The State of New Hampshire
DEPARTMENT OF ENVIRONMENTAL SERVICES

Robert R. Scott, Commissioner

November 1, 2019

The Honorable Donna Soucy
President of the New Hampshire Senate
State House, Room 302
107 North Main Street
Concord, NH 03301

The Honorable Stephen Shurtleff
Speaker of the NH House of Representatives
State House, Room 311
107 North Main Street
Concord, NH 03301

Subject: **HB 494 relative to the Coakley Landfill Superfund Site**
Proposed Approach for the Reduction of Contaminants Entering Berrys Brook

Dear Senate President Soucy and Speaker Shurtleff:

I am writing to update you on the progress being made by the New Hampshire Department of Environmental Services (NHDES) and others to address the provisions of HB 494, relative to surface water contamination issues near the Coakley Landfill Superfund Site.

Background and Introduction

The Coakley Landfill Superfund Site (site) is a closed 27-acre former municipal/industrial solid waste disposal facility located in North Hampton. The landfill operated from 1972 to 1982 and received incinerator ash from the Portsmouth Refuse-to-Energy Facility through 1985. The site was listed on the National Priorities List (Superfund) in 1983 and construction of selected remedies was completed in 1999. The site consists of two Operable Units (OUs). OU-1 (source control) addresses the source of contamination at the Coakley Landfill Site, including the contaminated groundwater beneath and in the vicinity of the landfill. OU-2 (management of migration) addresses groundwater contamination which has migrated off site from the landfill. The current remedy for OU-1 includes the following remedial components:

- Consolidation of the solid waste footprint and sediment from wetlands,
- Capping of the landfill,
- Passive collection of landfill gases,
- Long-term environmental monitoring, and
- Institutional controls.

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Sampling site groundwater for the emerging contaminants 1,4-dioxane and per- and polyfluoroalkyl substances (PFAS) in 2009 and 2016, respectively, confirmed their presence at the site and prompted extensive follow-on investigations. Currently, the Coakley Landfill Group (CLG), a consortium of the parties responsible for the contamination, is conducting an investigation that will further develop the conceptual site model, refining the source, fate, and transport of these emerging contaminants at the site.

Problem Statement and Approach

HB 494 states that "...by November 1, 2019, the department of environmental services, working with the Coakley Landfill Group and the Environmental Protection Agency (EPA), shall propose, under the applicable consent decree involving the Coakley Landfill superfund site, an appropriate remedy including a design solution and associated costs to ensure the substantial reduction of the contaminants entering Berry's Brook from the Coakley Landfill superfund site."

The time frame dictated by HB 494 (i.e., remedy implementation beginning by September 1, 2020) does not align with the CERCLA (Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended by the 1986 Superfund Amendments and Re-Authorization Act) data collection/decision process currently underway at the site, which is a long-term remedial approach. Specifically, it does not allow for the completion of the Remedial Investigation-phase of work currently underway, nor the potential subsequent CERCLA-based work components (i.e., Focused Feasibility Study, proposed plan, and associated decision document). Remedy modification(s), if determined necessary, will be based on data yet to be collected, evaluated, and associated risk assessment performed. Consequently, it is not feasible to propose a remedy that would be consistent with HB 494's requirement that the work be performed "under the applicable consent decree" within the time frames specified in the statute. However, it may be feasible within the statutory time frames to perform pilot testing of a potential remediation technology as part of the ongoing remedial investigation to achieve reduction of contaminants in Berrys Brook using a relatively simple and innovative method based on currently understood contaminant source and migration pathways.

Potential Contaminant Reduction Technologies

Based on the current understanding of PFAS occurrence at the site, two primary PFAS sources are believed to exist: (1) surface water impacts associated with stormwater contact with PFAS-containing components of the landfill cap; and (2) groundwater impacts resulting from the release of PFAS from landfill contents. Two potential treatment technologies have been identified that have merit for further evaluation: (1) passive flow-through treatment of surface water; and (2) groundwater treatment via injectable PFAS-sorbent media.

