UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 1 – NEW ENGLAND
5 POST OFFICE SQUARE – SUITE 100
BOSTON, MASSACHUSETTS 02109-3912

Via Electronic Mail

November 6, 2020

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

RE: Coakley Landfill Superfund Site
October 21, 2020 *Draft Deep Bedrock Investigation Pumping Test Work Plan*

Dear Mr. Britz:

The United States Environmental Protection Agency (EPA) is in receipt of the October 21, 2020 *Draft Deep Bedrock Investigation Pumping Test Work Plan* (the "Work Plan") submitted by CES, Inc. on behalf of the Coakley Landfill Group (CLG). Included with the Work Plan is CLG's response to EPA's comments on the August 18, 2020, *MW-6 Interval Packer Sampling Results and Pumping Test Viability* memorandum (Response to Comments).

Following review of the Response to Comments and Work Plan and consultation with the New Hampshire Department of Environmental Services (NHDES), EPA is providing the following comments:

1. The Work Plan should incorporate CLG's stated plan, as noted in the Response to Comments, to notify the owner of 178A Lafayette Road of the pending pumping test and to confirm if the owner resides at the address or if the property is rented. In the event it is rented, the renter should also be notified of the pending pumping test.

2. EPA suggests that one of the intentions of the pumping tests is not to specifically confirm that identified transmissive fractures in bedrock monitoring wells do not provide likely migration pathways for off-site migration of Site contaminants to potential receptors, but rather to confirm the presence of transmissive fractures in bedrock and to identify the likelihood that these fractures may transmit contaminants to potential receptors.

3. EPA concurs that one of the intentions of the pumping test is to evaluate inter-fracture groundwater flow and its relationship with overburden and shallow bedrock, but notes that many of the recommendations from the November 25, 2019, *Deep Bedrock Investigation Interim Report* and the July 17, 2020, *Deep Bedrock Investigation Work Plan Addendum* for addressing this data gap have not been implemented.

4. In the Response to Comments, CLG proposes to install a "Jaswell-type" seal at 34-37 feet below the top of casing to isolate the deeper fractures from the impacts of groundwater flow from the shallow fractures, rather than at 50-60 feet below the top of casing as suggested by EPA. The rationale for placing the packer seal at 50-60 feet below top of casing would be to isolate all the shallow fractures observed and shown in Zone 1 and Zone 2 in the borehole geophysics. Although shallow bedrock wells at the Site are often only 25-30 feet in to bedrock, it is important to isolate the shallow fractures that may be influenced by overburden groundwater during the pumping test and to fully capture the characteristics of the deeper fractures to determine any influence on flowpaths in deep bedrock that may impact private bedrock wells placed at depths much deeper than 25-30 feet. Based on further review of the borehole geophysical logs, EPA recommends the seal be placed at 58-62 feet below top of casing.

   Additionally, EPA recommends the placement of a transducer between the bottom of the steel casing and the packer seal to measure any induced hydraulic effects in fracture Zones 1 and 2 (as identified by the downhole geophysical logging) during the pumping test.

   The Work Plan shall also specify if the Jaswell-type seal will be permanent or temporary. Jaswell installations are typically permanent and could preclude the subsequent installation of PVC monitoring wells in MW-6 to facilitate long-term monitoring of individual fractures. Use of a temporary pneumatic packer to seal off the borehole for the pumping test is preferred over a Jaswell installation.

5. Section 2.1 states that water level data will be collected during "baseline, background, pumping and recovery" periods. The Work Plan shall clarify the difference between baseline and background periods.

6. Section 2.1 should specify that a barometric data logger will be used to record changes in barometric pressure during the pumping test. Changes in barometric pressure must be monitored to facilitate correction of the water level data and the use of a barometric probe and data logger set to record at the same frequency and times as the water level data loggers greatly simplifies the data correction. Note that all data loggers should be programed to begin recording at the same time to make data manipulation easier.

7. Section 2.1 indicates that groundwater levels will be measured in the monitoring wells identified in Table 1 for a minimum of two weeks prior to commencing the pumping test. In addition, EPA suggests that transducers be deployed in at least monitoring wells GZ-105, FPC-8B, FPC-3B, FPC-2B, MW-2, MW-5S, MW-5D and MW-11 prior to the drilling and development of the new bedrock borehole near GZ-105 (MW-25) to record any influence from drilling and development of the new well.

8. Table 1 does not include the yield for each monitoring well as requested by EPA and affirmed in CES Inc.'s July 17, 2020, *Deep Bedrock Investigation – Response to Comments on Draft Deep Bedrock Investigation Work Plan Addendum*.

9. Not all wells listed in Table 1 are shown on Figure 1. A new figure should be developed, or Figure 1 modified, to show all the wells to be monitored during the pumping test.

