UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

OFFICE OF
LAND AND EMERGENCY
MANAGEMENT

OLEM Directive 9200.3-123

MEMORANDUM

SUBJECT: Considerations for Adaptive Management at Superfund Sites

FROM: Larry Douchand, Director
Office of Superfund Remediation and Technology Innovation

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TO: Superfund and Emergency Management Division Directors, Regions 1-10

PURPOSE

This memorandum's purpose is to document completion of the Superfund Task Force's recommendation 3, pertaining to adaptive management (AM), by highlighting lessons learned, sharing considerations for applying AM specifically at sediments sites, and by identifying opportunities for AM technical assistance throughout the Superfund cleanup process.

BACKGROUND

In May 2017, U.S. Environmental Protection Agency (EPA) Administrator Scott Pruitt established a task force and charged it with developing recommendations to, among other objectives, identify strategies for restructuring the Superfund cleanup process to expedite cleanups. The Superfund Task Force published recommendations, one of which called for the agency to "broaden the use of adaptive management at Superfund sites" to focus "…limited resources on making informed decisions throughout the remedial process." To implement this recommendation, the Superfund remedial program established an AM workgroup. The memorandum "Superfund Task Force Recommendation #3: Broaden the Use of Adaptive Management" (OLEM 9200.3-120; July 3, 2018) initiated the AM pilot effort. In 2019, EPA selected pilot projects, which the agency implemented in 2019 and 2020.

ADAPTIVE MANAGEMENT OVERVIEW

Starting with the various AM definitions developed in the past 50 years, the Superfund AM workgroup developed a working definition, intended to ensure consistency and to align with the Superfund remedial program's goals and processes:

Adaptive management is a formal and systematic site or project management approach centered on rigorous site planning and a firm understanding of site conditions and uncertainties. This technique, rooted in the sound use of science and technology, encourages continuous re-evaluation and management prioritization of site activities to account for new information and changing site conditions. A structured and continuous planning, implementation and assessment process allows EPA, states, other federal agencies (OFAs), or responsible parties (PRPs) to target management and resource decisions with the goal of incrementally reducing site uncertainties while supporting continued site progress.

The workgroup determined that, for the Superfund remedial program, AM could be applied at the site or the project level. At the site level, AM is focused on achieving broad site objectives, making it generally better suited for complex sites in the earlier stages of the Superfund process. At the project level, AM can target specific project uncertainties in the remedial investigation/feasibility study (RI/FS) or remedial design/remedial action (RD/RA) phases. It may also be applicable to projects where remedial progress may appear stalled in the long-term operations and maintenance (O&M) phase.

PILOT IMPLEMENTATION

The AM workgroup focused on six site- and project-level pilots. The three site-level pilots were Bonita Peak Mining District in unincorporated Colorado; the Baytown Township Groundwater Plume in Washington County, Minnesota; and the 10th Street Superfund Site in Columbus, Nebraska. The project-level pilots were the Bunker Hill Lower Basin in Smelterville, Idaho; and two Federal Facilities, Operable Unit 1 at the Naval Base Kitsap Keyport in Keyport, Washington; and Site 1, Dudley Road Landfill, Operable Unit 33 at the Naval Weapons Station Yorktown in Yorktown, Virginia. Each pilot provided unique application, perspective and lessons learned for AM's potential future role in the Superfund remedial program.

LESSONS LEARNED AND RECOMMENDATIONS

Building a Team and Designating Roles

- Include primary partners and stakeholders, as applicable (including but not limited to, state counterparts, tribes and responsible parties), relevant to the selected site or project in the AM process. This inclusion can create mutual understanding of short- and long-term goals for the site or project.
- The lead agency for the remedial cleanup should typically be responsible for initiation of the AM process. Federal Facility sites were piloted during this project, led by the EPA AM workgroup and its extramural contractors. In the future, the lead agency should generally be the one to lead the AM process.
- An independent facilitator is beneficial to guide the process and balance differing perspectives in a neutral way; however, team members should expect that such an individual is unlikely to have site-specific knowledge and experience.
- Include team members early in the AM process, including technical support, legal and management. Include these members in the initial planning exercise to develop the main

AM project or site plan, if possible (although it bears noting that such inclusion takes considerable time and effort if involving the full team). This inclusion will ensure that expectations of site goals and timelines are reasonable from the technical, legal and program perspectives.

Application of Adaptive Management

- AM can provide meaningful structure to particularly complex sites in the earlier stages of the Superfund process or to sites lagging on the path to completion. Sites may be considered complex due to size and scope, technical difficulty, and/or community involvement.
    - For complex sites, site-level AM may consist of early actions followed by a final action, whereby an AM plan guides achievement of remedial action objectives and remediation goals. AM can also be used at the project level where specific project uncertainties are targeted in discrete phases, such as RI/FS, RD/RA or O&M.
    - The application of AM may not be necessary or useful for every site due to the large upfront time and resource investment and nature of the cleanup action, such as final remedies, interim remedies or early actions.
- AM can result in possible "scope creep" and overambitious timelines; therefore, site teams should develop an AM plan within the site's current remedy, scope and budget.
- AM may help to establish a mutual understanding across regulatory stakeholders regarding whether conditions warrant a remedy modification, but it does not replace the existing requirements or processes for documenting post-record of decision changes.
- AM requires a greater time and resource investment upfront but can result in overall project efficiency and alignment of expectations across stakeholders.
- Most pilot teams recommended updating AM plans approximately once per year to sync them with other annual site planning activity updates.

Future Considerations and Implementation

- There is some redundancy between an AM plan and a Site Strategy. The Site Strategy team may recommend AM as a follow-up tool where particularly complex projects or sites could benefit from more detailed and adaptive planning practices.
- It could be beneficial for remedial project managers to have access to extramural AM contractor support as a technical resource for development of site- and project- specific documents, meeting facilitation, etc.

ADDITIONAL RESOURCES

Sediment Sites

AM is one option for planning remediation at Superfund sediment sites with long remediation times and high levels of uncertainty regarding the remedial actions necessary to achieve final, protective remediation goals. The new *Sediment Assessment and Monitoring Sheet* (OLEM 9200.1-166, June 2022) describes how site-level AM can be applied to large, complex contaminated sediment sites in a manner consistent with the Comprehensive Environmental Response, Compensation, and Liability Act and the National Oil and Hazardous Substances Pollution Contingency Plan.

Technical Assistance
The Office of Superfund Remediation and Technology Innovation (OSRTI) is well positioned to provide a variety of technical and policy support in line with AM concepts. Site teams should contact the appropriate OSRTI regional coordinator to discuss support needs (the Site Assessment and Remedy Decisions Branch for RI/FS and remedy selection; the Construction and Post Construction Management Branch for post-remedy selection). Similarly, for Federal Facility sites, regions should contact their regional coordinator in the Federal Facilities Restoration and Reuse Office (FFRRO) to discuss AM at Federal Facility sites. Contact information for all regional coordinators (including FFRRO) is kept current on the OSRTI SharePoint site.

Employing headquarters regional coordinators in site-specific AM efforts creates a foundation to expand the Superfund program's knowledge and appropriate use of AM. Headquarters will use regional technical assistance requests to inform efforts to assess additional AM training and assistance, which may be necessary to support regional needs and to apply AM effectively at Superfund sites.

CONCLUSION

By providing a framework for structured and continuous planning, implementation and assessment, AM application in the Superfund process may help reduce site uncertainties while supporting continued site progress. A given site or project's suitability for AM will vary; therefore, regional site teams should work with the appropriate headquarters office to help ensure its application is appropriate and successful.

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