

July 2010

# RECOVERY ACT

## Most DOE Cleanup Projects Appear to Be Meeting Cost and Schedule Targets, but Assessing Impact of Spending Remains a Challenge



GAO

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Highlights of [GAO-10-784](#), a report to congressional requesters

## Why GAO Did This Study

The American Recovery and Reinvestment Act of 2009 aims to stimulate the economy, including funding for environmental cleanup projects. The Department of Energy (DOE) receives annual appropriations of \$6 billion to support the cleanup of radioactive and hazardous wastes resulting from decades of nuclear weapons research and production.

GAO was asked to examine (1) how DOE selected projects for funding and developed cost and schedule targets, (2) project status and extent to which projects are achieving these targets, and (3) key challenges faced and efforts to address them. GAO reviewed Recovery Act project documentation, including cost, schedule, and performance data for 84 projects at 17 sites; visited the 4 sites receiving most of the funding; and interviewed headquarters and site officials.

## What GAO Recommends

GAO recommends four actions for DOE to improve project management and reporting: (1) determine whether project management and oversight steps adopted for Recovery Act projects would benefit other cleanup projects, (2) clarify the methodology used to calculate jobs created, (3) develop clear and quantifiable measures for determining the impact of Recovery Act funding, and (4) ensure that cost savings are calculated according to federal guidance. DOE agreed with the recommendations.

View [GAO-10-784](#) or [key components](#). For more information, contact Gene Aloise at (202) 512-3841 or [aloisee@gao.gov](mailto:aloisee@gao.gov).

## RECOVERY ACT

### Most DOE Cleanup Projects Appear to Be Meeting Cost and Schedule Targets, but Assessing Impact of Spending Remains a Challenge

#### What GAO Found

DOE's Office of Environmental Management generally chose to use Recovery Act funds for cleanup projects that could be quickly started and finished. Most projects also had existing contracts, which allowed DOE to update and validate cost and schedule targets within a short time. DOE generally funded four types of projects: decontaminating or demolishing facilities, removing contamination from soil and groundwater, packaging and disposing of transuranic and other wastes, and supporting the maintenance and treatment of liquid tank wastes. In all, DOE selected 84 projects at 17 DOE sites in 12 states for Recovery Act funding, with 4 sites receiving most of the money.

As of May 2010, DOE had begun work on all Recovery Act projects and reported creating about 5,600 full-time equivalent jobs at the 17 sites during the first quarter of 2010. Spending on Recovery Act projects has been slower than planned. DOE had obligated about \$5.5 billion of the \$6 billion in Recovery Act cleanup funding and spent about \$1.9 billion of those funds. This sum is less than the \$2.3 billion DOE had expected to spend by that time. DOE reported that most Recovery Act projects were achieving cost and schedule targets, although a third of projects were not.

DOE has faced familiar challenges in both managing Recovery Act projects and measuring how Recovery Act funding has affected cleanup and other goals. According to DOE officials, a third of projects did not meet cost and schedule targets for some of the same reasons that have plagued DOE in the past: technical, regulatory, safety, and contracting issues. DOE has taken steps aimed at strengthening project management and oversight for Recovery Act projects, such as increasing project reporting requirements and placing tighter controls on when funds are disbursed to sites, but it is uncertain how these steps will ultimately affect Recovery Act project performance, or whether they hold the potential to be useful for cleanup work funded under annual appropriations. Measuring the impact of Recovery Act funding on job creation and DOE's cleanup goals has also been a challenge for DOE, in particular, providing an accurate assessment of the act's impact on jobs, environmental risk reduction, and the life-cycle costs of its cleanup program. DOE has used three different methodologies to assess and report jobs created, which provide very different and potentially misleading pictures of jobs created. For example, the calculations ranged from about 5,700 jobs to 20,200, depending on the methodology used. Also, DOE has not developed a clear means of measuring how cleanup work funded by the act will affect environmental risk or reduce its footprint—the land and facilities requiring DOE cleanup. Further, it is unclear to what extent Recovery Act funding will reduce the costs of cleaning up the DOE complex over the long term. DOE's estimate of \$4 billion in life cycle cost savings resulting from Recovery Act funding was not calculated in accordance with federal guidance. GAO's analysis indicates that those savings could be 80 percent less than DOE estimated. Without clear and consistent measures, it will be difficult to say whether or how Recovery Act funding has affected DOE's cleanup goals.

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## Abbreviations

CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
DOE	Department of Energy
EPA	Environmental Protection Agency
FTE	full-time equivalent
OMB	Office of Management and Budget

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United States Government Accountability Office  
Washington, DC 20548

July 29, 2010

The Honorable Joe Barton  
Ranking Member  
Committee on Energy and Commerce  
House of Representatives

The Honorable Peter J. Visclosky  
Chairman  
The Honorable Rodney P. Frelinghuysen  
Ranking Member  
Subcommittee on Energy and Water Development  
Committee on Appropriations  
House of Representatives

The Honorable Michael C. Burgess  
Ranking Member  
Subcommittee on Oversight and Investigations  
Committee on Energy and Commerce  
House of Representatives

The Honorable Greg Walden  
House of Representatives

In response to what is generally reported to be the most serious economic crisis since the Great Depression, the American Recovery and Reinvestment Act of 2009 (Recovery Act) was enacted on February 17, 2009.<sup>1</sup> The purposes of the act, among other aims, are to preserve and create jobs, to promote economic recovery, and to provide investments to increase economic efficiency by spurring technological advances in science and health. Initially estimated to cost \$787 billion, the Recovery Act includes an estimated \$580 billion in spending, including for environmental protection. One of the departments the act directs funds to—the Department of Energy (DOE)—received appropriations of \$6 billion to expand and accelerate its efforts to clean up numerous contaminated sites across the country, where decades of nuclear weapons research, development, and production left a legacy of dangerously radioactive, chemical, and other hazardous wastes.

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<sup>1</sup>Pub. L. No. 111-5 (2009).

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DOE's Office of Environmental Management directs the cleanup of this contamination across the DOE complex. The sites contain nuclear reactors; chemical processing buildings; and plants, laboratories, and maintenance facilities once used to manufacture thousands of nuclear warheads. Cleanup activities include treating and permanently disposing of millions of gallons of radioactive and chemical waste stored in large underground tanks; disposing of spent nuclear fuel; removing contaminated soil; treating contaminated groundwater; packaging and shipping solid wastes infused with synthetic radioactive elements like plutonium and americium for permanent disposal to a deep geologic repository; and eliminating excess facilities, which may include decontaminating, decommissioning, deactivating, and demolishing obsolete structures or a combination of these activities. DOE has estimated that the cost of this cleanup may approach \$300 billion<sup>2</sup> over the next several decades.

Recovery Act funding, which DOE intends to spend over 2.5 years, substantially boosts the Office of Environmental Management's annual appropriation for cleanup, of between \$6 and \$7 billion. DOE designated the bulk of this new funding—almost 80 percent—to speed cleanup activities at four large sites: the Hanford Site in Washington State; Idaho National Laboratory in Idaho; the Oak Ridge Reservation in Tennessee; and the Savannah River Site in South Carolina. As we have previously reported,<sup>3</sup> most of these sites have contended with various contract or project management challenges in the past, which have resulted in significant cost overruns or delays lasting years for some projects.

You asked us to examine (1) how DOE selected projects for Recovery Act funding and developed cost and schedule targets, (2) the status of Recovery Act projects and the extent to which the projects are achieving

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<sup>2</sup>This figure includes about \$83 billion in actual costs from 1997 to 2009, according to DOE.

<sup>3</sup>GAO has found these sites to have had problems with rising costs, schedule delays, and contract and project management. See GAO, *Department of Energy: Contract and Project Management Concerns at the National Nuclear Security Administration and Office of Environmental Management*, [GAO-09-406T](#) (Washington, D.C.: Mar. 4, 2009); GAO, *Hanford Waste Treatment Plant: Department of Energy Needs to Strengthen Controls over Contractor Payments and Project Assets* [GAO-07-888](#) (Washington, D.C.: July 20, 2007); GAO, *Nuclear Waste: Better Performance Reporting Needed to Assess DOE's Ability to Achieve Goals of the Accelerated Cleanup Program*, [GAO-05-764](#) (Washington, D.C.: July 29, 2005); GAO, *Nuclear Waste: Department of Energy's Project to Clean Up Pit 9 at Idaho Falls Is Experiencing Problems*, [GAO/RCED-97-180](#) (Washington, D.C.: July 28, 1997). A list of GAO related products appears at the end of this report.

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cost and schedule targets and performance measures, and (3) key challenges DOE has faced in carrying out these projects and its efforts to address them.

