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

US EPA RECORDS CENTER REGION 5
531512

REPLY TO THE ATTENTION OF: SR-6J

MAY 17 2018

Mr. Leo M. Brausch
Brausch Environmental, LLC
5318 Alexa Road
Charlotte, North Carolina 28277-0518

Re: EPA Comments on Groundwater Assessment Technical Memorandum
Operable Unit 2 (OU2), Lake Calumet Cluster Site, Chicago, Illinois

Dear Mr. Brausch:

The United States Environmental Protection Agency (EPA) and the Illinois Environmental Protection Agency have reviewed the OU2 Groundwater Assessment Technical Memorandum, dated July 24, 2017, for the Lake Calumet Cluster Site in Chicago, Illinois. This interim report, prepared by ARCADIS on behalf of the Lake Calumet Cluster Site Group (LCCS Group), was submitted to allow vetting of technical issues during the October 18, 2017 meeting, and prior to finalizing the Operable Unit 2, Remedial Investigation Report. Based upon our review, EPA has the following comments:

***General Comments*:**

1) The report should include a regional groundwater flow map that includes water level data from Paxton I and II, and Land and Lakes Landfill, and Indian Ridge Marsh. This may help to facilitate a greater understanding of regional flow and contaminant transport from these presumed upgradient sources.

2) Other Sites within the vicinity of LCCS have incidences of high pH (pH >12). Are there any instances of high pH at LCCS? ARCADIS should provide the purge-field parameter results in a table.

3) Groundwater investigations typically provide cross-sections. This is somewhat done in Appendix J, but there are data gaps within the LCCS (only perimeter data is provided). Cross-sections should be presented to facilitate understanding of the fill/geology within the LCCS site.

4) The report concludes no further investigation of Indian Ridge Marsh is necessary, but the report does not present all the data to support that conclusion. Although there appears to be limited recreational risk, there are still exceedances of chronic/acute aquatic criteria (ecologic risks) that may need to be addressed. The report provided the laboratory report for

data collected by ARCADIS from Indian Ridge Marsh, at least according to Appendix A in Volume I and Figure 6. This data should be explored further before making this conclusion. Additional data analysis is also recommended to further help facilitate the understanding of the various influences of the sources of contamination at LCCS and the surrounding areas.

5) During the October 18, 2017 meeting, Illinois EPA raised concerns over the underlying clay and assumption of it being an effective barrier. The methods used to evaluate aquitard efficiency are described in the documents below. Although this is not EPA guidance, it provides a reasonable method for the type of evaluation needed to move the OU2 RI/FS project forward.

    a) Cherry, J.A., Parker B.L., Bradbury, K.R., Eaton, T.T., Gotkowitz, M.B., Hart, D.J., Borchardt, M.A., 2006, Contaminant Transport Through Aquitards: A State-of-the-Science Review, American Water Works Association, IWA. This report can be accessed via the following link: Contaminant Transport Through Aquitards A State of the Science Review 91133a.pdf.

    b) Bradbury, K.R., Gotkowitz, M.B., Hart, D.J., Eaton, T.T., Cherry, J.A., Parker B.L., Borchardt, M.A., 2006, Contaminant Transport Through Aquitards: Technical Guidance for Aquitard Assessment", American Water Works Association, IWA. This report can be access via the following link: Contaminant Transport Through Aquitards Technical Guidance for Aquitard Assessment 91133b.pdf.

6) ARCADIS needs to make sure that the duplicate data are handled as follows:
    (i) If a constituent was detected in both samples and the relative percent difference (RPD) is less than 25%, the average of the two samples will be used.
    (ii) If a constituent was detected in both samples but the RPD is greater than 25%, the maximum concentration will be used.
    (iii) If a constituent is detected in only one sample, the detected concentration will be used

Specific Comments:

7) Executive Summary, Page ES-1, Second Paragraph: Text states that a primary objective of the investigations is to evaluate the "hydrogeologic setting and groundwater flow behavior within the fill deposits that constitute the water-bearing zone at the Site." Due to past filling and waste disposal activities at LCCS, it is unclear what the term "fill deposits" means. Characterizing the hydrogeologic setting and flow behavior at LCCS should include evaluating those features in native soil, and, in anthropogenic fill deposits and waste materials. Special attention should be paid to identifying groundwater flow characteristics in transition zones between native soil and anthropogenic fill/waste materials.

