The State of New Hampshire
DEPARTMENT OF ENVIRONMENTAL SERVICES

Robert R. Scott, Commissioner

EMAIL ONLY

January 4, 2019

Peter Britz, Environmental Planner
City of Portsmouth Planning Department
1 Junkins Avenue
Portsmouth, NH 03801

Subject: **North Hampton** – Coakley Landfill Superfund Site
DES Site #**198712001**, Project #431

November 27, 2018, *Deep Bedrock Well Interval Packer Sampling Results and Well Construction Recommendations: MW-20/MW-21/MW-22*

Dear Mr. Britz:

The United States Environmental Protection Agency (USEPA), in consultation with the New Hampshire Department of Environmental Services (NHDES), has reviewed the November 27, 2018, *Deep Bedrock Well Interval Packer Sampling Results and Well Construction Recommendations: MW-20/MW-21/MW-22* memorandum (the "Memo") prepared by CES, Inc., on behalf of the Coakley Landfill Group (CLG). USEPA requested that NHDES provide the enclosed comments, as they were largely completed prior to the Federal government shutdown.

The Memo details the packer interval sampling that was conducted in accordance with CES, Inc.'s August 27, 2018, *Deep Bedrock Downhole Geophysics and Packer Sampling Intervals: MW-20/MW-21/MW-22 memorandum*, as conditionally approved by USEPA on September 18, 2018. The Memo also provides the analytical results of the interval packer samples and provides recommendations for construction of wells within bedrock boreholes MW-20, MW-21 and MW-22.

The following comments shall be addressed prior to approval of the well construction recommendations:

1. The analytical laboratory reports for the final, data-validated packer interval sampling results shall be attached to the Memo.

2. The detailed driller's notes for the installation of MW-20, MW-21 and MW-22 shall be attached to the Memo to allow for review of the conditions under which the wells were drilled and cleared, and of the conditions observed during drilling.

3. The Memo references the conceptual site model (CSM) that has been developed for the Coakley Landfill Superfund Site (the "Site"), based partially on groundwater elevations taken from existing bedrock wells monitored as part of long-term monitoring at the Site. The Memo also concludes that "the results of the interval packer sampling support the current CSM with no detections of 1,4-dioxane or PFAS immediately west of the landfill

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at MW-22 and only in the shallowest bedrock zone in MW-21." Although the bedrock borehole geophysical survey data and packer interval sampling results for MW-20, MW-21 and MW-22 provide important information for development of the CSM relative to groundwater flow in bedrock, this new data alone does not conclusively support the current CSM. The CLG should use the information and data from the bedrock investigation, including lineament analysis, surface geophysics, downhole geophysics and packer sampling, to analyze and update the current CSM.

4. Calculations of fluid transmissivity for each of the fracture zones sampled should be provided. The fluid transmissivity can be calculated using water level data and observed pumping rates measured during sampling for each interval, and can be used to assess which fractures are best for screening with monitoring wells to target a fracture that produces enough water to facilitate sampling. The transmissivity values should be used in conjunction with the analytical results and geophysics logs to determine the fracture zones that are most appropriate for well construction. USEPA and NHDES are not able to fully evaluate the recommendations for construction without this data.

5. As specified in CLG's *Bedrock Investigation Time Line and Schedule of Activities*, Table 3 from the May 31, 2018, *Revised Draft Deep Bedrock Investigation Work Plan* (the "Revised Work Plan"), as updated and provided to USEPA on November 7, 2018, CLG shall install water level dataloggers in open boreholes MW-20, MW-21, MW-22 and MW-23 (formerly known as the Chinburg well). The data loggers shall remain in place for at least 30 days before completion of the wells to assess any water level (or pressure) responses to pumping that is associated with nearby water supply wells or, if seasonally appropriate, the golf course irrigation well(s).

6. The Memo shall include an evaluation of the potential for completing the boreholes using multi-port technology to allow for future sampling of multiple fracture zones within each borehole.