To conduct our work, we reviewed pertinent provisions of the American Recovery and Reinvestment Act of 2009; federal regulations guiding government acquisition of goods and services; Office of Management and Budget (OMB) and DOE policies, procedures, and guidance on Recovery Act implementation; and relevant studies of Recovery Act implementation. To determine how DOE selected projects and developed cost and schedule targets, we reviewed relevant project documentation, including project operating plans, DOE assessments of proposed cost and schedule targets, and project risk assessments. We obtained data on costs, schedules, and jobs created as of March 2010, the most recent data available, from DOE's Environmental Management Recovery Act Program office. We also interviewed DOE headquarters and federal project and contractor officials at each of the 17 sites receiving Recovery Act funding.<sup>4</sup> We interviewed officials at 13 sites by phone and visited the 4 DOE cleanup sites receiving the bulk of the \$6 billion in Recovery Act funding for environmental cleanup: (1) the Hanford Site, (2) Idaho National Laboratory, (3) the Oak Ridge Reservation, and (4) the Savannah River Site. At each site, we reviewed project documentation, interviewed officials, and observed Recovery Act work under way. In addition, at the Hanford and Savannah River sites, we also selected a nonrandom sample of four of the costliest projects—two projects involving demolition of facilities, a project to remediate soil and groundwater, and a project to package and dispose of waste—to better understand how cost and schedule estimates were developed and to assess the reliability of estimates for these projects. Two projects were located at the Hanford Site and two at the Savannah River Site. To assess to what extent projects were meeting cost and schedule targets, we reviewed March 2010 data, the most recent available, from DOE's system for tracking project performance, called an earned value management system, and also reviewed data on project-related performance measures that refer to specific cleanup

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<sup>4</sup>The 17 sites were Argonne National Laboratory (IL), Brookhaven National Laboratory (NY), Energy Technology Engineering Center (CA), Hanford Site Office of River Protection and Richland Operations Office (WA), Idaho National Laboratory (ID), Los Alamos National Laboratory (NM), Moab UMTRA Site (UT), Mound Site (OH), Nevada Test Site (NV), Oak Ridge Reservation (TN), Paducah Site (KY), Portsmouth Site (OH), Savannah River Site (SC), Separations Process Research Unit (NY), SLAC National Accelerator Laboratory (CA), Waste Isolation Pilot Plant (NM), and West Valley Demonstration Project (NY).

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activities. To determine what key challenges DOE faced and the steps officials took to address these challenges, we reviewed pertinent Recovery Act project guidance and DOE project documents and reports, and interviewed headquarters officials and federal and contractor officials at all 17 sites. We also conferred with staff from DOE's Office of Inspector General. To assess the reliability of data we reviewed, we sent out questionnaires to DOE headquarters and site officials regarding the steps taken to ensure the accuracy of data related to measuring progress toward cost and schedule targets, jobs created, and other project outcomes. We determined that the data were sufficiently reliable for the purposes of our report. Appendix I presents a more detailed description of our scope and methodology. Appendix II provides more information on the four projects reviewed in depth.

We conducted this performance audit from June 2009 to July 2010, in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

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## Background

Since the 1940s, DOE and its predecessor agencies have operated a nationwide complex of facilities used to research, design, and manufacture nuclear weapons and related technologies. DOE also conducts research in energy and sciences ranging from harnessing geothermal power as a renewable resource to the behavior of subatomic particles colliding at nearly the speed of light. Organizationally, DOE supports this broad range of activities with a diverse group of mission-based program elements. These include the Office of Science, charged with conducting basic science and technology research; the National Nuclear Security Administration, which oversees the nation's nuclear weapons stockpile; and the Office of Environmental Management, which leads the department's often complex and challenging effort to clean up nuclear, chemical, and other hazardous wastes. Environmental Management carries out its work at numerous DOE sites and facilities around the country, primarily through private entities that manage the facilities and work under contract to DOE. About 90 percent of DOE's annual budget (which totaled about \$27 billion in fiscal year 2010) goes to contracts with private firms. An extensive network of site offices directly oversees the work of these contractors.

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In 1990, GAO designated DOE's contract management, including both contract administration and project management, at high risk for fraud, waste, abuse, and mismanagement. In the following two decades, continued ineffective oversight and poor contract management led to substantial cost overruns and lengthy delays on many projects overseen by DOE, in particular, the Office of Environmental Management. DOE has faced difficulties in developing realistic cost and schedule targets and then achieving them, in part because of challenges addressing complex technical issues, negotiating contracts, complying with regulatory issues, and ensuring safety.<sup>5</sup> Recently, for example, factors such as these have delayed completion of Hanford's Waste Treatment and Immobilization Plant in Washington State. The project has been delayed by 8 years, while costs have escalated, more than doubling the initial estimate, from \$4.3 to \$12.2 billion. The treatment plant was one of nine major DOE construction projects, collectively valued at about \$14 billion, that as of 2009 had exceeded both their original cost and schedule estimates. As we recently reported, DOE has taken steps to improve its contract and management activities, including in 2000 issuing its order 413.3A, which established a process for managing projects, from beginning to end.<sup>6</sup> The order established five major milestones—or "critical decision points"—that span a project's life, beginning with approval of need and ending with project completion. Order 413.3A specifies the requirements that must be met, along with the documentation necessary, to move past each milestone, including when a variety of independent reviews should occur to assess progress. Other steps DOE has taken include developing a root-cause analysis, a corrective action plan, and performance measures intended to help assess progress. Nevertheless, Environmental Management's contract and project management activities remain on GAO's list of programs or agencies at high risk for fraud, waste, abuse, and mismanagement.

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<sup>5</sup>GAO, *Department of Energy: Major Construction Projects Need a Consistent Approach for Assessing Technology Readiness to Help Avoid Cost Increases and Delays*, [GAO-07-336](#) (Washington, D.C.: Mar. 27, 2007); GAO, *Department of Energy: Further Actions Are Needed to Strengthen Contract Management for Major Projects*, [GAO-05-123](#) (Washington, D.C.: Mar. 18, 2005); GAO, *Hanford Waste Treatment Plant: Contractor and DOE Management Problems Have Led to Higher Costs, Construction Delays, and Safety Concerns*, [GAO-06-602T](#) (Washington, D.C.: Apr. 6, 2006).

<sup>6</sup>GAO, *Department of Energy: Actions Needed to Develop High-Quality Cost Estimates for Construction and Environmental Cleanup Projects*, [GAO-10-199](#) (Washington, D.C.: Jan. 14, 2010).

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The Recovery Act is intended to promote economic recovery, make investments, and minimize or avert reductions in state and local government services. The Congressional Budget Office estimated that the Recovery Act would increase employment by about 1.2 million to 3.6 million jobs by the end of 2010. Enacted on February 17, 2009, the act directed that priority be given to projects that could be started quickly. The administration referred to such projects as “shovel-ready.” Projects funded by the Recovery Act must comply with section 1512 of the act, which requires funding recipients to report quarterly on a number of measures, including the amount of funds expended or obligated to projects or activities, and the number of jobs created. The act generally requires that all awarded funding must be obligated by September 30, 2010. Funds must be expended by September 30, 2015.

In implementing environmental cleanup work under the Recovery Act, Environmental Management established several goals. These goals included creating jobs; reducing DOE’s “footprint,” or area with ongoing cleanup activity; reducing the life-cycle costs associated with hazardous waste cleanup; completing cleanup activities at three small sites; and meeting a number of regulatory cleanup deadlines that it might not otherwise meet. In addition, Environmental Management set an internal deadline to expend all Recovery Act funds and complete Recovery Act work by the end of fiscal year 2011.

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**For Recovery Act  
Funding, DOE  
Generally Selected  
“Shovel-Ready”  
Projects Whose Cost  
and Schedule Targets  
Had Been Developed  
and Needed Minimal  
Work to Finalize**

DOE generally chose to use Recovery Act funds for cleanup projects that could be quickly started and finished. The majority of the projects selected also had existing contracts, which allowed the department to update and validate new cost and schedule targets within a short time frame.

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## Recovery Act Funding Enabled DOE to Implement Shovel-Ready Projects It Had Identified in Recent Planning Efforts

