UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
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CHICAGO, IL 60604-3590

January 7, 2011

To: David Favero, Favero Geosciences (for MLC)
From: Michelle Kaysen, US EPA Project Manager

Re: Former GM Delco Plant 5
Kokomo, Indiana
Draft Corrective Measures Proposal
EPA ID No. IND 000 806 844

Dave,

Thank you for the productive meeting held at the U.S. Environmental Protection Agency's offices in Chicago on November 17, 2010 regarding the subject document. EPA has reviewed the Former GM Delco Plant 5 Draft Corrective Measures Proposal (CMP) and has the following comments. Please make appropriate revisions to the CMS and submit the revised document within sixty days.

Section 1: Introduction

1. Please include an index to the administrative record which exists at the Kokomo Public Library as an appendix to the CMP. Ensure the public repository is up-to-date such that the files and index are accurate and accessible to the public.

Section 2: Proposed Final Corrective Measures

1. Regarding proposed corrective measure #3; soil treatment at five discreet soil boring locations based upon risk, EPA believes the scope of this corrective measure should be expanded. Onsite soil is highly contaminated with VOCs, specifically TCE, from approximately 8'bgs and below. Within AOI 3, for instance, the maximum concentration of TCE detected in soil was 4,520ppm, compared to the industrial PRG of 61ppm and soil to groundwater migration of 2ppm. Although the corrective action program is a risk-based program, final remedies carry an expectation of sufficient source control for the purpose of restoring groundwater to its "maximum beneficial use" (EPA 2004).

   EPA's overall goals for groundwater protection and remediation are to: 1) prevent adverse affects to human health and the environment, and 2) restore groundwater to its maximum beneficial use. Restoring contaminated groundwater does not necessarily imply cleanup to pristine conditions (2004). However, EPA expects facilities to control or eliminate surface and subsurface sources of groundwater contamination (EPA 1996). Although EPA's risk-based objective has been addressed in the CMP, the source control measure proposed does not sufficiently meet the goal of aquifer restoration as discussed (see comment Section 4).

The proposed final corrective measures should be revised to address groundwater restoration. Redefining the footprint of source control for the contaminated soil, proposing an active groundwater corrective measure, or, preferably, some combination thereof, may be sufficient in achieving that goal. For instance, source control could be evaluated through mass balance methods as evaluated in your 12/23/10 CMP follow up submittal to the Agency. Should MLC propose such an approach, however, the source control soil remedy must demonstrate that the goal of aquifer restoration is also being addressed. Although your follow up submittal provides information regarding the cost effective alternatives to the current proposed footprint, it does not provide a correlation to groundwater restoration. For instance, whereas MLC's proposed expansion to "include all of the area bound by 500ppm" may be most cost-effective for purposes of source control and potential future risk mitigation, treating soil site-wide within the 61 to 500ppm TCE contour, thereby increasing the percent TCE removed to 91%, may be more appropriate for the purpose of groundwater restoration. As stated below, however, should a more cost-effective approach which combines soil removal and active groundwater remediation be proposed, the Agency will consider it.

Alternatively, the remediation footprint for source control purposes could be evaluated through the derivation of a more site specific "migration to groundwater criteria". The current criteria was derived through EPA SSL methodologies, relying upon conservative default assumptions. For example, the default dilution attenuation factor of 20 may not be appropriate for this site, whereas SSL equation 4-11 may be more appropriate for the derivation of a site-specific DA factor. Otherwise, consideration of a leach test to more directly determine the target soil leachate concentration could further refine the source control final remedy footprint.

To be clear, EPA anticipates some reasonable footprint which provides for more aggressive aquifer restoration; however, it is understood that a practical limit exists. The corrective measures endpoint must be revised as appropriate and provide more detail than currently provided in Table 4.

