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Superfund

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MEMORANDUM

SUBJECT: Third Five-Year Review Technical Assessment
Missouri Electric Works Site
Cape Girardeau, Missouri

FROM: Greg McCabe
Human Health Risk Assessor
ENSV/EAMB

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ENSV/EAMB

Dan Nicoski
Hydrogeologist
ENSV/EAMB

TO: Dan Gravatt
SUPR/MOKS

As requested, we have conducted a technical assessment in support of the third five-year review of the Missouri Electric Works site, located in Cape Girardeau, Missouri. Our evaluation is limited to providing input on human health risk assessment, ecological risk assessment, and groundwater issues. More specifically, we focused on answering Questions A, B, and C from the U.S. Environmental Protection Agency's "Comprehensive Five-Year Review Guidance" (EPA, 2001).

It is our understanding that little progress toward remedy implementation has taken place since the last five-year review. According to an email received from you on September 16, 2013, aside from four quarters of groundwater sampling in a limited number of wells, little action has taken place at the site since the last FYR. The remedy selected in the 2005 Record of Decision has not yet been implemented (EPA, 2005). On April 21, 2009, we provided human health risk assessment comments on the second FYR (EPA, 2009). Because those comments have not yet been addressed, we consider them to remain valid, and applicable to the third FYR. Based on our review of the draft third FYR report, we also have the following comments to offer. Following our comments on the draft report are our answers to Questions A, B, and C from the EPA's Comprehensive Five-Year Review Guidance (EPA, 2001). Most, but not all, of the text answering Questions A, B, and C was included in our 2009 evaluation of the second FYR.

If you need additional assistance or have any questions regarding our assessment, please feel free to contact Greg McCabe at X7709, Venessa Madden at X7794, or Dan Nicoski at X7230.

Human Health Risk Assessor Comments

General Comment

Very little groundwater sampling has apparently been done at the site since the completion of the last five-year review. The four quarters of groundwater sampling data that were gathered in 2012 and 2013 is limited to seven alluvial wells located between the facility and the wetland. While contamination continues to be found in these wells, the contaminant concentrations are relatively low compared to past on-site groundwater sampling data. The number and location of wells sampled makes this data of limited usefulness for human health risk assessment purposes.

Specific Comments

1. Page 1, Title. The title is for the first FYR report (EPA, 2004). This is actually the third five-year review.

2. Page 2, Section 1. The first paragraph says this is the second FYR report. Again, this is actually the third five-year review.

3. At what should be page 4, the draft report format changes to landscape, and the pagination disappears, making the report difficult to read.

4. Section III, Background. There were no figures included with our copy of the draft report.

5. Section III. The table on the last page of this section includes bis(2-chloroethoxy)methane as one of the compounds with no toxicity data. In fact, toxicity values for this compound can be found in the EPA's Regional Screening Table. This table can be found online at: http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/index.htm.

6. Section IV. The text on the last page of this section implies that no inspection of the cap has taken place since before the last FYR, at which time several erosional features were identified. Has the cap been inspected since then to insure that it remains adequately protective?

7. Section VI. The text indicates that the last inspection of the site by the EPA was February 11, 2009. Has a more recent inspection been conducted in support of the third FYR?

8. Section VI. Much of the draft third FYR report has been taken word for word from the second FYR report. That is acceptable, as long as conditions at the site have not changed, and repeating that text makes sense. However, in some cases, this is not appropriate. For example, the text of the draft report, under the paragraph entitled "MEW Property", discusses two nesting hawks that were present during the 2009 inspection. These birds were said to be "active and quite vocal". This same text appears word for word in the second FYR report. The third FYR report should be carefully edited to insure that it reflects current conditions at the site, and is not simply a repetition of text from the second FYR report.

