July 3, 2018 Reference No.058502

Mr. Nate Nemani
RCRA Corrective Action Project Manager
Land and Chemicals Division
Remediation and Reuse Branch
U.S. EPA, Region 5
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Dear Mr. Nemani:

Re: Response to Technical Review of Sediment Pore-Water Evaluation Results for Secondary Pond Memorandum
RACER Nodular Industrial Land, Saginaw, Michigan
REPA5-3544-016

The following presents GHD's responses to Booz Allen Hamilton (BAH) technical review comments dated June 12, 2018 on the Sediment Pore-Water Evaluation Results for Secondary Pond Memorandum Under Future Use Scenario's Memorandum (dated June 1, 2018) for the Revitalizing Auto Communities Response Trust's (RACER) Former Nodular Industrial Land (Site) in Saginaw, MI.

On June 22, 2018, Daniel Smith (GHD) and Gary Pascoe (Eco-risk subcontractor to BAH) participated in a telephone call to discuss the June 12, 2018 comments. As part of the discussion, GHD requested clarification on the issues identified in Comment #3. Details of the discussion are further discussed in the response to Comment #3.

In light of this discussion, BAH's comments are provided below in ***bold and italics*** followed by the response.

Comment 1: Species Sensitivity Distribution – Aquatic Worm

The estimated aquatic worm 4-day lethal concentration 50 (LC50) is acceptable. Review of papers by Connell (e.g., Verma et al. 2012) suggest that a linear extrapolation is sufficiently conservative, since the relationship of zinc LC50 to zooplankton exposure may be non-linear, which could result in a relatively higher LC50 at a shorter exposure duration, and hence a higher chronic value. No changes are recommended.

Verma, V, QJ Yu, and DW Connell. 2012. Evaluation of effects of exposure time on aquatic toxicity with zooplanktons using a reduced life expectancy model. Chemosphere 89:1026-1033.

GHD Response:

No response is required. Thank you for the reference.

Comment 2: Species Sensitivity Distribution - Graphic

When the toxicity data are fit to the EPA Species Sensitivity Distribution (SSD) Generator, they do not appear to fall on the same percentiles as the graphs in Figures 2 and 3, but are slightly shifted to lesser percentages when less than 50 percent. Consequently, the SSDs in Figures 2 and 3 are considered to be sufficiently conservative. No changes are recommended.

GHD Response:

No response is required. Thank you for the reference.

Comment 3: Species Sensitivity Distribution - Interpretation

The potential for impacts to the benthos of the secondary pond is concluded to be less than 8.3 percent, which was derived as a percent of the area of the pond as spatially weighted with the other locations. The conclusion is that 8.3 percent is less than the 20 percent that is frequently cited as a threshold for effects on a population. However, that 20 percent threshold was derived to be applicable to a population not to a geographical area. The SSDs in Figures 2 and 3 can also be interpreted that 1/9th of the samples, or 1/9th of the pond area (11 percent), could present impacts to approximately 50 percent of the taxa in the area. Another interpretation is that a concentration of zinc in pore water at 33,000 micrograms per liter (µg/L) may be associated with an impact to 50 percent of the taxa, with 11,000 µg/L associated with an impact to 20-25 percent of taxa. The bulk sediment concentrations that are associated with the 11,000 µg/L and 33,000 µg/L pore water concentrations should be determined, or estimated. Based on the SSD, the area of the pond characterized by those sediment concentrations could be associated with impacts to >20 percent to 50 percent of the benthic taxa. Whether this level of impact and the spatial extent of this potential impact within the ponds is significant to warrant further study should be determined.

GHD Response:

Prior to preparing a response to the above comment and per USEPA concurrence, Daniel Smith (GHD) and Gary Pascoe (Eco-risk subcontractor to BAH) participated in a telephone call on June 22, 2018 to clarify that the comment's underlying concern is whether the pore water sampling locations and observed concentrations are representative of the entire pond. In response, we offer the following observations. Previous sampling of bulk sediment chemistry did not show any noticeable localization of high zinc concentrations with either water depth or location in the Secondary Pond. On the other hand, as discussed in the report, the sediments sampled for pore water were in areas that had been drained and, potentially, dried and oxidized. Thus, compared to sediments in deeper, never drained or less recently re-flooded portions of the pond, the pore water locations may be relatively poorer in AVS and richer in soluble zinc. Thus, the pore water concentrations measured in the peeper samples may be conservative (i.e., higher concentrations of soluble zinc) estimates of other sediment locations.

As the comment states, the original basis for the 20% rule was based on % effects on the population. However, Suter et al (1995) and others also applied the 20% rule to % of area affected for populations and communities. Suter et al. state

> *"De Minimis Ecological Risk. Risks corresponding to (1) less than 20% reduction in the abundance or production of an endpoint population within suitable habitat within a unit area, (2) loss of less than 20% of the species in an endpoint community in a unit area, or (3) loss of less than 20% of the area of an endpoint community in a unit area." Bolding added for emphasis. The unit area is later described, and it would be applicable to the entire site or, as considered in GHD's analysis, the pond.*

Application of the 20% rule to area of impact has also been recommended by other proponents of this 20% rule (e.g., see Henning et al., Swanson et al., 2004). Suter et al. also specifically discuss that higher levels of impact are acceptable if the resource value is low. Given the limited and artificial nature of the Secondary Pond ecosystem, areal impacts greater than 20% could be considered *de minimis*.

The comment recommends that the bulk sediment chemistry should be associated with specific pore water concentrations. Unfortunately, this is not really possible because 1) paired samples of bulk sediment chemistry were not taken and 2) pore water often does not correlate well with bulk sediment chemistry. (The latter is the rationale for taking pore water samples.) There are previously collected sediment quality data, but these samples are typically far deeper into the sediments, often a foot or more, than the peepers, which were placed with their permeable tops 1.5 inches below the sediment-water interface. Potentially because of the last two points, there are no relationships between bulk zinc concentrations in nearest sediment samples and observed pore-water concentrations of zinc. For example, nearest samples of zinc from near Station 8, had bulk sediment chemistry concentrations greater than those found near Station 10. In contrast, pore water concentration at Station 8 were less than 1/10th of those at Station 10.

In conclusion, consistent with our memorandum dated June 1, 2018 and based on the responses provided in this letter, we do not believe that further analyses are warranted in the Secondary Pond. Thus, RACER would like to proceed with implementing the removal of PCB-impacted sediment above 50 mg/kg. Following the removal of PCB impacted sediment, the pond would be left to slowly naturalize; i.e., no further action is recommended.

Should you have any questions on the above, please do not hesitate to contact us.

Sincerely,

GHD

Daniel Smith

JEP/wg/42

Encl.

cc: Dave Favero (RACER)
John-Eric Pardys (GHD)

References

Henning, M. and N. Shear. 1998. Regulatory perspectives on the significance of ecological changes as reported in ecological risk assessments. Human and ecological risk assessment, 4: 807 814

Suter, G. W., B. W. Cornaby, C. T. Hadden, R. N. Hull, M. Stack, and F. A. Zafran, 1995. An approach for balancing health and ecological risks at hazardous waste sites. Risk Analysis 15: 221 231

Swanson, S.M., et al. 2004. Multiple Stressors: Risk-Based Framework and Experimental Design for Cause/Effect Relationships 1st Edition Water. Environment Research Foundation