2. As discussed above, the proposed groundwater final remedy, based upon potential risk and supported by a theoretical groundwater model, does not address aquifer restoration. As stated above, EPA believes this could be achieved through additional soil source control, an active groundwater remedy, or, preferably, some combination thereof for those areas of the facility where soil concentrations and groundwater impacts are highest. However, EPA believes for those areas of the site where *groundwater* concentrations are highest, such as 13ppm TCE in groundwater compared to the MCL of 0.005ppm at AOI 5, some active groundwater remedy must be considered. Further reduction of the source of contaminants within the on-site soil and groundwater will serve to help restore the aquifer and more conservatively protect off-site receptors. In the absence of an active on-site groundwater remedy, there may be potential future risk to off-site residents from vapor intrusion due to further TCE migration within the S1 unit at its highest concentration. Although MLC has stated, "it is highly unlikely that the concentrations of on-site groundwater would migrate off-site and have the potential to pose significant risk to residents via vapor intrusion (RFI May 2010)," there is inherent uncertainty associated with the migration rates and ultimate disposition of contaminants, particularly within an aquifer experiencing influence from multiple high-yield pumping fields. Table 4 should

be revised to include corrective measures endpoints for any groundwater remedy proposed. EPA believes, given the significant reliance upon institutional controls for this site, and the S1 unit being unaffected by the model simulations, a minimum threshold criteria in the development of a groundwater endpoint should be that off-site groundwater concentrations east of the site in the S1 unit do not increase further.

Furthermore, it's not clear if the CMP has considered any State groundwater designations or regional groundwater goals which may affect the corrective measures endpoints. Please provide additional information to clarify the document and any correspondence you have had with the State on this matter.

3. MLC must establish performance monitoring wells such that groundwater impacts to both the S1 and S2 aquifers will be used to track post remediation groundwater impacts. These data should be used to improve current model predictions, where appropriate, helping to lend credibility to the model's predictiveness and the accuracy of the well restriction overlay district, as well as ensure groundwater concentrations towards the east are decreasing . The proposed groundwater and soil gas monitoring component of the final remedy does not provide enough detail, particularly where off-site groundwater contamination will not be dealt with by the institutional control. Please elaborate on the proposal with respect to the analytical constituents, sampling frequency and locations, cleanup standards, decision criteria and contingency plans. Although some of this information is in the text or tables, there is not enough detail, or it is not clear enough, to determine if the sampling will be sufficient. For instance, Table 2 indicates that groundwater would be monitored semi-annually during active remediation and for 2 years thereafter with an evaluation of on-going monitoring needs at that time. However, Table 5a provides a 30 year monitoring duration for the purpose of the cost estimate. Although reevaluating monitoring needs after some period of time is appropriate, it must be tied to some remedial standard and guided by associated decision criteria. Therefore, within that context, the monitoring scope and duration must be clarified.

   Further, how do you intend on ensuring residents are appropriately protected from potential vapor intrusion should conditions change? Please expand upon your proposed monitoring to further clarify the document.

Section 3.5: Water Supply

1. Please include any correspondence you have had with Howard County or the State (IDEM or IDNR) regarding the establishment of the Well Restriction Overlay District as an attachment or appendix to the CMP.

Section 3.6: Groundwater Modeling

1. MLC's 12/23/10 submittal provided additional information regarding possible vinyl chloride generation and migration within the context of the groundwater model. The revised proposed footprint of the well restriction overlay district based upon model Scenario 8 may be more appropriate in order to address vinyl chloride in the S2 aquifer. However, should the revised CMP support a significant reduction in the size and scope of the well restriction overlay district based upon revised proposed source control measures

and an active groundwater remedy, the Agency is willing to consider such revisions. It is the Agency's preference to shift the majority of the costs from institutional controls to active remediation, such as soil and groundwater source control, in an effort to minimize future uncertainties and costs. Any reasonable combination of remediation and institutional controls, which balances both cost and remedial goals, will be considered.

Section 3.8: Ecology

1. The Ecological Habitat Characterization is in Appendix E of the DOCC, not Appendix F. Please correct this.

Section 4: Summary of Corrective Measures Alternatives

1. The proposed remedies evaluated to address on-site soils have been designed to meet the objective of demonstrating cumulative cancer risk below the cancer risk limit of 10^{-4} for potential receptors. The site specific vapor intrusion criteria developed during the investigation were calculated based on target cancer risk of 10^{-5}. Re-defining the footprint of the source control soil remedy based upon the target cancer risk of 10^{-5} for direct contact pathways, either alone or in combination with some additional parameters which address aquifer restoration (should this metric alone be insufficient to address groundwater), may constitute an additional or alternative methodology to those mentioned above.

