: Section 3.3.1, pdf page 11 – *The plan states that "The Geosyntec field Engineer/geologist will visually inspect soil cuttings for mobile DNAPL (pooled pine tar), as drilling occurs…" GRU believes the intent should be to record evidence of any DNAPL (residual, liquid free product that may be immobile, as well as mobile product). NAPLs other than pine tar may be present (as seen in FDEP Transect #4 near the Cabot Lagoons).*

Response: To be discussed on conference call.

Comment 4a: Section 3.3.1 pdf page 11 – *The work plan states "If evidence of pooled pine tar is observed, the boring will be abandoned where such tar is observed, the boring will be grouted and another boring (i.e., step-out) will be performed approximately 25 ft outward from the initial boring."*

a. *GRU believes that the slurry wall should be aligned such that, at a minimum, all significant DNAPL impacts – whether pooled tar or other forms – must be contained within the slurry wall enclosure. The FFS states "The selected remedy for the Cabot Carbon portion of the Site is Alternative 8a/b, which is a containment based remedial approach with mass removal/treatment components. The remedial approach involves the physical containment of the source area and concentrated portion of groundwater plume with a slurry wall and a low permeability cap…".*

Response 4a: To be discussed on conference call.

Comment 5: Section 3.3.1, pdf page 11 – *The work plan states: "Step-out borings will not be performed on the north and east edges of the proposed VBW alignment (i.e., for approximately VBW-05 through VBW-10) because roadways prohibit installing a VBW beyond the footprint shown on Figure 4.I.*

a. *The road on the east side is a limerock jeep trail. DNAPL has already been documented east of that in NEL Transect #4.*

b. *GRU's position is that all substantial accumulations of source material should be treated or contained within the slurry wall. While GRU does not expect to see DNAPL impacts at the northern proposed boring locations, we do not accept the statement that it is not possible to extend the wall north of the road.*

Responses 5a and 5b: These is comments will be discussed during a conference call before responding.

Comment 20: Appendix B: SOG-10 – SOG-10 states *"This Standard Operating Guideline (SOG) was prepared to direct field personnel on the methods for visual identification of pooled pine tar (i.e., mobile DNAPL)…the goal is to place the vertical barrier wall such that it encircles areas of mobile DNAPL, to the extent practicable in the field."*

a. *The FFS states "The remedial approach involves the physical containment of the source area and concentrated portion of the groundwater plume with a slurry wall and low permeability cap…" GRU believes strongly that this objective should not be reduced.*

b. *SOG-10 should be expanded to include not only identifying mobile pine tar but also lesser DNAPL impacts to soil. GRU suggests that Cabot adopt a method for qualitatively characterizing contaminant impacts similar to the one used by Beazer East at the Koppers Site (Category 1 through Category 5) GRU believes it is important to note odors and residual DNAPL impacts – whether in the form of immobile pine tar, immobile NAPLs that may not be pine tar, staining, etc.*

Response: To be discussed on conference call.

We look forward to our upcoming a conference call to address the comments that have a response of "To be discussed on conference call".

Sincerely,

Steven E. Poirier, P.E.
Senior Engineer

Attachment: Geotechnical sample and testing matrix

Copies to: Wayne Reiber - Cabot
Manu Sharma, Meghna Swamy – Gradient
Richard Hutton, John Herbert, Stanley Feenstra – GRU
Kelsey Helton, Gus Olmos, Ted Goodman – FDEP
Pat Cline – University of Florida
Bryan Cotter – Water & Air

Table:
Summary of Laboratory Testing Samples
PDI Work Plan - Hawthorn Remedy
Cabot Carbon Superfund Site