10. Table 1 indicates that shallow bedrock wells AE-3B, AE-4B, FPC-5B, and FPC-9B will be measured manually during the pumping test instead of with transducers. AE-3B and FPC-5B are located along strike of the predominant fracture set from MW-6 on the opposite side of the landfill. It will be important to get continuous data from these wells to assess the hydraulic effects of pumping in the shallow bedrock beneath the landfill. AE-4B is located along strike of the cross-set fractures that are theorized to be the primary migration pathway to the west. While this location may be redundant to MW-22D1, the critical nature of this pathway warrants duplicity in the data collection. FPC-9B is located east of the landfill, in an area with no other shallow bedrock wells. Monitoring wells AE-3B, AE-4B, FPC-5B, and FPC-9B should be monitored with data loggers to obtain high quality water level response data. Conversely, bedrock wells MW-23 and GZ-122 could be measured manually in lieu of a data logger given the distance from the pumping well.

11. Table 1 lists four overburden wells that will be monitored using data loggers including GZ-123, MW-20S, MW-21S, and MW-22S. These wells are all distant from the pumping wells and are unlikely to see measurable drawdown as a result of pumping and could be left out of the monitoring network. Conversely, MW-4, FPC-2A FPC-8A, and AE-2A are much closer to MW-6 and could see measurable drawdown justifying the use of data loggers at these locations.

12. Section 2.2 describes the step-drawdown test and proposes steps and sample rates of 5, 10, and 12 gpm. Stepped pumping rates are calculated from the specific capacity, transmissivity and estimated drawdown of MW-6 as determined during well redevelopment. The Work Plan does not specify whether the three rates mentioned are examples or the actual rates calculated and seem to conflict with other pumping rates mentioned later in Section 2.2 (10, 15, and 20 gpm). The actual rates for the step-drawdown test should be provided in the Work Plan along with the calculations used to select them. Further, at least four steps (five would be preferred) should be employed to better define the performance curve for the well. The early steps will reach equilibrium very quickly, so that the additional steps should not extend the overall duration of the test.

13. Section 2.2: Note that a totalizing flow meter should be employed to allow both instantaneous flow rate measurements and the calculation of longer-term averages during the pumping of MW-6.

14. Section 2.2: A graph plotting drawdown versus pumping rate should be prepared using the step-drawdown test data and the resulting performance curve used to justify the selected rate for the constant-rate test. The graph will also allow quantification of the well efficiency which is useful in assessing how adequately the well is developed.

15. Section 2.2 shall specify the frequency for measuring water levels for wells that are equipped with data loggers and that are measured manually.

16. Section 2.3 states that "all wells being monitored during the test will be considered when establishing steady state conditions" for the constant rate pumping test. Given that many of the observation wells will be instrumented to measure water levels during the test, versus measuring manually, the procedures that will be used for collecting the data to establish steady state conditions should be specified.

17. Section 2.3 indicates that the wells that will be revisited for heat pulse flowmeter measurements during the constant rate pumping test will include GZ-125, GZ-130, MW-24, BP-4 and MW-25. CLG shall also conduct heat pulse flow metering in monitoring well GZ-108 if drawdown is observed in this monitoring well during the constant rate pumping test. CLG shall confirm the wells to be metered with EPA and NHDES prior to the initiation of heat pulse flow metering during the pumping test.

18. Section 2.3 does not specify the manual or data logger water level reading frequency. The data loggers should be reprogrammed after completion of the background test and before the start of the constant-rate test and the frequency should be reduced from the 15-minute interval to 1-minute intervals or less. Consideration should be given to using a logarithmic scale for the data loggers closest to the pumping well to get more measurements during the initial portion of the test when drawdown expands rapidly.

19. EPA concurs with the frequency of sampling and list of contaminants to be analyzed to assess groundwater quality proposed in Section 2.4, but because MW-6 is located close to the landfill, the CLG shall also add VOCs to the list of contaminants to be analyzed.

20. Section 2.5 states that a sample of the treated effluent will be collected and submitted for analysis prior to discharge of the water to confirm that the treatment process is effectively removing site contaminants at the start of the pumping test. However, influent concentrations of contaminants to the treatment system may change as the pumping test progresses and the carbon could become clogged or channelized over time. EPA recommends that a second effluent sample be collected near the end of the pumping test to document that the treatment system operated effectively throughout the test.

CLG shall incorporate these comments and finalize the Work Plan within ten days of the date of this letter.

If you have any questions or comments regarding this letter, or would like to convene a meeting to discuss these comments, you can contact me at (617) 918-1882 or Hull.Richard@epa.gov.

Sincerely,

Richard W. Hull

Richard W. Hull, Remedial Project Manager
New Hampshire and Rhode Island Superfund Program

cc: Andrew Hoffman, NHDES
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