TSCA
RISK-BASED PCB DISPOSAL APPROVAL APPLICATION ADDENDUM

Muncie Sanitary District
5150 West Kilgore Avenue
Muncie, Delaware County, Indiana 47304
IDEM SCP #: 0000511
EPA ID #: INR000138255

Prepared for Submittal to:

Mr. Andrew Kleinberg
Project Manager - Geologist
RCRA Corrective Action Section 2
Land, Chemicals & Redevelopment Division
Region 5, U.S. EPA
77 West Jackson Blvd. (LR-16J), Chicago, IL 60604

Prepared by:

Specialty Earth Sciences, LLC
1050 Summit Drive
Carmel, IN 46032

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SE Sciences Project Number 10475-16-260

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Subject: TSCA Risk-Based PCB Disposal Approval Application Addendum
Muncie Sanitary District
5150 West Kilgore Avenue, Muncie, Indiana (Site or Subject Property)
IDEM State Cleanup No.: 0000511
U.S EPA Generator ID No.: INR000138255

Dear Mr. Kleinberg,

Specialty Earth Sciences, LLC (SE Sciences), on behalf of the Muncie Sanitary District (MSD), is pleased to submit this *United States Environmental Protection Agency Toxic Substance Control Act Risk-Based Polychlorinated Biphenyl Disposal Approval Application Addendum* (*Application Addendum*) for the above referenced property (site or subject property).

This *Application Addendum* incorporates two specific components which were originally included in the SE Sciences' *Remediation Work Plan Addendum* (Link to RWP Addendum VFC #83500954). They are as follows:

- *The remedy should reduce Light Non-Aqueous Phase Liquid (LNAPL) to 0.01' or implement the Diminishing Returns Assessment.*

- *The remedy should reduce dissolved phase Polychlorinated Biphenyl (PCB) groundwater contaminant concentrations to below the Toxic Substance Control Act (TSCA) Cleanup Levels for Liquid PCBs of 0.5 micrograms per liter (µg/l). [40 CFR 761.79(b)(1)(iii)].*

The stated remedial objectives will be targeted at the onset, consistent with our recent correspondence. We recognize that achieving these objectives may not be cost-effective at some point. As such, we will then consider the options included in the diminishing returns assessment (i.e., plume stability, risk-based closure, site specific calculated limits, etc.) included as Section 2.0 of the *Remediation Work Plan Addendum*. Select portions of the diminishing returns assessment are provided below.

LNAPL Recovery and Diminishing Returns Assessment

The ideal goal of the MPE system is to achieve unconditional closure from IDEM. Given the above information and that IDEM requested a diminishing returns assessment we conclude in three basic scenarios:

A. Unlikely (Ideal) Scenario: all PCB-laden LNAPL is removed and dissolved phase PCB Aroclor concentrations are below IDEM Published Health Levels and/or U.S. EPA Regional Screening Levels.

B. Likely Scenario: cost-based remediation system operation/modification coupled with plume stability.

C. Most Likely Scenario: risk-based closure with ongoing groundwater monitoring and Long-Term Stewardship (LTS) consideration.

Due to the nature of the LNAPL (high viscosity) and the complex heterogeneity of the site's subsurface, a stepped remedial approach will be used. At the end of each step a diminishing returns assessment, including a cost-benefit analysis, will be performed. The cost-benefit analysis will compare the percentage of LNAPL recovered, and the percentage of dissolved phase contaminants removed, to the cost to accomplish the same. This information will be used to determine if continued system operation is appropriate or if the next phase of the treatment process would be a more cost-effective approach.

The three (3) steps in the remediation process are described below.

Primary PCB LNAPL Remediation (Phase I)

Phase I of the cleanup will include MPE LNAPL recovery via in-well separation. The primary cleanup phase will focus on LNAPL removal. Once LNAPL thicknesses have diminished to what the field instrument (oil/water interface probe) can measure (+/- 0.01 feet), then in-well separation activities will be stopped.

Note that LNAPL typically accumulates in a well at a much greater thickness (2-3 times) than in the soil matrix. Therefore, the above referenced 0.01 feet LNAPL thickness within the well would suggest only 0.003 – 0.005 feet (sheen) of LNAPL in the soil matrix.