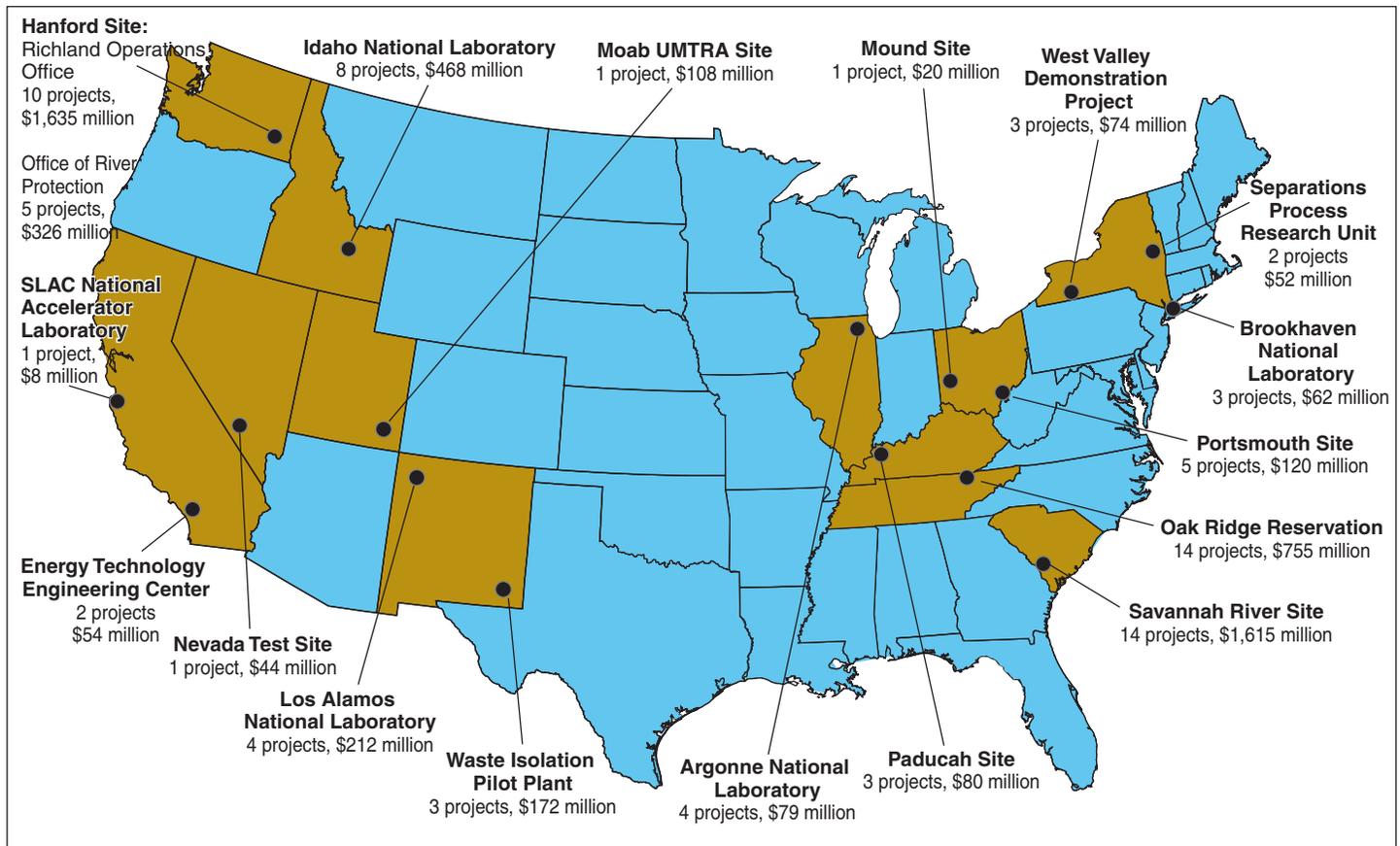
At the time the Recovery Act was passed, DOE was well positioned to select projects that could be implemented quickly with Recovery Act funding. DOE officials said they had planning efforts under way since 2006, which were aimed at identifying relatively low-risk cleanup projects that could reduce DOE's cleanup footprint and speed overall site remediation. Such projects included, for example, facility demolition, groundwater or soil remediation, or finishing work that could help accelerate site closure. These projects generally had contracts, including cost and schedule targets, in place; they used proven technologies, had secured needed regulatory approvals, and were therefore considered "shovel-ready." (According to DOE officials, this focus on discrete, low-risk projects stemmed in part from lessons learned during a 2002 cleanup acceleration attempt, which ultimately did not work well for complex and costly projects.<sup>7</sup>) In addition to its internal deadline to expend all Recovery Act funds and complete work by the end of fiscal year 2011, other criteria—including job creation and reducing environmental risk—also influenced DOE's selection. DOE officials said that in selecting these projects, they had to balance competing goals. For example, to begin and complete work quickly, they chose a portfolio of cleanup projects that may ultimately reduce DOE's footprint—its physical presence—on the national landscape by 372 square miles (approximately 40 percent) but would not address the most dangerously radioactive and hazardous wastes and the environmental risks these wastes present.

In all, DOE selected 84 projects at 17 DOE sites in 12 states for Recovery Act funding (see fig.1) with the majority of the money going to four sites—Hanford, Idaho National Laboratory, the Oak Ridge Reservation, and Savannah River (see app. III).

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<sup>7</sup>Our prior work found that technical problems (such as developing sophisticated waste separation technologies) or legal and regulatory issues (such as determining when a waste tank was clean enough to close) handicapped acceleration of complex and costly projects (see [GAO-05-764](#)).

**Figure 1: Sites Selected to Receive Recovery Act Funding**



Sources: DOE; Map Resources (map).

The vast majority of projects had been included in the sites' own work plans, such as groundwater remediation at Los Alamos National Laboratory, but some projects also represented work newly transferred from other program offices, such as remediation and demolition of a former weapons facility at Oak Ridge Reservation. In general, projects chosen for Recovery Act funding fell into four main categories of work:

- *Decontaminating and demolishing facilities:* for example, decontaminating and demolishing the K-33 building at the Oak Ridge

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Reservation.<sup>8</sup> A two-level structure that covers 32 acres (see fig. 2) was constructed in 1954 to process and enrich uranium for use in nuclear weapons. Although uranium enrichment operations ceased in 1985, the building's piping and other equipment were not removed completely until 2005, and radiological and chemical contamination remains throughout the building. DOE had initially selected a different building for demolition, K-27, which was also used to process and enrich uranium, but it found unexpectedly high levels of mercury contamination, complicating that cleanup. So in February 2010, DOE decided to instead demolish the K-33 building—a much larger building but a less-contaminated and less-complex cleanup project—at a cost of \$65 million. Work began in April 2010. Given the delay in starting the project, site officials expect the project to be completed in 2012.

**Figure 2: Aerial and Interior View of Building K-33, East Tennessee Technology Park, Oak Ridge Reservation**



Source: DOE.

- *Removing contamination from soil and groundwater:* for example, removing and disposing of radioactive and hazardous contaminants from soil and groundwater at the Mound Site, a former production site for explosives and other weapons' components. Production at the site ceased in 1995. The site's contractor declared the physical completion of environmental cleanup of the site in July 2006, although a landfill

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<sup>8</sup>To track projects, DOE assigns each project a number, which corresponds to project baseline information. A complete list of DOE Recovery Act projects, organized by site and project number appears in appendix III. Project number OR-0040.R1 (see apps. III and IV).

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remained, which DOE planned to monitor for contamination. Congress, however, directed further remediation of the landfill at the site. The project includes excavating and disposing of contaminated soils and backfilling the site. Although work began with base funding, the funding was insufficient to complete removal of the contamination. Recovery Act funding of \$19.7 million was applied to the project to complete remaining work, with an expected site closure date of September 2010.<sup>9</sup>

- *Packaging and disposing of transuranic and other wastes:* for example, characterizing and packaging transuranic wastes at multiple DOE sites for shipment to the department's deep geologic repository for permanent disposal. (See fig. 3.) Transuranic wastes are typically discarded rags, tools, equipment, soils, or other solid materials that have been contaminated by radioactive elements, such as plutonium or americium.<sup>10</sup> About 110,000 cubic meters of these wastes were generated mostly after 1970 and then stored at various DOE sites. Because these wastes remain radioactive for extremely long periods—hundreds of thousands of years in some cases—most are headed for disposal at the Waste Isolation Pilot Plant, a deep geologic repository near Carlsbad, New Mexico, designed for transuranic waste disposal. Idaho National Laboratory plans to ship 160 transuranic waste containers—those containers that because of their high radioactivity, must be handled remotely—to the Waste Isolation Pilot Plant.

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<sup>9</sup>Project number OH-MB-0031.NEW.R1 (see apps. III and IV).

<sup>10</sup>Transuranic waste is waste containing more than 100 nanocuries of alpha-emitting transuranic elements (radiation) per gram with half-lives greater than 20 years with certain exceptions. A half-life is the amount of time required for an element to decay by half, and nanocuries are a measure of radioactivity. Alpha-emitting radiation cannot pass through objects, including human skin, but is extremely dangerous if inhaled or ingested.

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**Figure 3: Workers Packaging Transuranic Waste, Savannah River Site**



Source: DOE.

- *Supporting the maintenance and treatment of liquid tank waste:* for example, upgrading the infrastructure used to stabilize and maintain the tanks that store chemical and radioactive waste at the Hanford Site. Projects funded through the Recovery Act are accelerating specific upgrades, such as installing new ventilation systems to prevent the buildup of hazardous and volatile gases produced in the tanks. The waste is gradually being transferred from the oldest, deteriorating underground tanks to larger, newer tanks in preparation for processing in the waste treatment plant, which is expected to start operating in 2019.

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## DOE Updated and Validated Cost and Schedule Targets for Recovery Act Projects

To implement Recovery Act work, DOE updated (or, for new work, developed) cost and schedule targets for each project. Once these targets were established, DOE followed the process established by order 413.3A for reviewing and assessing the targets' validity and the reasonableness of the price of the associated contract. Reviews fell into two general categories:

- *Program reviews:* Performed by DOE officials with no vested interest in a project, such reviews are to determine if a project's scope, cost and schedules, safety, and technology are valid and appropriate. Program reviews for projects estimated to cost no more than \$100 million are

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known as independent project reviews. Program reviews for projects estimated to cost \$100 million or more are known as external independent reviews.

- *Cost reviews:* These reviews verify that the contractors' price estimates adequately reflect the programs' scope and are reasonable for the work to be accomplished. Cost reviews for projects valued at \$100,000 or more are known as independent government cost estimates. Cost reviews for projects valued at \$5 million or more are known as independent reviews and validations.

Both of these categories of reviews serve to highlight any potential issues or problems with contracts, as well as offer an opportunity for DOE and its contractors to define and perform any needed corrective action. For example, the Savannah River Site's external independent review to assess cost and schedule estimates and readiness to begin construction found that the contractor had not produced sound cost and schedule estimates or risk management plans nor clearly defined the scope of Recovery Act work to decommission certain buildings. The site's contractor responded with a corrective action plan that spelled out actions to remedy these shortcomings. Reviews have also found contracts where information was missing. At Hanford, for example, the external independent review found that some of the Recovery Act projects had not fully defined the scope of their work or established cost and schedule targets at the time of the review. In other cases, the reviews found contracts that lacked sufficient "contingencies," that is, sufficient cushions built into the cost and schedule estimates in case of unforeseen technical or programmatic problems. For example, Idaho National Laboratory did not initially include a contingency estimate in its schedule for the site's Recovery Act activities. Reviews also uncovered concerns about project implementation, such as contractors' inability to start work as quickly as planned. For instance, at the Moab Site, Utah, an initial program review found that the contractor's procurement office was unable to acquire needed equipment to operate at full capacity, slowing work at the site.

