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Ms. Elizabeth Callahan
Department of Environmental Protection
Bureau of Waste Site Cleanup
One Winter Street, 6th Floor
Boston, Massachusetts 02108

Subject: Comments to Proposed Revisions
310 CMR 40.0000, The Massachusetts Contingency Plan

Dear Ms. Callahan:

Here presented are comments provided by CDM Smith Inc. relative to proposed revisions to 310 CMR 40.0000, the Massachusetts Contingency Plan (MCP). Comments are organized according to selected major topic areas within which proposed revisions were released.

Risk Assessment

Calculation of Exposure Point Concentrations for Soil

The revisions (310 CMR 40.0926(8)(a)2) state that the 90th percentile Chebyshev non-parametric upper confidence limit on the mean may be used as an Exposure Point Concentration in any case, and separately that the 95th percentile parametric upper confidence limit on the mean for a lognormal or gamma distribution may be used if technical justification is provided for the selection of this approach. Provided that sufficient data are collected, and the data are distributed such that either approach may be justified, does MassDEP have a preferred approach, or would it be acceptable for the risk assessor to select either of the two approaches?

Approach to sampling at sites larger than 2,000 square feet

The revisions to 310 CMR 40.0926(8)(a)2 state that a systematic sampling approach shall be used to obtain a representative data set for accessible soils at sites larger than 2,000 square feet. Given the time and expense necessary to collect such data, the effective date for the MCP revisions should be set such that sites that have already completed sampling under a more judgmental approach can reasonably meet the obligations of the MCP prior to the effective date of the revisions.

PFAS

RCs/Method 1 Standards in Soil

The Reportable Concentrations and MCP Method 1 Standards for Per- and Polyfluoroalkyl Substances (PFAS) in soil are very low, particularly the reporting category RCS-1 criteria of 0.0002 mg/kg. The concern with such a low RCS-1 is that due to the ubiquitous nature of PFAS, numerous sites will be added under the MCP that may not be from a true "release" of PFAS compounds. In addition, because the Method 1 S-1 Soil Standards are so low, cleanup of these sites may not be technically and/or financially feasible, resulting in numerous sites with either Temporary Solutions or Activity and Use Limitations.

The University of Vermont and Sanborn, Head and Associates have conducted a study of background soil concentrations within the state of Vermont. Numerous samples collected as part of this study exceeded the proposed RCS-1 standards for the individual PFAS constituents. These samples were collected in state/municipal parks, forests, greens, and building or school lawns and therefore are not indicative of a release. If the proposed MCP standards were used on these properties a significant portion would be considered regulated.

We would request that MassDEP consider the ubiquitous nature of these compounds and consider "background" concentrations in the development of these standards. It is suggested that higher RCS-1 criteria be used to ensure that true "releases" of PFAS are being regulated.

RCs/Method 1 Standards in Groundwater

Six PFAS have been added to the Method 1 Standards list – PFDA, PFHpA, PFHxS, PFOA, PFOS, and PFNA. MassDEP should develop compound-specific standards for each compound of concern and not combine them in an additive approach because their respective health effects and treatability may be different and contain a level of uncertainty. Per MassDEP's note to reviewers, there is "the dearth of toxicity, epidemiology, and pharmacokinetic data on PFHpA and PFDA." New Hampshire Department of Environmental Services (NHDES) recently released their final proposed Maximum Contaminant Level (MCL) values, which included different levels for each of the four individual compounds, PFOA, PFOS, PFNA, and PFHxS. Many other states have followed a similar approach as NHDES. New Jersey proposed and adopted the country's first individual PFAS MCLs for PFNA, PFOA, and PFOS; Michigan and New York proposed MCLs for regulating PFOA and PFOS individually; Minnesota has individual health risk values for PFOA, PFOS, and PFHxS; and California enforces individual notification levels for PFOA and PFOS only.

A combined sum standard for the proposed six compounds, which are commonly detected together in groundwater, may show an exceedance of the standard even though individually the compounds may be close to the minimum reporting limits. For example, if the samples were to detect 4 compounds at 5 parts per trillion (ppt) each, the 20 ppt standard would be exceeded. Importantly, the Association of State Drinking Water Administrators (ASDWA)'s PFAS Lab Testing Primer guidance document, published in October 2018, recommends laboratory analytical methods with reporting limits of at least 2-4 ppt despite that many commercial labs offer reporting limits of less than 1 ppt. It should be noted that advances in analytical technologies have allowed detections of PFAS at lower and lower levels, but detections at low levels (e.g. in ppt), do not always correlate to health impacts. Robust toxicological studies that investigate the health effects of individual compounds at low levels and the difference in the way animals (e.g. mice) and humans react to chemical influence should serve as the basis for setting a standard that may serve as a foundation for drinking water MCL.

