

## Why GAO Did This Study

As of 2018, the U.S. government faced an estimated \$577 billion in environmental liabilities. DOE is responsible for more than 85 percent of these liabilities. DOE is charged with cleaning up contamination from nuclear weapons production and energy research dating back to World War II and the Cold War, which generated large quantities of liquid and solid radioactive waste and contaminated soil and water. Since the mid-1990s, GAO and others have recommended that DOE adopt a risk-informed approach to making cleanup decisions—that is, an approach that helps agencies consider trade-offs among risk, cost, and other factors in the face of uncertainty and diverse stakeholder perspectives.

GAO was asked to review DOE's environmental cleanup decision-making. This report examines (1) the extent to which DOE has a framework for making risk-informed cleanup decisions, and (2) essential elements of a framework for making risk-informed cleanup decisions. GAO conducted a literature review, interviewed DOE officials, and convened an experts' meeting through the National Academies regarding risk-informed decision-making.

## What GAO Recommends

GAO is making two recommendations, including that DOE revise EM's 2017 cleanup policy to establish how EM should apply the essential elements of a risk-informed decision-making framework into its current decision-making requirements and guidance. DOE agreed with both recommendations.

View [GAO-19-339](#). For more information, contact David C. Trimble at (202) 512-3841 or [trimbled@gao.gov](mailto:trimbled@gao.gov).

# ENVIRONMENTAL LIABILITIES

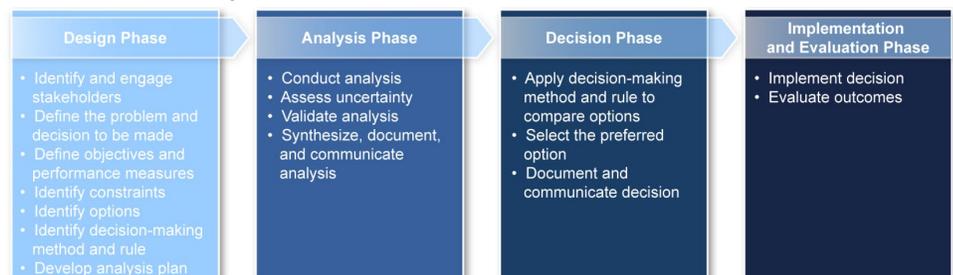
## DOE Would Benefit from Incorporating Risk-Informed Decision-Making into Its Cleanup Policy

### What GAO Found

The Department of Energy's (DOE) Office of Environmental Management (EM) follows certain laws—including the Comprehensive Environmental Response, Compensation, and Liability Act and the Resource Conservation and Recovery Act—agreements, federal guidance, and court decisions, which establish standards and procedures for DOE's cleanup of hazardous and radioactive waste. However, DOE does not have a framework for implementing these requirements and guidance to make cleanup decisions in a risk-informed manner. For example, DOE's 2017 cleanup policy, which governs the EM cleanup program, does not direct how EM should make environmental cleanup decisions, including how to make risk-informed cleanup decisions. For more than 20 years, several organizations—including the DOE Inspector General and GAO—have recommended that DOE adopt a risk-informed approach. By revising EM's 2017 cleanup policy to establish how EM should apply the essential elements of a risk-informed decision-making framework into its current decision-making requirements and guidance, DOE sites would be better able to implement consistent decision-making processes and ensure that resource allocation is risk informed to the extent practicable.

To assist agencies, such as DOE, in identifying and implementing the essential elements of risk-informed decision-making, GAO synthesized key concepts from relevant literature and input from experts who participated in GAO's meeting convened by the National Academies of Sciences, Engineering, and Medicine (National Academies). GAO subsequently developed a framework to be relevant to multiple types of cleanup decisions, from selecting a cleanup approach at a single site to prioritizing cleanup activities across sites. According to literature, entities implementing the framework should ensure that their decision-making process is participatory, logical, transparent, and traceable, and that it uses current scientific knowledge to produce technically credible results. The framework consists of four broad phases: (1) designing the decision-making process, (2) analyzing different options, (3) deciding which option is preferred, and (4) implementing and evaluating the preferred option. Each phase consists of several steps, such as identifying stakeholders, developing an analysis plan, and validating the analysis (see figure).

**Figure: Phases and Steps of a Risk-Informed Decision-Making Framework to Address Environmental Cleanup Decisions**



Source: GAO. | GAO-19-339