7. Regarding the specific construction recommendations for each of the bedrock boreholes:

    a. MW-20 - The well construction proposed for MW-20 includes a 20-foot screen spanning 190 to 210 feet below ground surface (bgs). A 20-foot screen is not recommended for this well because a shorter screen interval (10-foot) can be used to isolate a more specific fracture zone and allow for more representative sampling. As specified above, finishing MW-20 using multi-port technology shall be evaluated. A multi-port option would allow for isolation of multiple fracture zones without comingling the zones by using a longer screen. Transmissivity data for the sampled intervals shall be calculated and is necessary to evaluate the best option for well construction.

    b. MW-21 – Packer interval Zone 7 also appears to be appropriate for well construction. Transmissivity data for the sampled intervals shall be calculated and is necessary to evaluate the best option for well construction. Completion of well MW-21 using multi-port technology shall also be evaluated.

c. MW-22 – A 40-foot well screen is not optimal for isolating head and water quality data for the individual fracture zones. Isolating an individual fracture zone with a 10-foot screen shall be considered. Along with the fracture zones proposed for completion in the Memo, Zone 6 shall also be considered as it represents a fracture zone comparable to residential wells west of the landfill and well location. Again, transmissivity data for the sampled intervals shall be calculated and is necessary to evaluate the best option for well construction. Completion of well MW-22 using multi-port technology shall also be evaluated.

8. The Memo shall include a description of the overburden wells that are coupled with MW-20, MW-21 and MW-22, including the depths and screened intervals.

9. Figure 1 should be amended to show all the monitoring wells that are referenced in the Memo, including the golf course well, R-3, FPC-5B, FPC-6B, AE-4A, AE-4B and MW-23 (formerly known as the Chinburg well).

10. Along with the Work Plan, SOP-14 from the SAP should be cited in the third paragraph of Page 1, to specify that packer interval sampling was performed in accordance with the SAP.

11. Page 2, Bedrock Boring MW-20, first paragraph: Add reference to surface geophysics performed and lineament interpretations as references for the "regional geologic structure" cited.

12. Page 3, Bedrock Boring MW-21, third paragraph: Detail the borehole caliper results and fluid conductivity trends and their importance.

13. Page 6, "Interval Packer Sampling Procedure": Include a more detailed description of the sampling procedure as specified in SOP-14, such as purge method, chemistry analysis, etc.

14. Page 6, fourth paragraph: Clarification shall be provided to better define cleanup levels (CLs) as being set in the ROD, rather than just generally as "USEPA cleanup levels."

15. Page 6, fifth paragraph: Specify that 1,4 dioxane results were below the ROD CL of 3.0 µg/L.

16. Page 6, last paragraph: Specify that the PFOA and PFOS results cited (4.55 ng/L, 0.94 ng/L) were from residential well R-3.

17. Page 7, MW-21, second paragraph: The text compares the 1,4-dioxane result in MW-21 Zone 1 with concentrations observed in AE-4B and FPC-6B. The geologic units in which these two wells are completed (overburden, shallow bedrock, etc.) should be specified for this comparison. The text implies that these wells are also screened in the shallow bedrock, but that is not stated explicitly.

18. Page 8, third paragraph: Reference is made to the depth of well at 340 BHR, but not the depth of residential well R-3 (368 BHR) or the golf course well at 339 BHR. The justification for this interval should also include an interpretation of any relationship to fracture orientation found in MW-23 (formerly the Chinburg well.)

19. Include a description of the coupled overburden wells and the screened intervals within those wells.

The CLG shall respond to these comments and revise the Memo within 15 days of receipt of this letter.

If you have any questions or comments regarding this letter, you can contact me at the number provided below or, upon USEPA's return, Skip Hull at (617) 918-1882 or Hull.Richard@epa.gov.

Sincerely,

Waste Management Division

Digitally signed by Waste Management Division
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