Extensive research is currently being conducted throughout the US and in other countries. More research could support higher standards, such as those developed in Canada, the European Union, or other states. If Massachusetts established standards too hastily and too conservatively, it may be difficult to raise those standards in the future. Several states have initiated efforts to adopt very stringent standards, but other states, the United States Environmental Protection Agency (EPA), and international organizations are beginning to share more research and work collaboratively to identify more consistent and appropriate standards. MassDEP should consider adopting higher interim standards and participating in those collective efforts.

There is currently only one approved EPA analytical method for certain PFAS compounds, and that is for drinking water, Method 537.1. Laboratories have modified that method for non-drinking water uses, but the analytical results vary from lab to lab and constituent to constituent. EPA has announced that it will seek comment on a third method this fall that many experts are more encouraged by, but that method may not be finalized for another year or more.

Potential Implications to Public Water Supplies

MassDEP has not conducted a required state-wide sampling program from all public water suppliers or a background PFAS study in groundwater. Similar to the soil criteria, potential for background supply and potable water and groundwater concentrations to be above established standards is likely and may require many more municipalities to install treatment than one may expect. Furthermore, the combined-regulatory approach also ignores the complexities of selecting, implementing and operating the appropriate and affordable PFAS treatment solutions. There is no one-size-fits-all solution. Depending on several site-specific factors, such as the levels and types of PFAS present in water, general water quality, and existing treatment processes, treatment technologies may show different removal effectiveness depending on several factors, such as the carbon chain length and attached functional group. Targeted removal of each PFAS of concern down to an individual level that incorporates both sufficient protection of human health and treatability of that specific compound by available, appropriate, and affordable treatment technologies will offer the water suppliers effective guidance on PFAS treatment.

Another challenge is analytical standards being close to or at minimum reporting limits for individual PFAS. The PFAS standard needs to take into consideration the uncertainty associated with low level detections at or close to the reporting limits, high risk of cross-contamination, and potential PFAS fluctuation in background levels that are not fully understood. Integration of these considerations allow realistic operation and maintenance of the PFAS treatment facilities and avoid inefficient use of resources, such as requiring an excessive number of PFAS samples to ensure accurate results and expedited turnaround time on those samples.

Considerations for Water Treatment Implementations

CDM Smith has worked with a number of municipalities in Massachusetts and New Jersey to investigate and test PFAS treatment options and design and construct such systems at full-scale. Based on those experiences, CDM Smith highlights that there are many implementation challenges for water systems. Significant engineering effort, cost, and time go into selection and implementing the appropriate and affordable treatment technologies for each unique water system. Site-specific testing, either bench-scale or pilot-scale, that evaluates the effectiveness of the treatment technologies with the actual contaminated water quality conditions and the follow-up cost analysis are critical for identifying the appropriate treatment solution. There are only a handful of treatment alternatives available for PFAS removal, and their effectiveness determines life-cycle cost that will be incurred by the municipalities and their customers. Also, some treatment processes may not even be possible for implementation (e.g. high-pressure membrane systems require a significant portion of the flow to contain concentrated levels of PFAS and be discharged to waste, so availability for discharge is required for implementation of such technologies). Also, identifying and avoiding any potential unintended consequences that are inherently possible when any new water treatment process is added (e.g. although this is a very infrequent occurrence, coal-based carbon has been observed to release arsenic under certain water conditions). While such testing provides critical design parameters and potentially cost-saving measures, it takes time. Engineering the design of a permanent PFAS treatment facility and constructing it takes time. Renting temporary treatment equipment can be costly and time consuming. As an interim, a public outreach or risk communication strategy can be implemented to communicate uncertainties and the current state of PFAS science and regulation, as well as identify and address concerns of public stakeholders. These considerations should be taken into account in MassDEP's timeframe for enforcing PFAS standards.

We appreciate the opportunity to comment on these important revisions.