Geosyntec consultants

130 Stone Road West
Guelph, Ontario N1G 3Z2
PH 519.822.2230
FAX 888.635.3470
www.geosyntec.com

Memorandum

Date:	27 February 2020
To:	Matthew J. Ohl, USEPA
Copies to:	Norman W. Bernstein – N.W. Bernstein & Associates, LLC Peter M. Racher – Plews Shadley Racher & Braun LLP
From:	Suzanne O'Hara and Chris Gale, Geosyntec Consultants, Andrew Gremos Ramboll
Subject:	Response to Comments from McMillian McGee's February 21 Letter Identifying Concerns with Geosyntec's Proposed Sampling Plan

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This memo provides Geosyntec's response to the concerns raised by McMillan McGee (MM) on the proposed Dense Non-Aqueous Phase Liquid (DNAPL) Containment Area Sampling Work Plan for the Third Site (Geosyntec Consultants. *Third Site DNAPL Containment Area Additional Sampling Work Plan, Third Site Superfund Site, Zionsville, Indiana,* February 10, 2020.). The Work Plan outlines the field activities required to identify the source of residual mass observed in compliance monitoring wells P-1 and P-2 following Electrical Resistance Heating (ERH) within the DNAPL containment area.

MM raised concerns that the existing plan does not monitor groundwater beyond the existing long screened well network which have screened depths of 40 feet below ground surface (ft bgs). They raised the following concerns and we have provided responses below:

1. Existing monitoring and recovery wells have screens that extend to a maximum of 40 feet below ground surface, coincident with the bottom of the defined thermal treatment zone. Limiting groundwater sampling to these wells ignores potential contamination from deeper in the lower till;

   Response: The groundwater sampling from the existing well network is intended as a guide to identify areas of the DNAPL Containment Area where volatile organic compounds (VOCs) are higher (e.g., where residual VOC mass may be located) to target collection of soil cores, which will extend to a depth of 46 ft bgs, in areas of potential remaining mass. The soil cores will provide data on the distribution of any

potential remaining mass in both the unsaturated shallow soils and the saturated soils and associated pore water (i.e., groundwater).

2. The monitoring and recovery wells act as vertical conduits for groundwater flow. Since the volume in question is within a sheet pile-enclosed area of small dimensions, it is anticipated that groundwater flow is largely a matter of up-and-down movements of the water table. Such movements would preferentially move through the wells, since the resistance of flow through an open well is orders of magnitude less than flow through the soil matrix. This condition means that a groundwater sample collected from a vertical interval within a monitoring well may not necessarily originate from that depth, and thus would likely be unrepresentative of conditions within the adjacent soil matrix;

   Response: The groundwater samples are to be collected from the performance monitoring wells (e.g. P-1 to P-3) and other existing wells which are completed in the same manner as the performance monitoring wells. The groundwater samples are to be used as a screening evaluation to identify areas of the DNAPL Containment Area with higher VOC concentrations (e.g., where residual VOC mass may be located) as guide for targeting collection of collect soil cores, which will provide location specific information on the mass distribution. Groundwater samples will be collected from the top of the water column and from the base of the water column in the wells to provide a limited understanding of the vertical distribution of VOCs within the DNAPL Containment Area. Actual locations of residual mass will be shown by the soil and pore water (groundwater) samples collected from discrete depths to a total depth of 46 ft bgs.

3. All of the recovery and monitoring wells (except the 'Sump' well) have silt traps; these may have residual contamination unrepresentative of conditions within the neighboring soil matrix.

   Response: The groundwater samples are to be collected from the performance monitoring wells and other existing wells which are completed in the same manner as the performance monitoring wells. Hydrasleeve samplers are planned to collect the samples and are a grab sampler that will minimize the disturbance in the water column. In addition, if there is silt in the base of the wells, that material would have been heated and groundwater was extracted from these wells during operation. There should not be significant residual mass in the silt traps.

In addition, MM referred to their preferred method of evaluating the remaining mass in the cell. They have proposed conducting continuous vertical groundwater profiling to 46 ft

bgs within the DNAPL containment area conducted using the Waterloo APS™ or similar tooling. MM states using such tooling would allow:

1. Sample collection to the proposed depth of 46 feet BGS, or deeper, if desired; and
2. Groundwater samples truly representative of the local soil matrix, unaffected by the potential for preferential groundwater flow or possible residual contamination.

Response:

1. We have not proposed using this type of tooling to collect groundwater samples because:

   a) Based on our experience, we do not believe this type of tool will be able to collect a sufficient volume of groundwater for sampling in a reasonable time period. We previously used the Waterloo APS at the adjacent ECC Superfund Site to collect groundwater samples from the Upper Till (which is more permeable than the Lower Till) and Sand and Gravel Unit. Of the 23 locations that we tried to collect groundwater from the Upper Till, we were only able to collect samples from 10 locations despite leaving the sampler in place for up to 4 hours at some locations (Geosyntec Consultants. *Enviro-Chem Superfund Site Supplemental Sampling Report,* In preparation 2020). Although, as mentioned later in MM's letter, groundwater samples have previously been collected from the Lower Till, these samples were collected from CMT wells that were installed using a sonic drill rig, and the wells were completed at a depth of a maximum of 35 ft bgs and were allowed to sit for some time prior to sample collection.
   b) We do not believe that any type of groundwater grab sampler will be able to be direct pushed to a depth greater than approximately 35 ft bgs based on the MIP profiling that was conducted at the Site in 2014 (ENVIRON DNAPL Containment Area *Supplemental Data Collection Report, Third Site Superfund Site, Zionsville, Indiana.* November 1, 2014). Each of the MIP borings was advanced until refusal was encountered, with the majority encountering refusal at approximately 30 ft bgs with the deepest being advanced to approximately 37 ft bgs. The planned soils cores will extend to 46 ft bgs and will thus provide better vertical coverage.

2. The soil cores will provide samples that will be representative of the contaminant mass on both the solid phase and within the pore water. These will be the data used to evaluate residual mass distribution in the DNAPL Containment Area. The proposed groundwater samples collected from existing wells are to guide where to collect the soil cores.

MM provided supporting information to indicate that mass has historically been detected in the Lower Till, which may be contributing to the elevated concentrations in the performance

monitoring wells. We agree that the data do support that there has been contaminant mass (although not DNAPL) in the upper portion of the Lower., The depths at which contaminant mass was previously identified (approximately 35 ft bgs) is above the 40 ft bgs target treatment depth of the ERH remedy. We propose to evaluate the potential for mass distribution in the Lower Till below the ERH target treatment depth by collecting soil cores to a depth of 46 ft bgs, 6 feet below the target treatment depth of the ERH remedy.

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