In addition, DOE decided to disburse funding for Recovery Act cleanup projects in phases, requiring site officials to complete a series of steps before releasing the funds. For example, initial funding—equal to 30 percent of obligated funds—was released only after sites had certified that contracts were finalized for the Recovery Act projects.

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## DOE Has Begun Work on All Projects, Most Appear to Be Meeting Cost and Schedule Targets, and Spending Overall Has Been Slower Than Planned

DOE has begun work on all of its Recovery Act projects, spent over \$1.9 billion of its \$6 billion in Recovery Act funding, and created more than 5,600 jobs at the 17 cleanup sites selected for funding. DOE reported that the majority of Recovery Act projects were achieving cost and schedule targets, although about one-third were not.<sup>11</sup> In addition, inconsistencies exist between some projects' cost and schedule performance and progress shown by other performance measures, such as cubic meters of soil remediated.

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## DOE Reported All 84 Recovery Act Projects Are Under Way, Creating About 5,600 Jobs, but Overall Spending Has Been Slower Than Planned

Work has begun on each of DOE's 84 Recovery Act cleanup projects and, as of May 2010, each of the projects was still in progress. The first project planned for completion—an effort to remove contaminated soil and groundwater at the Mound Site in Ohio—is scheduled to finish in September 2010, according to DOE. According to DOE monthly reports, most of the other 83 projects are expected to be completed by September 2011, DOE's internal target for completing all Recovery Act work. DOE's monthly project reports from early 2010 indicated that 20 projects were scheduled for completion after fiscal year 2011, including 11 of the 14 projects at the Savannah River Site. More recently, however, DOE headquarters officials said that at least nine projects would not be completed before the September 2011 deadline. These projects include

- a project at Savannah River to clean up transuranic waste, which was delayed as the site awaited approval to ship its waste to the Waste Isolation Pilot Plant for permanent disposal, according to DOE;<sup>12</sup>
- a project to demolish a uranium enrichment and processing facility at the Oak Ridge Reservation, which began late, according to DOE; and<sup>13</sup>

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<sup>11</sup>In this report, references to a project achieving its cost and schedule targets means that the project is demonstrating an earned value metric that shows positive cost and schedule performance as assessed by the contractor's earned value management system. See app. IV for further information on how this metric is used.

<sup>12</sup>Project number SR-0013.R1.2 (see apps. III and IV).

<sup>13</sup>Project number OR-0040.R1 (see apps. III and IV).

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- a facility-decommissioning project at Idaho National Laboratory, which was delayed because of technical difficulties.<sup>14</sup>

In March 2010, DOE reported that Recovery Act cleanup work had resulted in more than 5,600 full-time-equivalent jobs at all 17 sites in 12 states.<sup>15</sup> Over 80 percent of these jobs were located at the four sites—Hanford, Idaho National Laboratory, the Oak Ridge Reservation, and Savannah River—that together received 80 percent of Recovery Act funding. The number of full-time jobs created varied from site to site. For example, DOE reported that 5 jobs were created at the Energy Technology Engineering Center in California, a 90-acre site currently engaged in deactivation and decommissioning activities to clean up the nuclear waste generated during years of nuclear research, and nearly 1,400 jobs were created at Savannah River, a 310-square-mile site where a number of DOE cleanup activities are taking place, including the stabilization, treatment, and disposal of nuclear waste generated during decades of development and production of nuclear weapons and materials.

DOE's spending on Recovery Act projects has been slower than the department had planned. As of May 2010, a little over a year into the program, DOE had obligated about \$5.5 billion (92 percent) of the \$6 billion in Recovery Act cleanup funding and had spent about \$1.9 billion of those funds—slightly less than the \$2.3 billion DOE had expected to spend through May 2010. Spending rates varied across sites, from 76 percent of obligated funds spent at the Energy Technology Engineering Center in California to 23 percent at Argonne National Laboratory in Illinois. On a project-by-project basis, as of March 2010, amounts spent ranged from less than 1 percent of total estimated project cost (a \$142 million project to decommission a reactor at Savannah River<sup>16</sup>) to 84 percent of estimated project cost (a \$17 million project to decommission a reactor at Brookhaven National Laboratory<sup>17</sup>). In some cases, according to DOE officials, the slower spending at a site or on a given project resulted from technical and management challenges that may have slowed progress. In other cases, however, DOE had planned to

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<sup>14</sup>Project number ID-0040B.NEW.R1.3 (see apps. III and IV).

<sup>15</sup>This jobs number reflects reporting by DOE contractors and represents a count of full-time equivalents for DOE's prime contractors only. Per OMB guidance, this number represents jobs created during the previous quarter (January through March 2010).

<sup>16</sup>Project number SR-0030.R1.2 (see apps. III and IV).

<sup>17</sup>Project number BRNL-0040.R1 (see apps. III and IV).

spend less money early on: for example, DOE estimated slower spending during the first several months of a project to remediate contaminated soil and groundwater at Hanford because fewer workers were needed for the work's first, less complex phase, according to a site official. DOE's plans for that project show an increase in the rate of spending Recovery Act funds beginning in May 2010, once excavating the contaminated soil is under way.<sup>18</sup> Table 1 shows Recovery Act spending on DOE cleanup projects through May 2010. In commenting on a draft of this report, DOE stated that the initial project spend plans for the Recovery Act were developed prior to finalizing the contracts for the work. Now, with the exception of nine projects for which the scope of work changed, DOE officials expect to spend over 95 percent of project funds by the end of fiscal year 2011.

**Table 1: Spending on Recovery Act Cleanup Projects through May 2010**

Dollars in thousands

Site	Total Recovery Act funds allotted	Allotted funds that have been obligated		Allotted funds that have been spent	
		Amount	Percentage	Amount	Percentage
1. Argonne National Laboratory (IL)	\$79,000	\$79,000	100%	\$17,843	23%
2. Brookhaven National Laboratory (NY)	61,855	61,855	100	29,636	48
3. Energy Technology Engineering Center (CA)	54,175	54,162	100	41,202	76
4. Hanford Site (WA):					
Office of River Protection	326,035	325,935	100	85,962	26
Richland Operations Office	1,634,500	1,633,993	100	476,258	29
5. Idaho National Laboratory (ID)	467,875	423,775	91	184,126	39
6. Los Alamos National Laboratory (NM)	211,775	211,775	100	64,234	30
7. Moab UMTRA Site (UT)	108,350	108,350	100	35,654	33
8. Mound Site (OH)	19,700	19,700	100	8,975	46
9. Nevada Test Site (NV)	44,325	44,300	100	21,795	49
10. Oak Ridge Reservation (TN)	755,110	657,563	87	193,340	26
11. Paducah Site (KY)	80,400	80,400	100	24,871	31
12. Portsmouth Site (OH)	119,800	119,800	100	38,430	32
13. Savannah River Site (SC)	1,615,400	1,363,924	84	563,292	35

<sup>18</sup>Project number RL-0041.R2 (see apps. III and IV).

Dollars in thousands

Site	Total Recovery Act funds allotted	Allotted funds that have been obligated		Allotted funds that have been spent	
		Amount	Percentage	Amount	Percentage
14. Separations Process Research Unit (NY)	51,775	51,775	100	16,202	31
15. SLAC National Accelerator Laboratory (CA)	7,925	7,925	100	5,351	68
16. Waste Isolation Pilot Plant (NM)	172,375	172,344	100	58,394	34
17. West Valley Demonstration Project (NY)	73,875	62,875	85	22,889	31
Other <sup>a</sup>	99,650	64,237	64	57,177	57
Unapportioned <sup>b</sup>	16,100	0	0	N/A	
<b>Total</b>	<b>\$6,000,000</b>	<b>\$5,543,688</b>	<b>92%</b>	<b>\$1,945,629</b>	<b>32%</b>

Source: GAO analysis of DOE data.

<sup>a</sup>Includes management costs, as well as DOE's Title X uranium and thorium reimbursement program funded with Recovery Act dollars.

<sup>b</sup>Refers to money held in reserve by OMB.

## A Majority of Recovery Act-Funded Projects Appear to Be Meeting Cost and Schedule Targets, Although Inconsistencies Exist between Some Targets and Performance Measures

A key set of metrics DOE uses to determine whether projects, including those funded by the Recovery Act, are meeting their cost and schedule targets comes from DOE contractors' earned value management system. Earned value is a project management tool that combines measurements of scope, schedule, and cost in a single integrated system that can be used by DOE contractors to manage programs.<sup>19</sup> According to DOE headquarters and site officials, DOE monitors this earned value information monthly from headquarters, as well as weekly or daily at some sites. Using these data, DOE reported that, as of March 2010, 57 of the 84 Recovery Act projects—about two-thirds—were meeting both cost and schedule targets. About 20 percent of projects were meeting either their cost or schedule target, but not both, and the remaining 11 percent had missed both targets altogether. Projects meeting and missing targets spanned the range of project types, including facility demolitions, groundwater remediation, and infrastructure upgrades. Appendix IV

