

**U.S. HOUSE OF REPRESENTATIVES  
COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY  
SUBCOMMITTEE ON ENERGY**

**HEARING CHARTER**

*Nuclear Waste Cleanup: Research and Development Opportunities for  
the Department of Energy's Office of Environmental Management*

Wednesday July 13, 2022  
10:00am ET

**PURPOSE**

The purpose of this hearing is to evaluate the Department of Energy's approach to research and development on new strategies and technologies to support the nuclear waste cleanup mission of its Office of Environmental Management (EM). Members and witnesses will consider how better coordination and focused research investments at the Department could potentially reduce life cycle costs and expedite schedules for both defense and non-defense environmental remediation around over a dozen Environmental Management sites.

**WITNESSES**

- **Mr. William "Ike" White**, Senior Advisor, Office of Environmental Management, U.S. Department of Energy
- **Dr. Vahid Majidi**, Executive Vice President and Director, Savannah River National Laboratory
- **Dr. John Plodinec**, Vice Chair, Committee on the Independent Assessment of Science and Technology for the Department of Energy's Defense Environmental Cleanup Program, National Academies of Sciences, Engineering, and Medicine
- **Mr. Nathan Anderson**, Director, Natural Resources and Environment, U.S. Government Accountability Office

**OVERARCHING QUESTIONS**

- How can dedicated research and technology innovation help the Department of Energy (DOE) fulfill its environmental cleanup obligations more quickly and/or at lower cost?
- How can DOE better coordinate its research activities within EM?
- How can DOE better leverage relevant research activities performed in other program offices and at national laboratories?
- Is DOE spending enough time and resources on science and technology activities within EM?

## GENERAL BACKGROUND ON DOE OFFICE OF ENVIRONMENTAL MANAGEMENT

DOE EM was established in 1989 to address environmental liabilities created and inherited by DOE as a result of weapons production during the Manhattan Project and the Cold War as well as other nuclear energy research. It is responsible for cleaning up the legacy waste from the handling of radiological materials at EM sites; for managing and disposing of these wastes; for remediating contaminated groundwater and soil; and for deactivating and decommissioning excess facilities.

Since its inception, EM has successfully completed its cleanup mission at 92 sites and has reduced the footprint of contaminated sites in terms of land area by 90%.<sup>1</sup> Fifteen sites across 11 states remain.<sup>2</sup> DOE estimates the lifecycle cost (FY2022 to FY2091) for completing cleanup activities at these 15 sites to be \$488.5-\$723.3 billion.<sup>3</sup> The total lifecycle cost estimates are a considerable increase from Fiscal Year 2011 estimate of \$163 billion.<sup>4</sup> Due in part to these growing costs, “The U.S. Government’s Environmental Liabilities” has been on U.S. GAO’s High Risk List since February 2017, with DOE responsible for the largest share of this liability.<sup>5</sup>

For Fiscal Year 2023, DOE requested \$7.643 billion for EM,<sup>6</sup> a 3.3% decrease from FY2022 appropriated levels of \$7.904 billion.<sup>7</sup> This represents almost 18% of DOE’s annual budget. EM’s activities are broken into three segments:

- Defense Environmental Cleanup, which addresses obligations resulting from defense-related nuclear activities, such as weapons development and testing. Its FY2022 appropriated budget is \$6.701 billion.<sup>8</sup>
- Non-Defense Environmental Cleanup, which addresses obligations from government-sponsored research, such as that in support of the commercial nuclear industry. Its FY2022 appropriated budget is \$333.9 million.<sup>9</sup>
- Uranium Enrichment Decontamination and Decommissioning. This budget line was created in the Energy Policy Act of 1992 to set aside funds for cleanup activities at three former gaseous diffusion sites specifically - the Paducah Site in Kentucky, the Portsmouth site in Ohio, and the Oak Ridge site in Tennessee – in part because the uranium enrichment activities conducted there over time were intended for both national security/defense and civilian/commercial purposes, and performed by both federal agencies and private companies.<sup>10</sup> Its FY2022 appropriated budget is \$860 million.<sup>11</sup>

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<sup>1</sup> [RH-doe-em.pdf \(nationalacademies.org\)](https://www.nationalacademies.org/rh/doe-em.pdf)

<sup>2</sup> <https://www.energy.gov/em/cleanup-sites>

<sup>3</sup> <https://www.energy.gov/sites/default/files/2022-06/doe-fy2023-budget-volume-6-em-v2.pdf> Pg 53

<sup>4</sup> <https://www.gao.gov/assets/gao-22-104490.pdf>

<sup>5</sup> <https://www.gao.gov/products/gao-17-317>

<sup>6</sup> <https://www.energy.gov/sites/default/files/2022-06/doe-fy2023-budget-volume-6-em-v2.pdf> Pg 6