Section 6: Proposed Corrective Measures; Soil

1. MLC has proposed calcium oxide treatment for the ex-situ treatment of on-site soils within the bounded area containing the five soil borings with potential future vapor intrusion risk. At this time, EPA has some reservations regarding this proposed technology, although has by no means eliminated its potential use at the site.

   The IDEM technical guidance document on calcium oxide treatment (IDEM 2009) states there are several uncertainties associated with the efficacy of treatment, including: the resulting byproducts of conversion, their mobility and toxicity, and the impacts of the treatment on the microbial populations present in the soil. The document's recommendation is for additional research before it's considered a reliable, cost-effective remediation process for soils. In fact, it asserts the treatment should be considered "experimental only".

   Based upon the experiences documented in several case studies, certain issues associated with treatment implementation may need to be addressed. A site in Crawfordsville, IN experienced a reduction in treatment efficacy based upon the specifications of the particular batch of calcium oxide used (ENTACT 2008). This Indiana site also determined that the cooling time parameter must be optimized in order for the reaction to be complete. Florida Department of Environmental Protection's Fairbanks site demonstrated that parameters such as soil moisture content and the calcium oxide to water ratio dramatically influenced the apparent destruction of the VOCs based upon the chloride concentrations remaining in the soil (University of Florida 2005). The treatment of VOC-contaminated soil with calcium oxide at a New Jersey site required an

air permit to treat the soil within a temporary enclosure, illustrating the degree of volatilization must be well understood prior to implementation (Robinson, D., & Angyal, G. 2008).

Provided the stated uncertainties associated with this treatment for the purpose of large scale soil remediation, EPA believes site-specific treatment parameters should be tested and optimized during a bench scale test or pilot study in order to ensure treatment efficacy. Further, determination of efficacy should include a leach test. The leach test should serve two purposes: 1. It must confirm the basis of remedy design based upon site-specific parameters which affect the destruction and/or volatilization of contaminants, and 2. It must confirm adverse, long-term effects to the aquifer will not occur from either the reaction byproducts or changes to the pH. Last, MLC must provide a soil and/or groundwater remedy contingency plan should the calcium oxide treatment be ineffective or insufficient in remediating the soils to an acceptable level.

To be clear, the Agency is not proposing specific remedial options, or methodologies by which to derive those options, in the comments above. Rather, they are intended to reflect the general expectations we have and provide a sense of flexibility with which we are willing to approach the site. Please revise the CMP to reflect potential remedies which address the issues in general and attach a cover letter which addresses these comments specifically. In an effort to streamline the final submittal process in a cost efficient manner, MLC may provide the Agency with intermittent electronic submittals or drafts to ensure the revised CMP is agreeable.

Thank you,

Michelle Kaysen

Michelle Kaysen

cc: Bhooma Sundar, US EPA
Gary Cygan, US EPA

References

EPA, 2004. Handbook of Groundwater Protection and Cleanup Policies for RCRA Corrective Action (EPA530-R-04-030).

EPA, 1996. Advance Notice of Proposed Rulemaking (61 FR 19432, May 1).

IDEM, 2009. Ex-Situ Treatment of Dense Non-Aqueous Phase Liquids Using Calcium Oxide (Quick Lime) (February 10, 2009; Revised: November 17, 2009).

ENTACT, 2008. Field Demonstration Report for the Treatment of TCE Impacted Soils in the Vadose and Perched Groundwater Zones at the former Impex Facility (May 23, 2008).

University of Florida, 2005. Evaluation of Quicklime Application as a Method of Treating Contaminated Soils (July 18, 2005 slides).

Robinson, D., & Angyal, G., 2008. Use of Mixed Technologies to Remediate Chlorinated DNAPL at a Brownfields Site.