8) Executive Summary, Page ES-2, Second Paragraph: The text states that "the shallowest native geologic unit at the Site is a low-permeability silty clay located immediately beneath the anthropogenic fill deposits" and that the "silty clay unit was encountered at every soil boring location and extends to the maximum depth of all soil borings completed." The range of thickness of the silty clay encountered via the soil borings should be provided. Also, the third paragraph states that the Fill Material is a uniform composition. Given the

heterogeneity encountered within the soil borings, please clarify what is meant by this statement.

9) Section 5.0, Groundwater Assessment: This section would benefit from a detailed explanation for determining the concentrations as either "high" or "low."

10) Section 5.1, Nature and Extent of Constituents in Groundwater: On page 16, text states that "The results from all four quarters of data were very similar and the fourth monitoring event was chosen as a representative data set." All the groundwater data from all four quarters should be used and screened against appropriate benchmarks. ARCADIS does not discuss why they believe the fourth quarter is "representative." In addition, MW12 was only sampled for one quarter (this is the well with the LNAPL). It should be noted that the contaminant concentrations of contaminants were very high in MW12.

11) Section 5.1, Nature and Extent of Constituents in Groundwater: On page 19, for VOCs, please add a similar orange table as was provided for all other constituents.

12) Section 6, Preliminary Evaluation of Recent LCCS and Historical IRM Data: As part of the OU2 Remedial Investigation/Feasibility Study (RI/FS) Work Plan, an approach for conducting the baseline human health and ecological risk assessments was outlined. ARCADIS states in Section 6 of the technical memorandum that the preliminary evaluation contained within the tech memo "is not designed to replace either of those two assessments nor is it designed to replace any particular section of those assessments (such as the selection of constituents of concern (COCs))." ARCADIS goes on to state that the preliminary screening conducted as part of the technical memorandum was to show "likely findings of the BHHRA and BERA" and to "inform and expedite the process of completing the RI phase of the work."

    The Agencies are concerned that ARCADIS conducted a major short cut of the risk assessment process. Although screening tables were included in the tech memo showing a comparison to the human health and ecological screening criteria listed in the RI/FS Work Plan, ARCADIS concluded that the only benchmarks applicable to human health are those based upon a recreational receptor. This is contrary to the ARCADIS response to USEPA on the RI/FS Work Plan which stated that "*Future construction workers and park employees at Indian Ridge Marsh will be evaluated as potential receptors in the BHHRA.*" Even though ARCADIS indicated that future construction workers and park employees at Indian Ridge Marsh (IRM) would be evaluated as potential receptors, the only receptor evaluated with alternative IRM-specific benchmarks was the recreational receptor.

13) The report concludes that the LCCS is **not** a principal source of constituents to IRM and further state that the human health and ecological screening results support their conclusion that no further evaluation of risk is needed. The Agencies do not agree that ARCADIS has made a compelling case for this conclusion. The following bullets identify issues of concern:

    a. The screening was conducted using only five monitoring wells (MW-04 through MW-08). This doesn't consider the potential migration of contaminants detected in other wells into the IRM. The screening process should include screening data from all the monitoring wells sampled.

b. Along with the maximum concentrations, ARCADIS used the arithmetic average to compare to the benchmarks (both human health and ecological benchmarks). The maximum concentration is typically used in the screening evaluation and the 95% UCLs (if sufficient data are available for calculating the 95% UCL) are to be calculated as the exposure point concentrations for receptors (except construction worker and immobile ecological receptors) in the human health and ecological risk assessment.

c. ARCADIS states on page 22 that human health-based standards from 35 IAC 302.208 and 302.407 "include exposure through consumption of surface water as a drinking water supply." Per communication with Illinois EPA's Bureau of Water, this statement is incorrect. The human health-based standards from those sections are based upon either incidental ingestion intake rates or the assumption of no water intake. Therefore, the standards from 35 IAC 208 and 302.407 are applicable and should be used in the screening process.

d. ARCADIS states that the water within the fill material at LCCS does not meet the definition of groundwater under 35 IAC Part 620 and, therefore, objectives and standards from 35 IAC Part 742 and 35 IAC Part 620 do not apply. This may be a true statement but it needs to be verified.

e. ARCADIS states that, although the surface water standards in 35 IAC 302.210 are based upon a recreational contact scenario, the ingestion rate for fish used in the development of the standards is not realistic for the IRM. That type of site-specific evaluation should be conducted as part of the Baseline Human Health Risk Assessment process, not as part of an initial screening evaluation. Additional resources can be consulted for fish consumption rates such as the Estimated Fish Consumption Rates for the U.S. Population and Selected Subpopulations (NHANES 2003-2010), April 2014, EPA-820-R-14-002 and the USEPA Exposure Factors Handbook, September 2011, EPA/600/R-090/052F.

f. On page 24 (and again in the ecological screening), ARCADIS conducted a "rough estimate of mixing" which is definitely "rough" and is not technically supportable. The dilution estimate was determined based upon averaging two surface sample results (SW-05 and SW-06) from 2009 and comparing them to the average of the groundwater results from four monitoring wells (MW-4, MW-5, MW-6, and MW-7) from 2016 and 2017...several years apart. References to this rough "10X" dilution should be deleted from the document.