9. A technical impracticability waiver granted for the site acknowledges that any attempt at groundwater cleanup in the fractured bedrock will not result in compliance with ARARs. Rather, exposure to contaminated groundwater will be prevented by the use of wellhead treatment to remove COCs from the drinking water supply. In addition to meeting ARARs at the wellhead, the ROD identifies To Be Considered criteria, including contaminant toxicity factors. The EPA health-based screening levels

derived using these toxicity factors can be found in EPA's Regional Screening table at the web link given above. Several of the COCs found in Table 4 of the 2005 ROD do not have MCLs. Rather, those COCs in Table 4 of the ROD have target cleanup levels that are based on other non-regulatory criteria, such as reporting limits. In those instances, the EPA health-based screening levels should be considered target cleanup levels in order to ensure that the most recent toxicity factors have been utilized in any wellhead treatment system.

10. Section VII. The sections "Changes in Exposure Pathways" and "Technical Assessment Summary" both imply that no toxicity factors or standardized human health risk methodologies have changed since the completion of the risk assessment. Given that the human health risk assessment was completed in 2004, this statement is not accurate. Several toxicity factors for the COCs, and human health risk assessment methodologies, have changed over the years. However, none have changed so significantly as to impact remedy selection or the protectiveness of the remedy.

11. Section VIII. When comparing the second FYR report with the draft third FYR report, we noticed that Table 2 no longer includes maintenance of monitoring well locks and security fencing. A similar change has been made in several other locations in the draft report. Were these changes intentional? If so, who will be responsible for ensuring that the monitoring wells and security fencing remain adequate?

Technical Assessment

Question B – Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives (RAOs) used at the time of the remedy selection still valid?
Changes in Standards and TBCs

- *Have there been changes to risk-based cleanup levels or standards identified as Applicable or Relevant and Appropriate Requirements (ARARs) in the Record of Decision (ROD) that call into question the protectiveness of the remedy?*

  Soil Operable Unit: We are not aware of any changes to risk-based cleanup levels or to standards identified as ARARs, which call into question the protectiveness of the remedy currently in place. The ROD of September 1990 (EPA, 1990), called for the excavation of all soils and sediments with PCB concentrations greater than 10 parts per million (ppm) to a depth of 4 feet, and soils below that depth with PCB concentrations greater than 100 ppm. Excavated soils were then to be incinerated on-site, and the ash and clean soil returned to the excavated areas as backfill. This remedy was later modified to add thermal desorption to the thermal treatment component of the remedy (EPA, 1995). Also, all sediments and soils contaminated with greater than 10 ppm were excavated, regardless of depth (France-Isetts, 2000).

  Groundwater Operable Unit: It is our understanding that ARARs were not identified for this operable unit. The September 1990, ROD (EPA, 1990) identified a pump and treat system as the selected groundwater remedy. However, subsequent investigation of site geology determined that this remedy could not be implemented effectively due to the nature of the fractured bedrock aquifer (Komex, 2005a, 2005b). Consequently, a technical impracticability evaluation was completed (Komex, 2005c), with the result that a new groundwater alternative was selected. This alternative consists of institutional controls to prevent use of the contaminated groundwater, the installation of any well-head treatments system found to be necessary in order to treat a potable water supply, and long-term groundwater monitoring (EPA, 2005).

- *Are there newly promulgated standards that call into question the protectiveness of the remedy?* We are not aware of any newly promulgated standards that call into question the protectiveness of the remedy.

- *Have TBCs used in selecting cleanup levels at the site changed in way that could affect the protectiveness of the remedy?* The 2005 ROD identifies the need for consideration of TBCs in the alluvium, including contaminant toxicity factors found in the IRIS and the EPA risk assessment guidance. We would recommend that these TBCs also be considered during any wellhead treatment efforts undertaken relative to the groundwater in fractured bedrock. Consideration of current contaminant toxicity factors and the EPA risk assessment guidance could potentially increase the protectiveness of the remedy.

Changes in Exposure Pathways

- *Has land use or expected land use on or near the site changed (e.g., industrial to residential, commercial to residential)?* We are not aware of any land use changes or potential land use changes at the site. However, page iv of the draft FYR report questions whether new buildings were built on-site in 2011.

- *Have any human health or ecological routes of exposure or receptors changed or been newly identified (e.g., dermal contact where none previously existed, new populations or species identified on site or near the site) that could affect the protectiveness of the remedy?* We are not aware of any new human health routes of exposure.