The U.S. EPA considers that the objective of 40 CFR 280.64 is the removal of free product to prevent migration. Specifically, 40 CFR 280.64(a) requires "*free product removal in a manner that minimizes the spread of contamination into previously uncontaminated zones by using recovery and disposal techniques appropriate to the hydrogeologic conditions at the site*"; while 40 CFR 280.64(b) specifies the "*abatement of free product migration as a minimum objective for the design of the free product removal system.*" (EPA, *The Leaking Underground Storage Tank Cleanup Process*, EPA Link).

The recovered volume of LNAPL will be recorded and tracked routinely, as will the cost of operation and maintenance (O&M) of the remediation system. In the event the operation and maintenance costs outweigh the benefits of the LNAPL recovery, then the next step in the process will be initiated.

Secondary PCB Dissolved Phase Remediation (Phase II)

Dual-phase extraction (DPE) is a remedial technique by which groundwater and PCB laden LNAPL droplets are simultaneously removed from the subsurface through mechanical methodologies. High level vacuum blower systems and submersible pumps work in unison to simultaneously remove ground water and apply a concentrated negative pressure (vacuum) to the aforementioned extraction well network located within the impacted areas of concern. LNAPL droplets trapped in the subsurface pore space and adsorbed to the soil matrix are captured and transported above ground for treatment.

Specifically, the in-well separation sleeves will be removed from the MPE wells, and pneumatic submersible pumps will be inserted into each extraction well to allow the MPE system to operate as a DPE system. No other major components would be changed to convert the MPE system to a DPE scenario.

NOTE: Pneumatically actuated submersible pumping does not "shear" the groundwater upon recovery, which significantly reduces the potential of LNAPL droplet emulsification (as compared to electric pumps, MPE drop tubes, etc). Emulsified LNAPL influent is extremely difficult to treat/separate prior to sewer discharge.

The DPE system will operate at a higher groundwater recovery rate and will create a larger cone of depression to capture more of the dissolved PCB plume. In addition, the larger cone of depression could capture hard to recover LNAPL ganglia. If significant LNAPL is realized, then the DPE system can be retrofitted to the original MPE system to effectively capture the LNAPL if present.

During this phase of the remedy, groundwater sample results will be used for the diminishing returns assessment to determine when to conclude system operation. The DPE system will continue to operate until the remedial objectives are met. If dissolved phase PCBs concentrations remain above the remedial objectives, then a diminishing returns assessment will be performed and will include a cost-benefit analysis of continued system operations compared to dissolved PCB recovery rates.

Tertiary PCB Dissolved Phase Remediation (Phase III)

If dissolved phase PCB concentrations remain above the remedial objectives, then pulsed operation of the DPE system (i.e., on 1 week / off 1 week) will be considered as a cost-savings means for continued remediation system operation. Additionally, pulsed operation provides dynamic subsurface conditions that can dislodge stubborn LNAPL ganglia.

INSTITUTIONAL AND ENGINEERING CONTROLS

Based on the industrial use of the site, institutional and/or engineering controls will be appropriate to control exposure pathways and to facilitate closure. These controls will be evaluated after LNAPL recovery and during groundwater monitoring to address post-remedy risks/exposure pathways.

LONG TERM STEWARDSHIP

Long-term groundwater monitoring may be considered based in part on the effectiveness of MPE and DPE system operation. Paired with long-term groundwater monitoring could be a site-specific Long-Term Stewardship (LTS) plan. If required, the LTS plan would be developed as we approach site closure and will include inspections, and operation and maintenance of the of the engineering controls related to the PCB LNAPL remediation.

Please contact us at 317-688-1212 if you have any questions or concerns regarding this *Application Addendum*.

Sincerely,
SPECIALTY EARTH SCIENCES, LLC

P. Cory Smith
Senior Project Manager

Eric S. Lewis, LPG (IN #2180)
Senior Geologist

cc: Mr. Jason Ingram, Superintendent (Muncie Sanitary District)
Ms. Clare Parker & Mr. George Ritchotte, (IDEM)