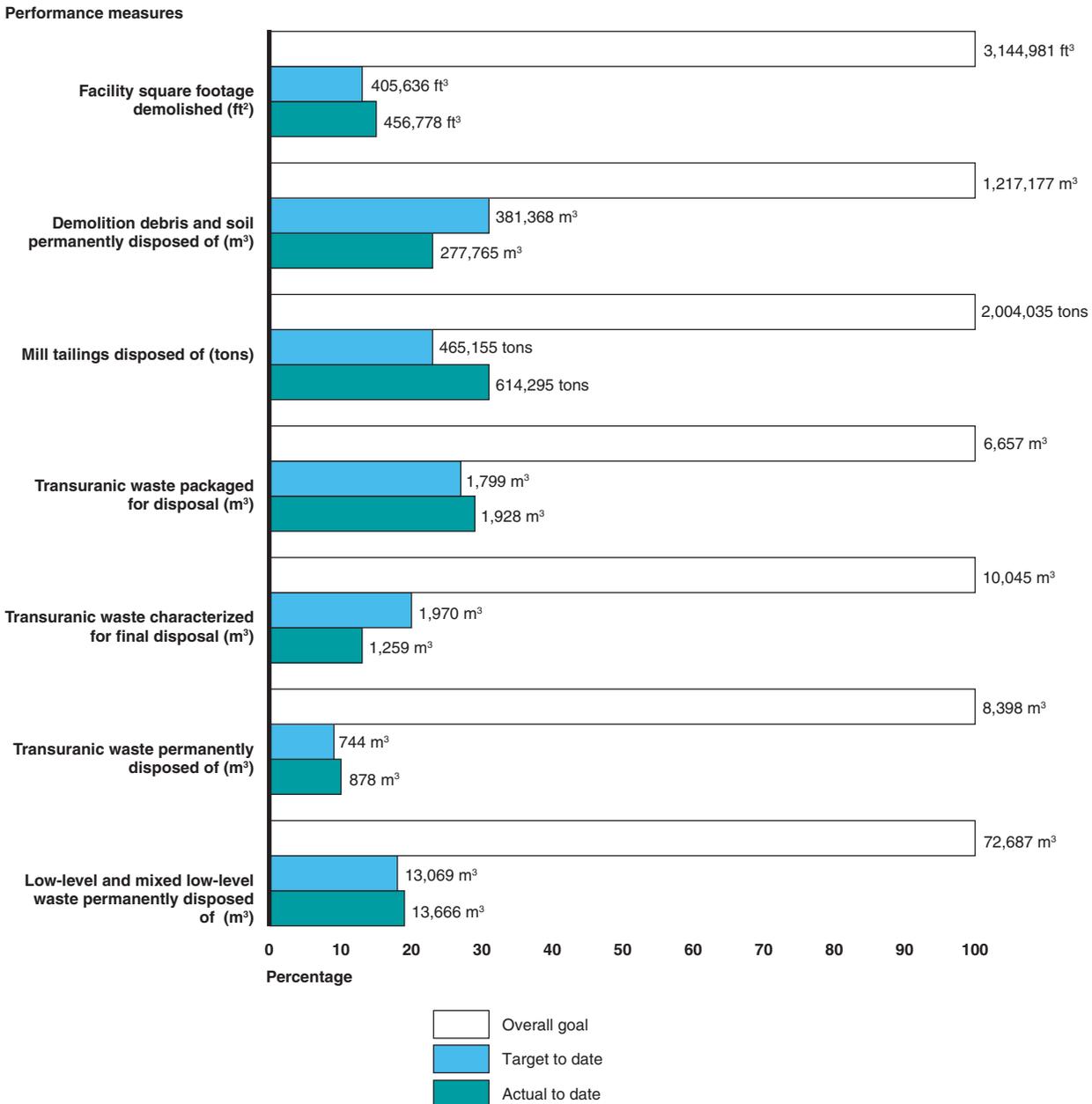
<sup>19</sup>DOE has certified that the earned value system used by its contractors is reliable for all but one Recovery Act contractor (Savannah River's liquid tank waste contractor). DOE does not require contractors at three of the sites—Argonne National Laboratory, Paducah, and SLAC National Accelerator Laboratory—to have their earned value systems certified.

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provides performance information by project number for Recovery Act projects.

In addition to tracking earned value metrics, DOE also evaluates project performance by reviewing project-specific performance measures. As of March 2010, DOE reported that across the complex, progress on five of seven selected performance measures was meeting or exceeding targets (see fig. 4). These measures relate to the specific cleanup activities under way at a given site, such as cubic meters of waste disposed of or the number of radioactive facilities decommissioned. Historically, DOE has used such measures to track cleanup progress complexwide. DOE developed several new performance measures specific to Recovery Act projects. These include, for example, cubic meters of transuranic waste that have been prepared and certified for shipment to the Waste Isolation Pilot Plant, a measure that supplements existing measures tracking only the amount of transuranic waste actually disposed of. Some sites have also developed site- or project-specific cleanup measures, such as the Savannah River Site, which is measuring cubic yards of grout (a cementlike material) poured into decommissioned reactor facilities, and the Hanford Site, which is measuring the number of waste tank systems that are upgraded.

**Figure 4: Selected Performance Measures for Environmental Management’s Recovery Act Projects, Reported by DOE, as of March 2010**



Source: DOE.

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Note: Demolition debris and soil permanently disposed of represents a planning estimate rather than a performance measure, according to DOE. For Recovery Act projects, DOE's goal is to generate and dispose of less than the total estimated volume of such debris—1.2 million cubic meters—shown in the figure.

While DOE is using performance measures to track progress on most of its 84 Recovery Act projects, progress on 31 projects has not been tracked using any performance measures, for two main reasons. First, 18 of the 31 projects do not yet have any corresponding performance measures assigned. According to a DOE Recovery Act Program official, performance measures are being developed for most of these 18 projects. Five of the 18 projects will not be assigned any performance measures, however, because the work does not lend itself to meaningful performance measures, the work is almost complete, or earned value data are deemed sufficient to track the projects' progress, according to DOE. For example, DOE will rely primarily on earned value measures to track progress on a project to maintain and monitor the physical condition of inactive facilities at the Savannah River Site.<sup>20</sup> Second, the remaining 13 of 31 projects currently have performance measures assigned for tracking progress, but the planned work associated with those measures has not begun. For example, for a particular project at the Hanford Site to identify and dispose of contaminated soil, the performance measure is cubic meters of soil disposed of.<sup>21</sup> But because work during the project's first several months involved identifying the extent of the contamination (before beginning actual excavation of contaminated soil), this particular performance measure will not be useful for tracking progress until the first planned disposal of contaminated soil in October 2010.

For the remaining 53 projects that had performance measures in place as of March 2010, results were mixed. Of these projects, DOE reported in its monthly reports that 38 were meeting all their performance measure targets, and 15 were missing some or all of their targets (see fig 5). For example, a project at the Savannah River Site to treat and dispose of several types of solid waste had five performance measures tracking progress, as of March 2010, including metric tons of depleted uranium packaged for disposal, number of waste drums disposed of, and cubic meters of debris and soil disposed of.<sup>22</sup> As of March 2010, the project was

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<sup>20</sup>Project number SR-0040.R1 (see apps. III and IV).

<sup>21</sup>Project number RL-0041.R2 (see apps. III and IV).

<sup>22</sup>Project number SR-0013.R1.1 (see apps. III and IV).

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falling short on three of its five performance measures. Among other aims, the project was supposed to prepare about 11,600 metric tons of depleted uranium for disposal, but only about 4,000 metric tons had actually been prepared because of a delayed start on the project, according to site officials.

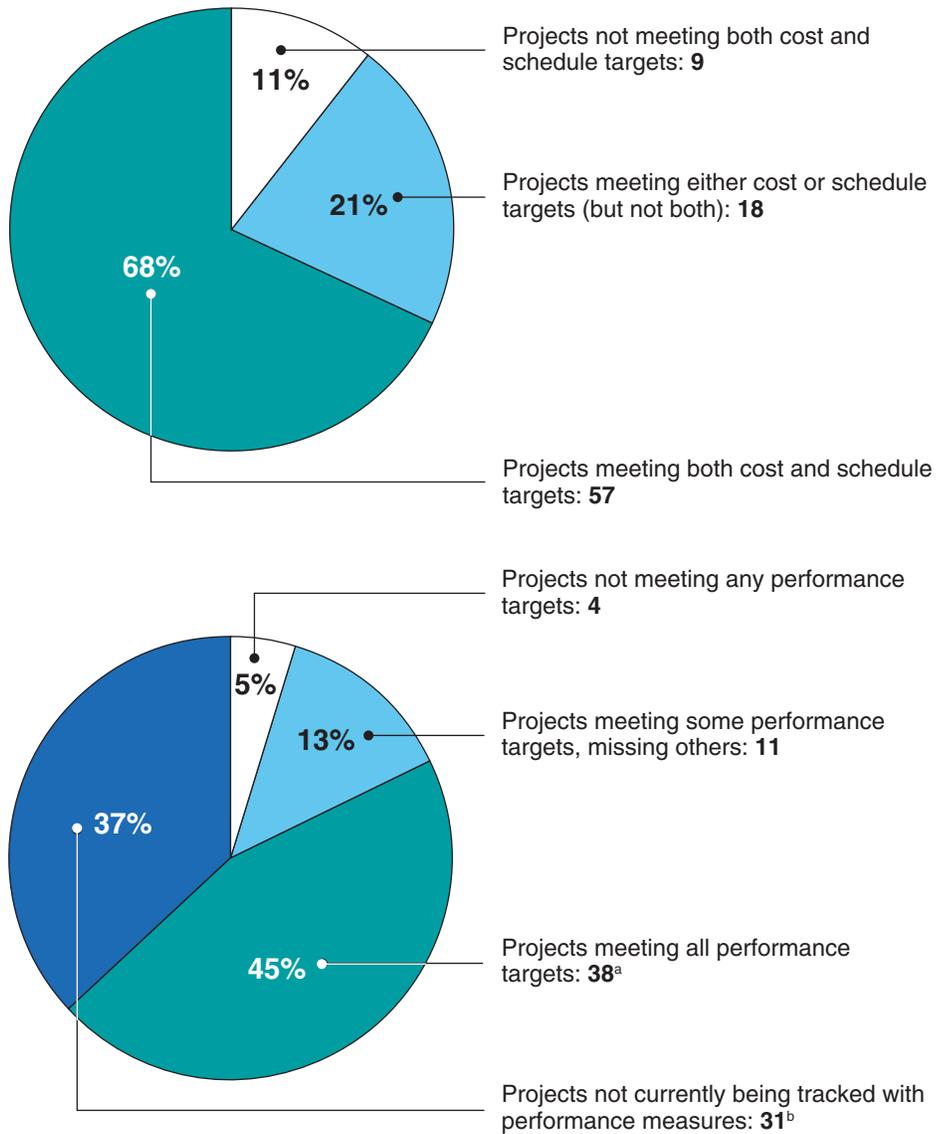
In reviewing projects' earned value cost and schedule target data and projects' associated performance measures, we found that the results as assessed by performance measures were sometimes inconsistent with the results shown by earned value data for cost and schedule targets. A given project might have met cost and schedule targets but have nevertheless fallen short in meeting performance measure targets. For example, at the Hanford Site, a project to dispose of contaminated soil and debris met or bettered its cost and schedule targets, but a related performance measure showed that none of the contaminated material had been disposed of as planned.<sup>23</sup> Conversely, earned value data for a project to demolish contaminated buildings at Idaho National Laboratory showed that the project was not meeting its cost and schedule targets but was meeting all of its performance measures, such as square footage of facilities demolished.<sup>24</sup> In commenting on a draft of this report, DOE officials stated that earned value scores and other project performance information are intended to provide complementary insights into overall performance. Officials said that when differences among the indicators arise, headquarters officials follow up with federal and contractor officials at the site to determine the reasons for these differences.