- *Are there newly identified contaminants or contaminant sources?* We are not aware of any newly identified contaminants or contaminant sources.

- *Are there unanticipated toxic byproducts of the remedy not previously addressed by the decision documents (e.g., byproducts not evaluated at the time of remedy selection)?* We are not aware of any unanticipated toxic byproducts.

- *Have physical site conditions (e.g., changes in anticipated direction or rate of groundwater flow) or the understanding of these conditions (e.g., changes in anticipated direction or rate of groundwater flow) changed in a way that could affect the protectiveness of the remedy?* Following the completion of the soil remediation efforts, no PCBs are expected to be present in the surface soil, and no PCB concentrations greater than 10 ppm are expected to be located at depth on-site. Groundwater sampling data does indicate the continued presence of contamination at concentrations greater than the EPA's regulatory levels (Komex, 2005d). This is not unexpected since the Feasibility Study recognized that, due to the nature of site geology, "Residual human health risks from COC [contaminants of concern] in groundwater would remain for an unknown period and ICs would be required for an indefinite period to ensure protectiveness" (Komex, 2005b).

Changes in Toxicity and Other Contaminant Characteristics

- *Have toxicity factors for contaminants of concern at the site changed in a way that could affect the protectiveness of the remedy?* Many of the non-carcinogenic and carcinogenic toxicity factors identified in the RODs have been updated. In particular, the EPA has developed new screening levels for contaminants which may be carcinogenic by a mutagenic mode of action.

However, these new levels focus on a potential direct contact route of exposure to the contaminants by children. Given that site surface soils contain no PCBs, these new levels are not relevant. If, however, the Superfund program should decide to conduct additional soil sampling near the site, and if any of these mutagenic contaminants were to be identified, their concentrations would be compared with the new levels for mutagenic compounds.

- *Have other contaminant characteristics changed in a way that could affect protectiveness of the remedy?* We are not aware of any other changes to contaminant characteristics that could impact the protectiveness of the remedy.

Changes in Risk Assessment Methods

- *Have standardized risk assessment methodologies changed in a way that could affect the protectiveness of the remedy?* The EPA has revised several of its methodologies since the completion of the ROD, including its dermal risk assessment guidance, its process for estimating the health risks from inhalation of volatile organic compounds during household use of contaminated groundwater (i.e., bathing, showering, cooking, etc.), the use of the Integrated Exposure Uptake Biokinetic Model and the Adult Lead Methodology to evaluate potential health risks from lead, the means by which the EPA evaluates the vapor intrusion pathway, and the means by which it evaluates compounds which are carcinogenic by a mutagenic mode of action. The EPA has also changed the toxicity values for a number of compounds since the signing of the original ROD. However, these changes in methodology and toxicity values do not adversely affect the protectiveness of the remedy currently in place at the site.

Question C – Has any other information come to light that could call into question the protectiveness of the remedy?

Have newly found ecological risks been found? Any discussion of potential ecological risks associated with the site will come from the Region 7 ecological risk assessor. We would note here that the Expanded Ecological Risk Screening Evaluation contains the results of off-site soil and sediment sampling. It appears that there may be some off-site migration of PCBs that has taken place as a result of surface water runoff. The Superfund program may want to consider additional sampling in the ditches along Wilson Road as part of OU3 in order to determine if, in fact, significant off-site migration of PCBs has occurred.

- *Are there impacts from natural disasters (e.g., a 100-year flood)?* We are not aware of any natural disasters that have occurred on this site.

- *Has any other information come to light which could affect the protectiveness of the remedy?* We are not aware of any other information which has come to light which could affect the protectiveness of the remedy currently in place. However, as we noted earlier, very limited recent sampling data was available for our review. The most recent on-site groundwater data available for our review is from June 2005 (Komex, 2005d). The 2005 ROD stated that long-term monitoring would be one component of the selected remedy. We were unable to determine when or why the decision was made to discontinue groundwater monitoring in 2005.

  The 2005 ROD also stated that institutional controls were components of the ROD. We were unable to locate any documentation that institutional controls have been implemented since the signing of the 2005 ROD.

