TECHNICAL MEMORANDUM

TO: Rick Hutton

FROM: DNAPL Team

XC:

DATE: December 12, 2008

SUBJECT: **GRU DNAPL Team Comment to Hawthorn Group Investigation and Monitoring Well Installation Workplan by GeoTrans dated November 11, 2008**

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1. Page 3, Drag down of contaminants: We do not accept that 'drag down' of DNAPL contamination is the inevitable consequence of drilling through DNAPL-contaminated soils. Because the viscosity of Koppers' creosote is approximately 25-times that of groundwater, the continued employment of careful drilling and casing operations will prevent drag down. The implication that drilling and casing installation failures have been responsible for contamination detected in the Floridan Aquifer is rejected.

2. Page 5, Well Screen Construction: Because of the long-term nature on these monitoring wells as part of a network of compliance wells for the Koppers Site, we recommend that the wells screens be constructed of stainless steel rather than PVC. This was the practice prior to the installation of the recent Hawthorn Group (HG) monitoring wells in 2007 and should be reinstated.

3. Figure 3, Target Depths for Monitoring Wells: Figure 3 in the workplan shows the shallow and deep wells of each well pair, screened in the middle of the Upper Hawthorn and Lower Hawthorn, respectively. However, we recommend that the wells be screened to the base (i.e. to the underlying clay unit) of each zone. This is because contamination is most likely to be present in the lower portions of each zone. DNAPL creosote is most likely to accumulate on the Middle Clay and Lower Clay unit, and also dissolved-phase plumes migrating laterally through the Hawthorn are most likely to exist immediately above the Middle Clay and Lower Clay.

4. Target Depths for Borings: The target depths for the soil borings are not specified, although the stated intention to characterize "observable creosote impacts, if any in the Surficial Aquifer and in the Upper Hawthorn deposits" (p. 6). If the borings are to be limited to the Upper Hawthorn, we recommend that they should extend,

at least, to the top of the Middle Clay. DNAPL creosote is most likely to accumulate on the Middle Clay. The presence of DNAPL in the Upper Hawthorn close to the eastern site boundary is indicated by DNAPL in well HG-15S, naphthalene concentrations exceeding 1,300 µg/L (i.e. >10% estimated effective solubility) in eastern site boundary wells HG-6S and HG-4S, and off site in well HG-26S.

However, naphthalene concentrations exceeding 1,300 µg/L (i.e. >10% estimated effective solubility) were observed also in the Lower Hawthorn in site boundary wells HG-6S and HG-4S. There are no other wells present in the Lower Hawthorn along the eastern site boundary. Hence, there is a reasonable probability that DNAPL is present at, or beyond, the eastern site boundary in the Lower Hawthorn. However, the proposed borings will be too shallow to determine if this is the case.

5. Pages 5 & 6, Chemical Analysis of Hawthorn Soil Samples: The workplan indicates that only visual observations of creosote impacts will be made on the core samples, which will be then discarded. This approach misses a substantial opportunity to evaluate the nature of creosote migration in the Hawthorn sediments. Until this point in time, there have been almost no chemical analyses of soils from the Hawthorn. It is not presently possible, from either past investigation or the proposed investigation, to begin to relate the observations of creosote impacts such as strong odors, staining, residual NAPL, free-product NAPL to more quantitative measures such as concentrations, mass or NAPL saturation. Therefore, we recommend that selected soil samples (perhaps 20-30) be submitted for chemical analysis of volatiles, semi-volatiles, PCP, and phenolic compounds.

   Using chemical concentrations in the soil, it will be possible to estimate:

   - NAPL saturations;
   - whether NAPL is likely to be mobile or immobile;
   - NAPL chemical composition;
   - groundwater concentrations in the absence of NAPL; and,
   - identify which zones comprise creosote or groundwater plume pathways.

   Using the results from the chemical analysis of these cores and the direct observations, it may be possible to re-evaluate observations from previous borings enhance the overall site hydrogeologic interpretation.

   The following is a summary of the samples which should be retained and tested, together with the information that might be obtained. The possible observation terminology noted below is taken from the GeoTrans core log codes.

Description of Soil Sample for Selected for Chemical Analysis	Information from Chemical Analysis
Observation "NAPL appears mobile"	Calculation of NAPL saturation to estimate if NAPL is in mobile range or immobile range. Estimation of NAPL chemical composition to assist interpretation of groundwater analysis results across the site.
Observation "NAPL appears immobile"	Calculation of NAPL saturation to estimate if NAPL is in mobile range or immobile range. Estimation of NAPL chemical composition to assist interpretation of groundwater analysis results across the site.
Observation "Staining Prominent", with any level of creosote odor	Calculation of NAPL saturation to estimate if NAPL is in mobile range or immobile range. If NAPL saturations are low and at residual, does such NAPL contain substantial soluble components and constitute source zone?
Observation "Staining Distinct", with any level of creosote odor	Calculation of NAPL saturation to estimate if NAPL is in mobile range or immobile range. If NAPL saturations are low and at residual, does such NAPL contain substantial soluble components and constitute source zone?
Observation "Staining Faint", with any level of creosote odor	Calculation of NAPL saturation. If NAPL saturations are low and at residual, does such NAPL contain substantial soluble components and constitute source zone?
Observation "Creosote Odor Strong", with no visual observation of NAPL	Do concentrations indicate NAPL present but not visually evident, or presence of dissolved groundwater plume? What would be the groundwater concentrations in such zones?
Observation "Creosote Odor Moderate", with no visual observation of NAPL	Do concentrations indicate NAPL present but not visually evident, or presence of dissolved groundwater plume? What would be the groundwater concentrations in such zones?
Observation "Creosote Odor Slight", with no visual observation of NAPL	What would be the groundwater concentrations in such zones?

6. Page 7, Contingency Plan: The implementation of a contingency plan to investigate any migration of DNAPL east of the Koppers site should be submitted for review and comment as part of the report of the results of this present Work Plan.

7. Page 8, Groundwater Sampling: The reporting limits for all parameters should be the low limits achieved in 2007 and earlier sampling efforts, not the higher reporting limits proposed in the CGMSAP.