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<sup>23</sup>Project number RL-0041.R1.3 (see apps. III and IV).

<sup>24</sup>Project number ID-0040B.NEW.R1.3 (see apps. III and IV).

**Figure 5: Performance of Recovery Act Projects, as of March 31, 2010**



Source: GAO analysis of DOE data.

<sup>a</sup>DOE considers performance to be meeting targets until it drops below 90 percent of the target. That is, work could be slightly under expectations—but not less than 90 percent of the target—and still be considered as meeting its target.

<sup>b</sup>Some of these projects have performance measures in place, but those measures did not show any planned work through March 2010.

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## DOE Has Taken Steps to Help Address Potential Problems but Continues to Face Key Challenges in Managing Projects and Measuring Their Impact

DOE's Recovery Act work is well into its second year, and the department faces familiar challenges. While DOE has taken steps to strengthen project management activities, as of March 2010, about one-third of projects did not achieve cost or schedule targets, or both. According to DOE officials, many schedule delays and cost problems could be traced to the same types of issues that have troubled DOE in the past—technical challenges, regulatory issues, and contracting delays. In addition, it is unclear how Recovery Act funding has affected job creation and the department's environmental cleanup goals or, in particular, to what degree this additional funding will reduce DOE's footprint, related environmental risks, and future cleanup costs.

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## DOE Has Taken Steps to Help Projects Achieve Cost and Schedule Targets, Although Some Project Management Issues Remain

To help Recovery Act projects achieve their cost and schedule targets, DOE has taken steps to strengthen project management and oversight, such as adding federal oversight staff, increasing project reporting requirements, and placing tighter controls on when and how funds are disbursed to cleanup sites. First, DOE created a management structure to oversee Recovery Act projects separately from its cleanup projects funded by annual appropriations. At the headquarters level, DOE created an Environmental Management Recovery Act program office, where experienced DOE staff oversee site reporting and project review requirements for Recovery Act work. In addition, DOE assigned a certified on-site federal project director to oversee each Recovery Act project. All federal project directors for Recovery Act projects are senior managers certified by the Project Management Career Development Program Certification Review Board.<sup>25</sup> DOE also created a new position for cleanup sites—a Recovery Act site representative—who reports project status to DOE's headquarters' Recovery Act program office and the Office of Environmental Management's Consolidated Business Center. Recovery Act site representatives are expected to monitor and report to the Recovery Act program office on technical, programmatic, regulatory, environmental, safety and health, and fiscal issues and concerns. The

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<sup>25</sup>In 2001, DOE established DOE's Project Management Career Development Program, which defines a project management career path that includes certification, minimum training and continuing education requirements, and project management responsibilities that are commensurate with clearly defined qualifications. According to DOE officials, all project directors overseeing Recovery Act projects are certified at, or greater than, the level appropriate for the project they are managing, which means that they have the qualifications to oversee projects valued at more than \$100 million. The requirements are articulated in DOE order 361.1B, Acquisition Career Management Program.

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business center provides project management support, such as assistance in cost estimating and analysis.

Second, DOE increased oversight via new and more frequent reporting requirements for Recovery Act work. In addition to reporting the number of jobs funded by the act, sites report to Environmental Management's Recovery Act program office—on a monthly, rather than quarterly, basis—projects' progress toward cost and schedule targets, as well as progress on performance measures. Sites also are to report whether contractors are completing certain tasks (milestones) on time, or whether contractors have missed their targets. Third, DOE has disbursed Recovery Act funding to sites in phases and required site officials to complete and document a series of tasks before funding can be released at each phase. For those cases where a site does not satisfactorily complete these tasks, DOE officials said they are prepared to withhold additional funding until the site has complied with the requirements. For example, one of the requirements for receiving funding is that a project receives a favorable project review, which involves an assessment of cost and schedule targets and project management plans. At the Savannah River Site, because a July 2009 external independent review of a decontamination and decommission project found that the contractor had failed to produce sound cost and schedule estimates or risk management plans as required, DOE shifted \$200 million it had intended to allocate to that contractor to a different project managed by a second contractor at the site. DOE subsequently implemented corrective actions at the site, including management changes. DOE has not taken similar steps to increase oversight of projects within its broader environmental cleanup program, and it is uncertain how or whether the actions taken to strengthen project management and oversight of Recovery Act projects will benefit management of DOE's larger portfolio of cleanup projects.

As of March 2010, nearly one-third of Recovery Act projects were facing cost or schedule difficulties or both—despite DOE's efforts to choose low-risk, straightforward, shovel-ready projects for funding and to increase oversight—and overall spending was somewhat slower than expected. About halfway through DOE's planned Recovery Act program, slightly less than one-third of the department's \$6 billion allocation had been spent. Officials attributed these difficulties to technical, regulatory, safety, and contracting problems—some of the same issues that have challenged DOE's project management in the past. For instance:

- *Technical challenges:* Some Recovery Act projects faced technical problems, such as the discovery of unanticipated wastes that require

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additional time and effort to remediate or an inability to obtain necessary materials or equipment in a timely manner. For example, unexpected levels of contamination—discovered after cost and schedule targets under the Recovery Act had been established—have delayed the decommissioning and demolition of the former Experimental Breeder Reactor II (one of 52 nuclear reactors at Idaho National Laboratory).<sup>26</sup> In determining the extent of contamination at the facility and planning the decommissioning effort, DOE discovered that a portion of the reactor contained a layer of asbestos insulation between the reactor's outer steel shell and its inner concrete lining and that the concrete lining was also filled with asbestos. As of May 2010, according to DOE officials, the contractor had to slow the work to figure out how to best address this unexpected contamination, and as a result, this \$118 million project is not expected to be completed by September 2011. At the Savannah River Site, a \$304 million project to accelerate disposal of 5,000 cubic meters of transuranic waste<sup>27</sup> cannot be completed until 2012 because of problems obtaining the proper containers for shipping the waste to the Waste Isolation Pilot Plant. When the site could not obtain large containers in a timely manner, workers instead packaged the waste into smaller containers—a process that was time-consuming and costly, officials said. In early June 2010, DOE officials said the Nuclear Regulatory Commission issued a certification of compliance for the large containers. According to a Savannah River Site official, the new containers will enable workers to package the waste more efficiently and at lower cost. Still, as a result of this delay, the project is expected to be completed in 2012, later than planned.

- *Regulatory issues:* Some sites have also faced regulatory issues that require additional time to address. For example, DOE is working on a \$38 million Recovery Act cleanup project at the Energy Technology Engineering Center<sup>28</sup>—which was once involved in nuclear reactor development and testing—in partnership with the Environmental Protection Agency (EPA). Under an interagency agreement between EPA and DOE, EPA has responsibility for conducting a comprehensive characterization of radioactivity at the site, in accordance with Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) processes.<sup>29</sup> When this CERCLA characterization is completed,

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<sup>26</sup>Project number ID-0040B.NEW.R1.3 (see apps. III and IV).

<sup>27</sup>Project number SR-0013.R1.2 (see apps. III and IV).

<sup>28</sup>Project number CBC-E TEC-0040.R1.1 (see apps. III and IV).

<sup>29</sup>42 U.S.C. 9601-9675 (2006).

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DOE can develop an environmental impact statement and proceed with facility demolition and groundwater and soil cleanup.<sup>30</sup> According to site officials, however, EPA's characterization activities are taking longer than expected.

