UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 4

61 Forsyth Street
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March 21, 2012

Mr. James R. Erickson, P.G.
Vice President, Principal Hydrogeologist
Tetra Tech GEO
363 Centennial Parkway, Suite 210
Louisville, CO 80027

Dear Mr. Erickson:

Thank you for the February 14, 2012 revision 1 Workplan titled: "*Former Process Area In-Situ Geochemical Stabilization Remediation Demonstration Project Workplan for Hawthorn Group Deposits, Former Koppers Inc. Site, Gainesville, Florida*". Our comments on the Workplan are as follows:

1. In the third sentence of the first paragraph of Section 3.1.2 of the Workplan, the Workplan states "In addition, the need for installation of additional DNAPL recovery wells will be evaluated after 12 months of performance monitoring." It is not clear from the Workplan what sort of monitoring is under consideration here or what criteria will be used to determine if the performance monitoring results indicate the need for additional DNAPL recovery wells. More detail about this proposal should be included in the Workplan.
2. In Section 3.1.2 on pages 12 and 13, the text refers to collecting a groundwater sample using sampling procedures detailed in the CGMSAP and then collecting a volume-averaged groundwater sample intended to represent groundwater through a larger part of the formation. The exact nature of the volume-averaged sample is unclear and should be explained in detail. For example, is a volume-averaged sample simply a sample collected after pumping a well for an extended period or is it a sample that is created by blending samples obtained at different times during the well pumping to obtain some average of the groundwater concentrations across the extended sampling period? The latter type of sample is a concern because of the possibility of loss of volatiles or other conditions that might occur in the handling and mixing of different samples. Additionally, regarding the proposed groundwater sampling procedures, post-testing groundwater samples are proposed with only the volume-averaged sampling being considered (for example, see text on page 28, Section 3.4.2). There may be some benefit in obtaining post-testing groundwater samples in a manner entirely consistent with the pre-treatment samples. If

the workplan is not proposing to include post-testing sampling consistent with the approved CGMSAP, then (a) a rationale must be provided for why post-testing sampling need not include sample collection consistent with current groundwater sampling protocol and (b) the workplan needs to explain the need for pre-treatment sampling consistent with the CGMSAP.

3. At the close of Section 3.2.2.2, in point 6, the Workplan indicates that depending on results obtained during Phase I core analysis, additional laboratory analysis of cores collected under the pre-demonstration testing may be performed. The Workplan needs to discuss both the Phase I results that would indicate the need for such additional analyses and the type and utility of additional analyses that might be run. This comment also has applicability to point 5 in Section 3.2.2.3.
4. With regard to item 4 in Section 3.2.2.3, it would appear that the timing of the second injection event should be based upon the results of monitoring the initial injection of 3,750 gallons of the reagent. If during the latter phase of the 3,750-gallon injection there is already some indication that the ability of the injection zone to admit reagent is being adversely affected by encrustation, then waiting 7 days for the follow-up injection may not be advisable. Also, since encrustation will occur, can the temporary injection point testing be designed to simply determine if a requisite amount of reagent for a full-scale application can be introduced through a temporary well point in a one-time application before encrustation limits effective delivery of additional reagent through the well point? In other words, would the follow-up treatment after 7 days be necessary if the proposed initial testing (3,750 gallon injection) is modified or if monitoring of that 3,750 gallon test reveals sufficient information about the viability of the injection method?
5. Section 3.4.1 indicates that a minimum of 15 cores will be collected following the demonstration project to qualitatively evaluated reagent distribution and contact with DNAPL zones. Figure 10 indicates there will be in excess of 250 injection points. A potential concern is that 15 samples will not be sufficient to represent conditions across the treatment area and for the number of injection points planned. However, the data set size relative to the treatment area and number of injection points may not be a concern if there is a plan to optimize the coring locations based on indications of recoverable NAPL presence, hydrostratigraphic characterization, injection rates or other factors noted at the injection points, and other factors. Section 3.4.1 of the workplan should include some discussion of how coring locations will be selected to maximize the information provided by the coring.
6. With regard to the five points included at the close of Section 3.4.4 (page 30), this part of the workplan needs to either (a) provide some elaboration on how these factors are proposed to be monitored or (b) refer back to earlier parts of the workplan, if appropriate, where proposed monitoring to address these five issues is described or (c) indicate that details regarding the monitoring of these variables or factors will be included in a subsequent document, such as a plan that describes monitoring of the full-scale ISGS treatment.
7. In Appendix B, Section 2.0, the text states that because the monitoring wells will be located outside of residual creosote DNAPL impacts, degradation of PVC well materials would not be expected. On page 28, the text reads as if monitoring wells may be constructed in locations where free-phase DNAPL is present and that water samples will

be collected from monitoring wells in the former Process Area. On page 11, text states that two or three monitoring wells will be installed downgradient of the treatment zone to monitor water quality in the upper Hawthorn. Although the specific locations of these wells are not identified, the page 28 text indicates or implies they will be in the former Process Area. If so, then the new monitoring wells need to be completed using materials consistent with existing upper Hawthorn wells inside the footprint of the former Process Area. Wells HG-11S and HG-15S were completed with an inside casing and screen composed of stainless steel. If the new monitoring wells are not to be constructed within the former Process Area, then the specific casing materials should be selected on the basis of the DNAPL investigation borings or other pre-existing data that provide an indication of the location of free-phase and residual DNAPL.

8. In Appendix C, Section 2.1, the third paragraph text states that where multiple DNAPL zones are encountered, the temporary injection points may be completed with multiple screened intervals. Are there any concerns about a multiple-screen injection point not being optimally designed for efficient delivery of ISGS reagent to all targeted injection zones? If the reagent is injected through multiple screened zones rather than in a targeted manner, isn't there a potential that most of the reagent will be introduced into the zone with higher hydraulic conductivity and the zone(s) with lower hydraulic conductivity will mostly be bypassed? Also, injection into multiple zones will preclude having good information on the volume of fluid emplaced into the injection targets. Such data may be useful for understanding the volume of geologic material reached by the injected fluid.
9. With regard to Appendix D, Task 2, some explanation is needed regarding the statement "At GeoTrans discretion, or if site soils are found to plug, a range of coarser geologic media (e.g., medium to coarse sands) may be used to conduct the tests." Does this statement indicate that in order to evaluate the change in hydraulic conductivity imparted by the ISGS treatment, geologic materials that are coarser grained than native sediments would be used to determine permeability reductions and the results extrapolated to less permeable Site sediments? This approach is not recommended, because of the complexities in the hydraulic conductivity-grain size relationship created by differential grain shapes and packing of fines in a sediment versus grain shapes and packing of sand sized particles, microscale soil textural variations, and so forth.

Please contact me at (404) 562-9120 or via Internet e-mail to discuss these comments further.

Sincerely,

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