Surface Water and Stormwater Treatment

A passive flow-through treatment system would involve temporary structure(s) constructed to redirect overland flow through a sorbent media (granular activated carbon or ion exchange resin). The sorbent media would be placed into a filter system that would allow water to pass through while retaining the sorbent media. The system may not be operable during winter months, due to icing potentially damaging the filter system. Design and

placement of sorbent media would be based on results from current stormwater/surface water investigations.

Either virgin or reactivated granular activated carbon (GAC) could be used. The GAC adsorption capacity can vary depending on water chemistry, contaminant loading, and proportion of shorter chain carbon PFAS compounds present. GAC would need to be removed and replaced when it becomes spent. The spent media would then be shipped for disposal or regeneration for reuse. GAC is a demonstrated technology that has been shown to reduce select PFAS to very low or non-detectable concentrations and is currently the most common groundwater treatment method used for PFAS removal. GAC removal efficiencies have been reported between 90% to 99% (ITRC PFAS Fact Sheet, 2018). Note, the effectiveness of employing a GAC-based passive surface water treatment system is not yet known.

Ion exchange (IX) resin uses synthetic, polymeric media to remove PFAS. Ion exchange resin is employed similarly to GAC and can be used in combination with GAC. Both regenerable and nonregenerable IX media are available. IX has higher adsorption capacity for some PFAS and significantly faster reaction kinetics compared to GAC (Conte et al. 2015). The combination of these properties means an equivalent treatment system for IX is smaller and thus uses less media. Like GAC, usage capacities and corresponding breakthrough times vary depending on PFAS functional groups, chain length, and other water chemistry parameters.

The references cited are included in a combined list that is available on the ITRC web site: https://pfas-1.itrcweb.org/

Groundwater Treatment

Injection of adsorbent media is an insitu treatment technology that utilizes a proprietary liquid containing colloidal activated carbon that is injected to form a passive vertical groundwater treatment zone. The colloidal activated carbon is composed of very fine carbon particles (1-2 µm) that are suspended in water using polymer dispersion. In theory, once in the subsurface, the material binds to the aquifer matrix, removing contaminants from groundwater. An advantage of this technology over granular activated carbon is the readily available contact sites for contaminants to adsorb given the very fine carbon particle size. Some potential disadvantages of this technology include, but may not be limited to: (1) adsorption versus treatment of contaminants, which will ultimately remain in the aquifer for potential future release back to the groundwater; (2) contaminants may compete for contact sites, eventually saturating the activated carbon, which may cause release of previously adsorbed contaminants and may require re-injection of treatment media; (3) inherent difficulty of adequate characterization, injecting treatment media, and achieving treatment objectives.

https://regenesis.com/en/remediation-products/plumestop-liquid-activated-carbon/

Conclusions and Next Steps

Passive flow-through technologies are promising options for potentially significant reductions of PFAS concentrations impacting surface water of Berrys Brook. Injection of adsorbent media may be a viable treatment option for groundwater impacting Berrys Brook. However, these technologies are unproven in this context and require further characterization, bench-scale evaluation, and/or pilot testing to evaluate their implementability and effectiveness at the site. Performance of such pilot projects can then be evaluated as part of the continuing CERCLA process.

EPA and NHDES (Agencies), in consultation with members of the CLG, have tentatively outlined an approach that will allow the CLG to move forward with the evaluation, design, and implementation of a contaminant reduction strategy targeting PFAS in surface water. While the specifics are still being discussed among the parties, NHDES anticipates reaching agreement on the approach and schedule by year's end.

Tentative next steps include:

a. Stakeholder negotiations (through 2019)
b. Data gathering (winter/spring 2020)
c. Design (spring/summer 2020)
d. Construction and implementation of pilot study (fall 2020)

If you have any questions regarding this letter, please contact Michael Wimsatt, Director, Waste Management Division, at Michael.Wimsatt@des.nh.gov or at (603) 271-1997.

Sincerely,

Robert R. Scott
Commissioner

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