- *Safety issues:* Safety concerns also affected project progress. For example, a project at the West Valley Demonstration Project in New York<sup>31</sup> to process transuranic wastes for disposal is not meeting either cost or schedule expectations, according to site officials, because of safety issues that have slowed progress. DOE site officials said that after work started on the project, air monitors showed that contamination in the work area exceeded allowable limits. Although the workers were already wearing respirators, the air monitors' warning prompted site officials to require workers to wear additional protective gear to complete the work. This additional gear, which includes bubble suits, is more cumbersome and contributed to slower-than-expected progress. Nevertheless, DOE expects the \$4.2 million effort to be completed by December 2010 as planned.
- *Contracting delays:* Delays in finalizing new contracts or contract modifications have also led to cost and schedule difficulties. For example, three of the four indefinite-delivery/indefinite-quantity contracts<sup>32</sup> at the Oak Ridge site in Tennessee have not been finalized. (Such contracts constitute standing arrangements for goods and services and introduce greater flexibility into the contracting process.) The four projects involve cleaning up contaminated soil and decontaminating or demolishing excess facilities, including demolishing a radioisotope development laboratory, a wooden building originally constructed in the 1940s for a variety of processing and research activities. Unoccupied since 1998, the dilapidated building contains both radioactive and hazardous materials. The contract has not been finalized for this project and, as a result, work cannot begin. Site officials at Oak Ridge Reservation said that finalizing this type of contract often takes longer than they expect or plan for. In addition, one of the contracts for the Oak Ridge site was protested by prospective contractors, also delaying the projects.

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<sup>30</sup>Project number CBC-EETEC-0040.R1.2 (see apps. III and IV).

<sup>31</sup>Project number OH-WV-0013.R1 (see apps. III and IV).

<sup>32</sup>Indefinite-delivery/indefinite-quantity contracts allow the government to contract for indefinite quantities of supplies or services during a fixed period. The government places delivery orders (for supplies) or task orders (for services) in a base contract and specifies minimum and maximum quantity limits, then places individual orders as needed. 48 C.F.R. §§ 16.501-1,504(a) (2009).

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## Recovery Act Impact on Job Creation and Environmental Cleanup Goals Is Unclear

In reporting the number of jobs created as a result of Recovery Act spending, DOE has reported three substantially different figures, which can be confusing and potentially misleading. Also unclear is how much impact Recovery Act spending will have on the department's environmental cleanup goals, such as reducing environmental risks from nuclear and hazardous wastes and long-term costs of maintaining excess facilities and monitoring stored wastes and contaminated soil and groundwater.

### Determining Impact of Recovery Act Spending on Job Creation Is Problematic Because DOE Calculates Jobs Created Using Three Different Methodologies

DOE has wrestled with calculating and reporting jobs created—a requirement of the Recovery Act—publicly reporting three vastly different figures. Recovery Act reporting requirements direct agencies to count hours worked under a prime contractor—the nonfederal entity that receives Recovery Act funding directly from the federal government.<sup>33</sup> OMB guidance states that agencies are to report jobs created as full-time equivalents (FTE) calculated by totaling the number of hours charged by workers to Recovery Act projects in a given quarter and dividing the sum by the total number of work hours representing a full work schedule.

While DOE has used this required figure, it has also chosen to calculate and publicize two additional figures that represent jobs created: (1) the sum of both prime contractor and subcontractor FTEs and (2) the number of people who have charged time to Recovery Act activities—without regard to the number of hours worked—which DOE refers to as “head count” or “lives touched.” DOE officials stated that because the department relies largely on subcontractors to carry out the cleanup work, reporting only prime contractor FTEs substantially understates the employment impact of DOE's Recovery Act program. The number of prime contractor FTEs DOE reported to OMB as of March 2010 was 5,655, while the sum for both prime contractors and subcontractors for the same period was nearly twice that, at 10,018. The head count, or number of workers engaged for any length of time in Recovery Act work, was substantially higher still (see table 2).

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<sup>33</sup>Federal Acquisition Regulations 52.204-11 governing the reporting of job creation figures have changed, and, beginning with the third quarter of fiscal year 2010, subcontractor FTEs will also be reported.

**Table 2: Number of Recovery Act Cleanup Jobs Created by DOE, as Calculated According to OMB and DOE Guidance, as of March 31, 2010**

Site	OMB-required calculation (prime contractor FTEs)	DOE's additional calculations	
		Prime contractor plus subcontractor FTEs	Cumulative head count
1. Argonne National Laboratory (IL)	93	129	264
2. Brookhaven National Laboratory (NY)	18	93	172
3. Energy Technology Engineering Center (CA)	5	15	248
4. Hanford Site (WA)			
Office of River Protection	187	414	1,235
Richland Operations Office	1,116	2,486	5,197
5. Idaho National Laboratory (ID)	760	786	1,902
6. Los Alamos National Laboratory (NM)	120	296	653
7. Moab UMTRA Site(UT)	148	227	229
8. Mound Site (OH)	7	42	50
9. Nevada Test Site (NV)	67	110	545
10. Oak Ridge Reservation (TN)	1,141	1,886	3,749
11. Paducah Site (KY)	165	253	626
12. Portsmouth Site (OH)	142	464	794
13. Savannah River Site (SC)	1,389	2,258	3,356
14. Separations Process Research Unit (NY)	32	119	219
15. SLAC National Accelerator Laboratory (CA)	32	42	146
16. Waste Isolation Pilot Plant (NM)	150	270	504
17. West Valley Demonstration Project (NY)	84	128	377
<b>Total</b>	<b>5,655</b>	<b>10,018</b>	<b>20,266</b>

Source: DOE.

DOE's job creation calculations are problematic because they are confusing and potentially misleading. DOE frequently publicizes all three figures to represent the employment impact of Recovery Act funding on communities near DOE cleanup sites, without explaining how the figures were calculated. But only FTEs for prime contractors are counted in a manner that can be compared with other federal recipients of Recovery Act funds. It is this number that DOE reports on the federal Web site [FederalReporting.gov](http://FederalReporting.gov). DOE officials said they had tried to gain permission from OMB to include subcontractor FTEs in this official count, but OMB has not changed its guidance. In commenting on a draft of this report, however, DOE stated that federal acquisition regulations have changed and, effective with the third quarter of fiscal year 2010, DOE will report both prime contractor and subcontractor FTEs. Further, DOE's

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calculation of head count is potentially misleading for two reasons. First, counting the number of people carrying out Recovery Act work, rather than the time they have actually spent in such work, implies that one person engaged in 2 hours of work per week is equivalent to one person engaged in 40 hours of work per week. The economic benefits to the worker, however, differ significantly. Second, the estimate includes a count of those people who contributed to the manufacture of materials or equipment purchased by prime contractors and subcontractors to support Recovery Act work, an estimate that is difficult to verify, according to site officials.

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### The Impact of Recovery Act Spending on Cleanup and Other Goals Remains Unclear

In addition to inconsistencies in how the department measures job creation, DOE has no clear means of determining how cleanup work funded by the act will reduce environmental risk, if at all. While a key departmental goal for the funding is to reduce DOE's footprint, or area of ongoing cleanup activity, just what this goal entails is unclear. DOE is using a comprehensive list of existing measures to assess environmental cleanup performance, including additional measures developed under its Recovery Act program. Existing measures include such metrics as amount of hazardous material packaged or disposed of, number of facilities demolished, number of sites for which remediation has been completed, and number of sites closed. Recovery Act project-specific measures are similar to department measures, although more specific, such as number of groundwater wells installed or square feet of facilities demolished. These project-specific performance measures, however, focus on outputs and are not directly linked to long-term outcomes such as reducing risks. For example, the performance measures do not indicate what impact installing groundwater wells or demolishing facilities will have on reducing risks to human health and the environment. Moreover, the way progress is measured is sometimes inconsistent, and many projects have no performance measures established to date. As a result, project-specific performance measures reveal very little about the outcomes DOE intends to achieve with Recovery Act funding, in particular, how DOE will measure the impact that Recovery Act funding will have on the long-term condition of large tracts of land under DOE management or on DOE's footprint. Headquarters officials defined footprint reduction as "physical completion of activities with petition for regulatory approval to follow." Some federal cleanup site officials, however, said they were confused by DOE's footprint reduction goal and uncertain how they are to take credit for having achieved it. For example, it is not clear whether footprint reduction includes total square footage of facilities owned by DOE, acres of land surrounding those facilities and owned or controlled by DOE,

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contaminated soil and groundwater beneath the facilities, some combination of all of these things, or something else entirely. Without a clearly defined and consistent measure of its footprint, it will be difficult for DOE to report whether or how Recovery Act funding has affected progress toward this key DOE cleanup goal.

Furthermore, it is also uncertain how much DOE can expect to save in life-cycle costs of its environmental cleanup program as a result of Recovery Act funding. DOE Recovery Act program officials estimated that as much as \$4 billion in life-cycle savings would be realized by doing the work under Recovery Act funding sooner rather than later, as originally planned.<sup>34</sup> Officials stated that savings are to be achieved by avoiding costs such as those for long-term maintenance, security, and waste monitoring. DOE's \$4 billion estimate, however, includes an estimate for savings that could be achieved because of inflation—by avoiding the higher costs of materials and labor in the future. In addition, DOE's estimates do not take into account the time value of money. That is, they do not account for the fact that costs incurred in the future are worth less than costs incurred sooner. According to standard economic analysis, OMB guidance on benefit-cost analysis, as well as DOE's guidance on life-cycle cost analysis, life-cycle analyses should be based on cost adjusted for both inflation and the time value of money—that is, on cost in present-value dollars. In contrast, DOE's comparison of its base program life-cycle cost estimate and its Recovery Act program estimate is based on current dollars and does not correct for either the effect of inflation on prices or the time value of money. Our analysis of DOE's cost savings, taking the appropriate factors into account, found that DOE's \$4 billion savings estimate may be overstated by as much as 80 percent. GAO has previously taken issue with DOE's method of calculating savings in life-cycle costs.<sup>35</sup> DOE officials have said that when estimating life-cycle cost savings from Recovery Act work, they prefer to use current dollars, which take into account increasing costs due to inflation. An official said that using current dollars provides for a more direct comparison with DOE's budget submission to Congress.