The 2005 ROD also included a provision for establishing wellhead protection in the event a drinking water supply well should become contaminated with site COCs. We were unable to locate any documentation which describes how such wells are to be monitored for contamination, nor were we able to locate any documentation which indicates whether any wellhead protection actions have or have not been necessary since the signing of the ROD.

Ecological Risk Assessor Comments

Technical Assessment

Question B – Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives (RAOs) used at the time of the remedy selection still valid?

- *Have there been changes to risk-based cleanup levels or standards identified as Applicable or Relevant and Appropriate Requirements (ARARs) in the Record of Decision (ROD) that call into question the protectiveness of the remedy?* We are not aware of changes to ARARs or risk-based cleanup levels as they relate to the OU1 and OU2 of the site.

  However, chronic National Ambient Water Quality Criteria, as well as the State of Missouri's water quality criteria, should be considered ARARs for surface water in OU3. The chronic NAWQC for total PCBs in surface water is 0.014 μg/L. To date, there are no sediment or fish tissue ARARs that would impact a future ROD for OU3.

- *Are there newly promulgated standards that call into question the protectiveness of the remedy?* None that we are aware of.

Changes in Exposure Pathways

- *Has land use or expected land use on or near the site changed (e.g., industrial to residential, commercial to residential)?* Land use has not changed at the site and we are not aware of any potential future land use changes.

- *Have any human health or ecological routes of exposure or receptors changed or been newly identified (e.g., dermal contact where none previously existed, new populations or species identified on site or near the site) that could affect the protectiveness of the remedy?* Yes. However, the identified ecological exposures in the wetland area will be characterized as part of OU3.

- *Are there newly identified contaminants or contaminant sources?* The available data do not demonstrate new contaminants or contaminant sources.

- *Are there unanticipated toxic byproducts of the remedy not previously addressed by the decision documents (e.g., byproducts not evaluated at the time of remedy selection)?* We are not aware of any unanticipated toxic byproducts.

- *Have physical site conditions or the understanding of these conditions changed in a way that could affect the protectiveness of the remedy?* With regard to ecological risk, there have not been changes to site conditions that impact the protectiveness of the remedy for OU1 or OU2.

Site conditions in the wetland area will be characterized as part of the OU3 remedial investigation.

Changes in Toxicity and Other Contaminant Characteristics

- *Have toxicity factors for contaminants of concern at the site changed in a way that could affect the protectiveness of the remedy?* None that we are aware of.

- *Have other contaminant characteristics changed in a way that could affect protectiveness of the remedy?* We are not aware of any other changes to contaminant characteristics that could impact the protectiveness of the remedy.

Changes in Risk Assessment Methods

- *Have standardized risk assessment methodologies changed in a way that could affect the protectiveness of the remedy?* Standardized methods for ecological risk assessment can be found in *Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessments - Interim Final* (EPA, 1997).

Question C – Has any other information come to light that could call into question the protectiveness of the remedy?

- *Have newly found ecological risks been found?* Ecological receptors at the site have been identified and will be addressed as part of OU3 through an ongoing remedial investigation. An inadequate and misleading screening level ecological risk assessment was performed for the wetland area and associated drainage by the responsible parties (ENVIRON, 2006). Based on the information provided in the draft SLERA, as well as the nature of the contaminants on site (PCBs), we recommend that a baseline ecological risk assessment be completed. This is identified as an issue in the draft FYR with a milestone date of September 2012. However, a BERA has not been received.

- *Are there impacts from natural disasters (e.g., a 100-year flood)?* None that we are aware of.

- *Has any other information come to light which could affect the protectiveness of the remedy?* Not that we are aware of.

Hydrogeologist Comments

General Comments

Three operable units were designated at the site: Operable Unit 1 - Soil; OU2 – Groundwater; and OU3 – Wetlands. The remedy selected in the 1990 Record of Decision for OU1 included excavation, processing and on-site incineration of soil contaminated with PCBs in excess of 10 ppm to four feet, and in excess of 100 ppm at depths greater than four feet. An Explanation of Significant Differences was issued in 1995 that changed the soil treatment technology from incineration to thermal desorption. Excavation and treatment of the approximately 38,000 tons of PCB contaminated soil in excess of 10 ppm from the surface to 27 ft was completed in 2000.