14) Section 6.1.1, Human Health Benchmark Comparisons: The report notes on figure 6 that Indian Ridge Marsh already had past sampling events of the surface water and sediment. ARCADIS should provide this data on a figure and compare the COC and concentrations to LCCS and upgradient sources.

15) Section 6.1.2, Ecological Benchmark Comparisons: Please provide figure(s) for the locations with exceedances of screening levels for the Illinois Numeric Water Quality Standards for acute and chronic standards. If available, compare these exceedances to concentrations identified from previous investigations at Indian Ridge Marsh.

16) Section 6.2, Spatial Comparisons of IRM Data: ARCADIS is using one surface water sampling round (metals and ammonia-nitrogen only) from April 2009 to support their

conclusion that LCCS is not a principal source of constituents to IRM (page 28). ARCADIS further states that the results from only two sediment samples further support their conclusion. ARCADIS even concludes on the bottom of Page 28 that "To the extent that the human health and ecological screening evaluations presented elsewhere in this Technical Memorandum suggest that additional investigation and evaluation of select constituents in IRM may be necessary, the spatial evaluation of existing data presented herein suggests that such investigation and evaluation should focus on other portions of IRM and sources of constituents to those portions of the IRM." This conclusion is unsupportable based upon one round of surface water data and two sediment samples.

17) Section 6.2, Spatial Comparisons of IRM Data: On page 28, the text discusses spatial comparison and presents data in Tables 13 and 14. It would be more informative if the data were provided in figures. Also, please provide an explanation for the omission of SW-08 and SW-09 data from Table 14.

18) Section 6.3, Comparison of IRM Surface Water Data to Human Health and Ecological Benchmarks: ARCADIS uses the 2009 surface water data and compares it to the IRM-specific benchmarks for the recreational receptor. The 2009 surface water sample results only included 17 metals and total ammonia-nitrogen. However, on Page 24 it states that six constituents (arsenic, manganese, Aroclor-1221, Aroclor-1232, ethyl benzene, and vinyl chloride) in groundwater exceeded their IRM-specific benchmark for the recreational receptor. Of those six constituents, only arsenic and manganese were sampled in the surface water samples from 2009. This represents a data gap.

19) Section 7.0, Summary and Conclusions: On page 32, ARCADIS states the silty clay unit underlying the fill material represents a vertical limit of groundwater flow originating at the Site. The report further concludes the low permeability, uniform composition, and significant thickness of the clay unit provide a barrier preventing groundwater from migrating vertically into deeper permeable units. However, no data is presented to support this conclusion. Additional investigation of the native geology beneath the waste (vertical) and the hydrogeology surrounding the waste mass (horizontal) is needed.

20) Figures 11-18: The figures need to be improved for greater clarity and understanding of conclusions made in the report. Although, somewhat useful, the "High" and "low" symbols on the figures only provide limited utility. Additional figures that shows a color scale similar to the scales used in Appendix J will help evaluate the geospatial relations of the concentrations of COCs and may help illustrate and support the claims presented in the report. As is, it does not lend itself to identifying the potential influences from each of the parcels as the groundwater flows east-southeast towards the surface water.

    a) It is recommended that at least one figure include all the data available (HPT and MW data) given the limited dataset. This may help further delineate COC fate and transport.

    b) It is also recommended that at least one figure include all soil and subsoil results from previous investigations to be able to compare those spatially to the groundwater concentrations.

21) Additional Comment/Concern: There were some elevated detections of manganese in surface water and sediments. However, the 2009 Tetra Tech sediment data table contained in the appendices of the OU2 RI Work Plan does not list manganese. Please clarify whether

manganese was sampled in the sediment in 2009. In addition, there is a lot of emphasis placed on the results of the SEM/AVS results but manganese is not one of the metals evaluated for availability through that method.

If you have any questions regarding this letter, please do not hesitate to contact me at 312-886-6151 or via e-mail, kolak.shari@epa.gov.

Sincerely,

Shari Kolak
Remedial Project Manager
Superfund Division

cc: Paul Lake (Illinois EPA)