

ITRC Guidance Documents Instrumental in Saving Time and Reducing Costs at Complex Superfund Site



Remediation at sites issued Technical Impracticability (TI) waivers is complex; however, the Interstate Technology and Regulatory Council (ITRC) is helping identify innovative solutions. When the U.S. Air Force re-opened two contaminated TI waiver sites

at the former Loring Air Force Base (AFB) in Limestone, Maine, three ITRC guidance documents provided the framework to identify the best remediation methods and significantly reduce the remediation timeframe, originally estimated at over 300 years.

A Remediation Challenge

Active from 1952 until it was closed in 1994, the 9,000-acre Loring AFB was an important military installation during the Cold War. The former base is now home to a thriving commercial and aviation park, but decades of military aviation activities left behind groundwater and soil contamination in some cleanup areas. Contaminants in these areas include chlorinated organic compounds, such as trichloroethylene (TCE) and perchloroethylene (PCE). These chlorinated solvents can form Dense Non-Aqueous Phase Liquids (DNAPLs), a type of contamination that is denser than water and presents some of the most difficult problems at environmental restoration sites.



A bioremediation amendment recirculation system is being used at one of the TI waiver sites.

Triple Success

To assist in remediation efforts at DNAPL-contaminated sites, ITRC provides guidance for developing a consistent approach, broadening technical knowledge, and improving regulatory decisions that reduce costs and maximize remediation efforts. Three ITRC guidance documents are being used by the Air Force to remediate two TI waiver sites at the former Loring AFB: **(1) *In Situ Bioremediation of Chlorinated Ethene: DNAPL Source Zones***, **(2) *Integrated DNAPL Site Strategy (IDSS)***, and **(3) *Use and Measurement of Mass Flux and Mass Discharge***.

Naji Akladiss with the Maine Department of Environmental Protection (DEP) oversees remediation at Loring AFB for the state. He dubbed the effort a “triple play” because of the benefits the three ITRC guidance documents provided. The ITRC documents are a credible resource, states Akladiss, and were used to identify remediation methods, develop an integrated site strategy, and monitor progress using mass flux and mass discharge at the two TI waiver sites. Akladiss explains that being able to remediate the sites is remarkable because of the complexity of IT waiver sites. The guidance documents also enhanced communication between members of the cleanup team and regulators by providing consistent terminology understood by all.

1) Bioremediation Provides a Solution

The two sites were initially issued a TI waiver because technologies were not available in the 1990s to fully remediate the groundwater. The original course of action was to use monitored natural attenuation (MNA) to reduce contamination and conduct long-term monitoring of the soil and groundwater. MNA was estimated to take more than 300 years at these TI waiver sites. However, improvements in DNAPLs treatment technology has advanced since that time, and ITRC's bioremediation guidance is providing a way to remediate the two TI waiver sites and reduce cleanup time.

According to Akladiss, some were skeptical about using bioremediation at first, but he was able to use the ITRC bioremediation document as a tool to explain to the Air Force that bioremediation works and would be appropriate for the two TI waiver sites at Loring AFB.

The Air Force began implementing bioremediation efforts in September 2014 by injecting wells with specific bacteria that would degrade the chlorinated solvents into a less toxic form.

2) An Integrated Strategy

In addition to the ITRC's bioremediation guidance, the integrated strategy outlined in ITRC's IDSS guidance was used to develop objectives, create measurable goals, and set reasonable remediation time frames. Remediation of DNAPLs can be a complicated process, which makes an integrated cleanup strategy beneficial.

Using the ITRC IDSS guidance ensured the cleanup team had the requisite understanding of the site before choosing and implementing remediation methods. "We have found the [IDSS guidance] to be a useful planning tool regardless of whether DNAPL is present or not," states Project Manager Michael Quinlan, CB&I.

3) Demonstrating Progress

To track progress and measure the success of the remedy, CB&I proposed the use of ITRC's mass flux and mass discharge guidance. Mass flux and mass discharge provide a numerical estimate of the bulk amount of contamination that is being removed. This provides critical information on remediation performance that cannot be captured with measuring contaminant concentrations alone.

Using mass flux at the two TI waiver sites allows better decision making and can decrease remediation timeframes. By using the methods outlined in ITRC's mass flux and mass discharge documents, the Air Force set a new objective to demonstrate an 80 percent reduction in mass discharge after three years of remediation. Other methods, such as the use of concentration data, would take an estimated five to ten years to demonstrate success.

Quinlan explains that ITRC's mass flux and mass discharge guidance is especially relevant to the work at the two Loring AFB TI waiver sites and will be used to evaluate the overall success of the treatment technology. To do this, the mass flux of chlorinated solvents will be measured before and after implementation of remediation efforts to demonstrate an overall reduction in contamination.

Akladiss says the Maine DEP approved the use of this method to track progress, adding that it was "an easy sell" because Maine DEP previously approved the use of this, and other ITRC guidance documents for remediation of applicable sites.

ITRC's IDSS guidance helps "set objectives that are clear, realistic, and achievable within the available budget."

– Michael Quinlan,
Project Manager



Value of ITRC guidance documents:

- Reduces cost
- Enhances decision making
- Develops consistent approaches
- Saves time
- Increases remediation efficiency
- Provides innovative solutions
- Broadens technical knowledge
- Improves communication
- Measures success sooner

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