<sup>7</sup> [https://www.crs.gov/Reports/R46857#\\_Toc105671707](https://www.crs.gov/Reports/R46857#_Toc105671707)

<sup>8</sup> <https://www.govinfo.gov/content/pkg/CPRT-117HPRT47047/pdf/CPRT-117HPRT47047.pdf> Pg 791

<sup>9</sup> <https://www.govinfo.gov/content/pkg/CPRT-117HPRT47047/pdf/CPRT-117HPRT47047.pdf> Pg 787

<sup>10</sup> <https://sgp.fas.org/crs/nuke/IF11372.pdf>

<sup>11</sup> <https://www.govinfo.gov/content/pkg/CPRT-117HPRT47047/pdf/CPRT-117HPRT47047.pdf> Pg 787

Approximately 95% of EM’s annual budget is paid to contractors for work to be performed on a site-by-site basis.<sup>12</sup> When cleanup operations are considered completed at a DOE EM site, responsibility for that site is transferred to DOE’s Legacy Management program, which conducts the long-term surveillance, maintenance, and property management activities.<sup>13</sup>

## SCIENCE AND TECHNOLOGY WITHIN DOE EM

Research and development on new technologies has the potential to reduce lifecycle cleanup costs and speed the pace to project completion. EM has a Technology Development Office funded over the past few years around \$25-35 million per year which helps both identify R&D needs and direct the research itself. EM sites, through their contractors, independently direct at least another \$80 million annually to national laboratories for site-specific operational R&D needs.<sup>14</sup> EM has developed a National Laboratory network through which it can access resources from other national laboratories to support ongoing technology development and deployment. In addition, in March 2022, DOE EM issued an updated ten-year Strategic Vision for 2022-2032.<sup>15</sup> The plan noted that EM is “seeking to enhance its technology R&D efforts to better identify and demonstrate new and innovative approaches for tackling cleanup challenges that offer a significant return on investment, and to effectively adapt commercially available technologies to EM cleanup needs.” It also noted that DOE is conducting a holistic EM technology review to ensure “unity of effort” and efficiency across the DOE complex.

In a 2019 report prepared pursuant to a direction in the 2017 National Defense Authorization Act, a National Academies of Science, Engineering and Medicine (NASEM) Committee found that while funding for headquarters-managed S&T development was about \$300 million (5%) of EM’s budget in the 1990s and early 2000s, it has declined to about \$25 million (0.3%) by fiscal year 2019.<sup>16</sup> The Committee found that EM’s management of S&T development is “ad hoc and uncoordinated and thus less effective than it should be” and that headquarters-directed S&T investments “are not geared toward finding breakthrough solutions and technologies that have the potential to substantially reduce cleanup lifecycle costs and schedules.”

In March 2020, Chairwoman Johnson and Ranking Member Lucas of the Science, Space, and Technology Committee requested the U.S. Government Accountability Office conduct a study on how EM scopes and manages its S&T activities, lessons to be learned from other countries with nuclear waste remediation programs, and challenges EM might face in developing and adopting new remediation technologies.<sup>17</sup> The report, issued in October 2021, found that DOE EM does not have a formal system to collect information on R&D activities across the complex, and that EM does not take a comprehensive approach to prioritizing R&D.<sup>18</sup>

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<sup>12</sup> <https://www.energy.gov/sites/default/files/2022-06/doe-fy2023-budget-volume-6-em-v2.pdf> Pg 9

<sup>13</sup> <https://www.energy.gov/em/completed-cleanup-sites>

<sup>14</sup> <https://www.gao.gov/assets/gao-22-104490.pdf> Pg 10-11

<sup>15</sup> <https://www.energy.gov/em/annual-priorities-strategic-vision>

<sup>16</sup> <https://doi.org/10.17226/25338>.

<sup>17</sup> <https://science.house.gov/news/press-releases/chairwoman-johnson-ranking-member-lucas-request-gao-evaluation-of-does-management-waste-cleanup-technology-development>

<sup>18</sup> <https://www.gao.gov/assets/gao-22-104490.pdf>

The 2022 National Defense Authorization Act authorized a number of programs relating to technology development. These programs have yet to be funded. They include:

- an “incremental technology development program” aimed at improving the efficiency and effectiveness of current cleanup processes
- a “high-impact technology development program” within EM that will aim to develop innovative solutions in response to holistic office-wide needs
- an “environmental management university program” to help support the EM workforce<sup>19</sup>

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<sup>19</sup> <https://www.congress.gov/117/plaws/publ81/PLAW-117publ81.pdf> Pg 681