		Proposed Laboratory Testing						
Sample Type[1]	**Sample ID[2]**	**ASTM D422 Particle Size Analysis**	**ASTM D2216 Moisture Content**	**ASTM D2487 USCS Classification**	**ASTM D4318 Atterberg Limits**	**ASTM D2974 Moisture, Ash, Organic Content**	**ASTM D4972 Soil pH**	**ASTM D2435 1-D Consolidation**
Vertical Barrier Wall Composite Samples	VBW-01-[DATE]-C	X	X	X	X	X	X	
	VBW-02-[DATE]-C	X	X	X				
	VBW-03-[DATE]-C	X	X	X	X	X	X	
	VBW-04-[DATE]-C	X	X	X				
	VBW-05-[DATE]-C	X	X	X	X	X	X	
	VBW-06-[DATE]-C	X	X	X				
	VBW-07-[DATE]-C	X	X	X	X	X	X	
	VBW-08-[DATE]-C	X	X	X				
	VBW-09-[DATE]-C	X	X	X	X	X	X	
	VBW-10-[DATE]-C	X	X	X				
	VBW-11-[DATE]-C	X	X	X	X	X	X	
	VBW-12-[DATE]-C	X	X	X				
	VBW-13-[DATE]-C	X	X	X	X	X	X	
	VBW-14-[DATE]-C	X	X	X				
Vertical Barrier Wall Discrete Samples	VBW-[NORTH]-[DATE]-[SURIFICAL AQUIFER]	X	X		X			
	VBW-[NORTH]-[DATE]-[UPPER CLAY]	X	X		X			
	VBW-[NORTH]-[DATE]-[UPPER HAWTHORN GROUP]	X	X		X			
	VBW-[NORTH]-[DATE]-[MIDDLE CLAY]	X	X		X			
	VBW-[EAST]-[DATE]-[SURIFICAL AQUIFER]	X	X		X			
	VBW-[EAST]-[DATE]-[UPPER CLAY]	X	X		X			
	VBW-[EAST]-[DATE]-[UPPER HAWTHORN GROUP]	X	X		X			
	VBW-[EAST]-[DATE]-[MIDDLE CLAY]	X	X		X			
	VBW-[SOUTH]-[DATE]-[SURIFICAL AQUIFER]	X	X		X			
	VBW-[SOUTH]-[DATE]-[UPPER CLAY]	X	X		X			
	VBW-[SOUTH]-[DATE]-[UPPER HAWTHORN GROUP]	X	X		X			
	VBW-[SOUTH]-[DATE]-[MIDDLE CLAY]	X	X		X			
	VBW-[WEST]-[DATE]-[SURIFICAL AQUIFER]	X	X		X			
	VBW-[WEST]-[DATE]-[UPPER CLAY]	X	X		X			
	VBW-[WEST]-[DATE]-[UPPER HAWTHORN GROUP]	X	X		X			
	VBW-[WEST]-[DATE]-[MIDDLE CLAY]	X	X		X			
Low-Permeability Cap Design Samples	CD-01-[DATE]-[DEPTH] (Shelby Tube)	X	X		X			X
	CD-02-[DATE]-[DEPTH] (Shelby Tube)	X	X		X			X
Stormwater Pond Design Samples	SPD-01-[DATE]-C	X	X	X				
	SPD-02-[DATE]-C	X	X	X				
	SPD-03-[DATE]-C	X	X	X				
	SPD-04-[DATE]-C	X	X	X				

Notes:

1. Sample Types correspond to the PDI Activities described in the PDI Work Plan. Vertical Barrier Wall samples will be used to guide the selection of additional VBW samples to be used for the Mix Design.

2. Sample IDs shown contain placeholders for date, boring location for vertical barrier wall discrete samples, and depth interval for vertical barrier wall discrete samples and Shelby Tube samples. Sample IDs will be generated in the field by the Field Engineer/Geologist.

3. This table contains the minimum sampling to be performed; additional samples may be collected at the discretion of the field engineer/geologist or Cabot project team.

4. Additional laboratory testing may be performed at the discretion of the Field Engineer/Geologist or Geosyntec Engineer.

5. "VBW" = vertical barrier wall, "CD" = Cap Design, "SPD" = Stormwater Pond Design, "[DATE]" = a placeholder for date of sample, "[WEST]" = placeholder for boring location to be determined by Field Engineer/Geologist, "[e.g., UPPER CLAY]" or "[DEPTH]" = placeholder for depth interval of a discrete sample, "C" = composite sample