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<sup>34</sup>DOE also estimated more than \$3 billion in costs that would be avoided because of Recovery Act funding. These include, for example, accelerated shipments to the Waste Isolation Pilot Plant, which would avert a schedule extension and continued operating costs.

<sup>35</sup>GAO, *Nuclear Waste: Absence of Key Management Reforms on Hanford's Cleanup Project Adds to Challenges of Achieving Cost and Schedule Goals*, [GAO-04-611](#) (Washington, D.C.: June 9, 2004), and [GAO-05-764](#).

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## Conclusions

DOE expected that Recovery Act funding would help it achieve several goals, including accelerating the cleanup effort and reducing the footprint of facilities and contamination at 17 of its sites, creating jobs, and reducing total remaining cleanup costs. As the halfway mark in DOE's Recovery Act work approaches, the department has made progress toward completing cleanup projects and the majority, although not all, of these projects appear to be meeting cost and schedule targets. In carrying out its Recovery Act work, DOE has implemented additional steps to address familiar contract and project management challenges, by providing stricter controls over how and when funds are disbursed to cleanup sites, increasing reporting requirements, and paying greater attention to project oversight. Although we do not yet know what effects each of these additional steps to improve project management and increase oversight of Recovery Act projects will ultimately have on DOE's ability to meet projects' cost and schedule targets, some of the steps could be found useful for Recovery Act cleanup work, as well as carry the potential to be beneficial for projects funded under annual appropriations. The department has been less successful in implementing steps to better assess the results of its Recovery Act work. Specifically, DOE faces challenges in accurately assessing the effects of Recovery Act spending on job creation, environmental risk, footprint reduction, and long-term cleanup costs. Regarding jobs created, OMB requires that job creation figures be calculated and reported using a standard methodology. DOE, however, has chosen to also use two additional methodologies to calculate and publicly report job creation figures, which potentially provides a misleading picture of actual jobs created. DOE sites also do not have a means of determining how cleanup funded by the act will reduce environmental risk, if at all, or how DOE will measure progress toward its goals for footprint reduction. Further, DOE is not following OMB's or its own internal guidance in calculating cost savings that might accrue from completing cleanup projects sooner using Recovery Act funding. The methodology chosen by the department appears to significantly overstate savings from Recovery Act spending. Without clear performance goals and consistent and meaningful methodologies for measuring outcomes stemming from Recovery Act spending, it will be difficult for the department or others to accurately assess the benefits gained from the \$6 billion of Recovery Act funding directed to the department.

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## Recommendations for Executive Action

To help ensure successful completion of Recovery Act projects and apply lessons learned to DOE's larger cleanup effort, we recommend that the Secretary of Energy direct the Assistant Secretary of Environmental Management to take the following four actions:

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- Determine whether additional project management and oversight steps adopted for Recovery Act projects, such as more frequent reporting, have proven beneficial and whether these steps would be effective and appropriate for DOE's cleanup projects funded under annual appropriations.
  - Clarify the methodology used to calculate any supplemental job creation figures in addition to prime contractor and subcontractor FTEs, such as head count—that is workers who have charged any amount of time to Recovery Act projects—so that users of this information fully understand what each number represents and its significance and limitations.
  - Develop clear, quantifiable, and consistent measures for determining the impact of Recovery Act funding on environmental risk. As part of this effort, clearly define what the DOE footprint consists of, determine how changes to the footprint will be measured, and ensure that all DOE sites report changes to their footprint in a consistent and comparable manner.
  - Ensure that savings estimates over the life of the cleanup projects are calculated according to OMB and DOE guidance, so that these estimates accurately represent potential savings and reflect costs adjusted for both inflation and the time value of money.

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## Agency Comments and Our Evaluation

We provided a draft of this report to DOE for its review and comment. In written comments, the Assistant Secretary for Environmental Management stated that DOE concurred with our four recommendations contained in the report and indicated that some of the actions we are recommending have already been taken. Regarding the first recommendation—to evaluate the effectiveness of additional project management and oversight steps adopted for Recovery Act projects and determine if these steps would be effective for projects funded under annual appropriations—DOE indicated that some steps had been taken. These include requiring more frequent reviews of projects. DOE stated it is still evaluating the potential benefit to the base program of other steps taken to manage Recovery Act projects. In responding to the second recommendation on the methods used to calculate job creation figures, DOE stated that a recent change to federal acquisition regulations, which will result in the reporting of both prime contractor and subcontractor jobs in [FederalReporting.gov](https://www.federalreporting.gov), will negate GAO's concern on the matter. Our concern, however, centered on ensuring that users of DOE's three job creation figures—prime contractor FTEs, prime contractor and subcontractor FTEs, and head count—understand exactly what the figures represent. The head count figure is not reported into [FederalReporting.gov](https://www.federalreporting.gov) and, as we note in our report, was a

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significantly higher figure than prime contractor or subcontractor job figures. In its detailed comments, DOE stated that it has posted guidance on its Web site regarding the methodologies used to calculate job creation figures and will also include a one-page explanation sheet with job numbers presented to stakeholders or the public. We have reworded this recommendation to enhance its clarity. Third, DOE stated that it agreed with GAO's recommendation to have clear, quantifiable, and consistent measures of footprint reduction and has taken steps to better define this concept and communicate the definition to all its sites. While we agree that DOE has made progress on defining footprint reduction, the focus of our recommendation was broader, emphasizing the development of clear, quantifiable, and consistent measures for determining the impact of Recovery Act funding on environmental risk. While we recognize that DOE collects information related to project risks, as it stated in its response, the information collected concerns risks associated with successfully carrying out a project, not quantifying the reduction in environmental risks themselves. DOE went on to point out that its performance measures are focused on outputs that are directly tied to cleanup of the site. Outputs, such as cubic meters of soil remediated, do provide a measure of work performed, but they may not easily translate into the outcome in terms of environmental risk reduction due to Recovery Act funds spent at each site. We maintain that DOE needs to continue to develop measures for determining the impact of Recovery Act funding on reducing environmental risks. DOE also expressed concern over the method we used to determine project performance, as well as our assessment that inconsistencies exist between some projects' cost and schedule performance and other measures. We modified the draft to address these concerns. In responding to our recommendation on calculating life-cycle cost savings, DOE agreed stating that it is currently following OMB and DOE guidance. As we noted in our report, however, the \$4 billion in savings that DOE has stated will result from Recovery Act projects could be overstated by as much as 80 percent because the calculation does not take into account the time value of money and inflation.

DOE's written comments are presented in appendix V. In addition, DOE provided detailed technical comments, which we incorporated as appropriate.

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We are sending copies of this report to the appropriate congressional committees, the Secretary of Energy, and other interested parties. The report is also available at no charge on the GAO Web site at <http://www.gao.gov>.

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If you or your staff members have any questions regarding this report, please contact me at (202) 512-3841 or [aloise@gao.gov](mailto:aloise@gao.gov). Contact points for our Offices of Congressional Relations and Public Affairs may be found on the last page of this report. GAO staff who made major contributions to this report are listed in appendix VI.

A handwritten signature in black ink that reads "Gene Aloise". The signature is written in a cursive style with a large, looped initial "G".

Gene Aloise  
Director, Natural Resources and Environment

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# Appendix I: Scope and Methodology

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To determine how the Department of Energy (DOE) selected projects for funding under the American Recovery and Reinvestment Act of 2009 (Recovery Act) and developed cost, schedule, and performance targets, we reviewed key provisions of the Recovery Act and Office of Management and Budget (OMB) guidance regarding the act. We also reviewed various DOE guidance documents regarding project management and project reviews (orders 413.3A, 413.3-8 and 413.3-9), cost-estimating procedures (order 430.1-1), and the use of earned value management techniques (order 413.3-10). In addition, we reviewed key project planning and management documents. These included project operating plans, DOE assessments of project cost and schedule targets, and earned value management system certifications. We also reviewed OMB and DOE guidance on collecting and reporting data on jobs created and DOE's most recent performance accountability annual reports. To gain a better understanding of how projects were selected and the steps officials took to develop cost and schedule targets, we interviewed DOE headquarters officials and officials at each of the 17 sites receiving Recovery Act funding—once after initial project implementation, and again several months later. We visited the four DOE cleanup sites receiving the bulk of the \$6 billion in Recovery Act funding for environmental cleanup: (1) the Hanford Site, (2) Idaho National Laboratory, (3) the Oak Ridge Reservation, and (4) the Savannah River Site. For each site, we reviewed project documentation, interviewed officials, and observed Recovery Act work under way. We also selected a nonrandom sample of four of the costliest projects—including soil and groundwater remediation, facility demolition, and disposal of waste—to better understand how the cost estimates were developed and to assess the reliability of the estimates for these projects. Two projects were at the Hanford Site and two at the Savannah River Site. Further information on the four projects appears in appendix II.

To determine the status of the Recovery Act projects and the extent to which projects are achieving cost and schedule targets and performance measures, we used contractor data submitted to the Office of Environmental Management and assembled under its integrated planning, accounting, and budgeting system. Information we reviewed from this database consisted of cost and schedule targets; monthly cost and schedule performance; earned value management system data; and key agencywide, site, and project performance metrics. To assess the reliability of data we reviewed, we sent out questionnaires to DOE headquarters and site officials regarding the steps taken to ensure the accuracy of data related to measuring progress in meeting project cost and schedule targets, jobs created, and other project outcomes. