

## **Innovative Remediation Solutions to Aggressively Remediate LNAPL Plumes**

Two recent case studies will be presented to detail innovative remediation solutions to two different and challenging LNAPL plumes. The first case study will show how the combination of many in-situ technologies and remote monitoring resulted in the aggressive remediation of a 10-acre LNAPL plume in just 5-months of system operation. Remediation technologies included oil recovery, groundwater recovery, air sparging, surfactant injection, vacuum-enhanced oil recovery, and enhanced bioremediation. The case study will demonstrate how the combination of aggressive in-situ technologies and remote control and data management features allowed for real-time system optimization and plume visualization to understand remediation progress. LNAPL mobility and risk assessment work led to the development of site-specific cleanup goals for the site (based on potential residential use). The project achieved “no further action” status following the 5-month remediation and continued monitoring. The system was able to be optimized remotely by the project engineer, and included a lot of real-time monitoring, including groundwater elevations, and pressures and flow rates of remediation equipment. Variable frequency drives on electrical pump motors made it easy to remotely adjust flow rates and liquid levels of recovery trenches across the site.

The second case study involved the remediation of a long-term oil spill into the ocean from an on-shore industrial area in the Bahamas. The case study will demonstrate how stakeholder engagement and an innovative 3-stage barrier system along the ocean was effective to prevent oil migration. Thousands of gallons of oil had been migrating into the ocean each week prior to the innovative 3-stage barrier system, which included a 1600' steel barrier wall into the ocean floor, a 9-segment oil recovery trench system (over 1500' long), and an HDPE liner barrier system. Multiple government agencies were involved in the important project, and we will discuss how stakeholder engagement and teamwork was critical. To view more information on the second case study, click here: <https://youtu.be/lellj8RE3s8>

The presentation will discuss various remediation system optimization concepts that can be included in any remediation system design and O&M program to reduce months, or perhaps years, off of the typical remediation duration. The presenter has over 25 years of experience designing remediation systems and has been involved in over 450 remediation projects in his career.