

Incorporating Climate Change into Long-Term Remedies and Operation and Maintenance Plans

Lucinda Pype (pypelj@cdmsmith.com) (CDM Smith, Wayne, PA, USA)
Melissa Harclerode (harclerodema@cdmsmith.com) (CDM Smith, Edison, NJ, USA)

Background/Objectives. Climate change is affecting how regulators think about long-term remedies and their operation and maintenance (O&M). Climate change impacts in the northeast region of the United States are expected to include extreme temperatures, water table extremes, heavy precipitation events with concomitant flooding, sea level rise, ocean acidification, etc. Therefore, climate change has the potential to significantly impact the performance, effectiveness, and protectiveness of a remedy. Vulnerability assessments and continuous monitoring of flow velocity and water levels provide information to integrate precautionary measures into remedy design and O&M to alleviate impacts from the increasing frequency and intensity of severe weather and associated flooding. This presentation will discuss EPA's climate change policy and how two sites in New York and Pennsylvania are incorporating continuous climate change monitoring into long term remedial actions. The first case study will cover the long-term EPA removal action at the BoRit Asbestos Superfund site, where asbestos impacted soil is capped and maintained along a riverbank. The second case study is a NYSDEC polyurethane site in which the rate of light non-aqueous phase liquid (LNAPL) seepage is influenced by water table fluctuations and precipitation.

Approach/Activities. The USEPA *Climate Change Adaptation Plan* recommends consideration of whether the future 100-year storm event, and other applicable events (e.g., 100-year flood plain and extended droughts), is expected to differ from the historical 100-year storm event. In order to determine if characteristics of the historical (and current) 100-year weather-related events are changing over time, baseline monitoring of flow velocity, water levels, and precipitation data will be collected during O&M activities. The data will be used to develop a continuous baseline of "current" site conditions in order to identify trends towards renewed static conditions reflective of increased surface water flow velocity and flooding frequency. Monitoring data will be used in conjunction with site inspection observations to determine if climate change impacts are having a direct effect on cap integrity and LNAPL production, thus triggering consideration of precautionary measures to ensure the existing containment systems are prepared for reasonably anticipated weather-related events.

Results/Lessons Learned. Federal agencies are embracing climate change adaptation planning beyond remedial design and selection, and are now beginning to incorporate this planning into O&M activities. The identified vulnerabilities are being leveraged to pinpoint local climate data needs to help ensure that long term remedies are robust and can remain safe to human health and the environment. This precautionary approach enables resiliency planning to be flexible and adaptable to a changing climate. Monitoring for the NYSDEC Site commenced in Fall 2016 and monitoring at the BoRit Site is expected to commence in late 2017. All monitoring data and an evaluation of climate change vulnerabilities will be provided in the O&M Quarterly Reports, as well as summarized in this presentation.