The 2005 ROD for OU2 addressed groundwater in the fractured bedrock and alluvium. A technical impracticality waiver was issued for chemical-specific Applicable or Relevant and Appropriate Requirements for the fractured bedrock. Enhanced biodegradation was the primary remedy component for the alluvial aquifer. The other major remedy components for each aquifer are institutional controls, wellhead treatment (where appropriate) and long-term monitoring. An ESD issued in 2013 for the alluvial aquifer changed the remedy from enhanced biodegradation to monitored natural attenuation and modified two of the remedial action objectives. Managing the migration of the COCs in the fractured bedrock/alluvial groundwater and the COC migration from fractured bedrock into the alluvium were removed from the RAOs. The 2005 ROD has not been implemented at the site.

A remedy has not been selected for implementation at OU3.

Technical Assessment

Question A- Is the remedy functioning as intended by the decision document?
The PCB contaminated soil has been removed and treated on-site. The remedial action has been completed for OU1 and appears to be functioning as intended by the ROD and ESD. Human health risks for this media have been addressed through this action. According to the 2005 ROD, PCB contamination was detected to the top of the bedrock. The source areas for groundwater impacts are thought to be contamination remaining in the soil in the area of wells MW-3/5/11 on the southeast portion of the site and the former transformer storage area.

The selected remedy for OU2 has not been implemented at the site. Groundwater impacts in the bedrock may flow into the alluvium. Institutional controls will apparently be implemented or imposed to prevent exposure to the contaminated groundwater thereby limiting potential exposure and human health risk concerns.

A remedy has not been selected for the wetland area. A remedial investigation and feasibility study is warranted to evaluate selection and implementation of an appropriate remedy in the wetlands area.

- *Is the selected remedy adequate for this site?* The OU1 remedy included excavation and thermal desorption to treat approximately 38,000 tons of PCB impacted soil at the site. This remedy was appropriate for the site. As indicated, a TI wavier was issued due to the highly variable and fractured nature of the bedrock aquifer. An ESD for groundwater was issued in 2013 for the OU2 alluvial aquifer that changed the remedy from enhanced biodegradation to monitored natural attenuation (EPA, 2013). This remedy has not been implemented at the site nor has a remedy been selected for OU3.

- *Is the plume stable?* Monitoring frequencies during this FYR period for all site associated wells has been insufficient to adequately evaluate plume stability or contaminant trends. For this FYR, the alluvial wells appear to have been sampled four times over two years (2012 – 2013). The bedrock wells were not sampled during this FYR period. We recommend periodic sampling frequencies be increased.

- *Do contaminant trends indicate the remedy is adequate?* The remedy for OU2 has not been implemented at this site. As indicated, monitoring frequencies are inadequate and contaminant trends for this FYR period cannot be evaluated at this site.

Vapor Intrusion (VI) Pathway

- *Are the COCs of sufficient volatility and toxicity to warrant a VI investigation?* There are VOCs of sufficient volatility and toxicity that have been detected in groundwater at this site. However, not all site associated wells have been sampled during this FYR period. The alluvial wells were last sampled in 2013. COC concentrations detected in those wells are not sufficient to warrant a VI investigation. No current receptors are present in the area of the alluvial wells. On-site wells were apparently last sampled in 2004.

- *Has a VI Investigation been conducted at this site?* No, a VI investigation was not conducted at this site. Concentrations of several COCs detected in groundwater during the last on-site event could potentially present a VI concern. Although, unless there are occupied structures, only a future use scenario would apply. If there are occupied structures, a mitigating factor would be the near surface site geology which consists of 15 ft to 25 ft of silt underlain by gravelly clay. These finer materials would inhibit vapor transport.

- *Is the VI pathway complete? If complete, has the VI concern been adequately mitigated to insure protectiveness?* A VI investigation was not conducted at this site. Unless there are currently occupied structures, the VI pathway will not be complete.

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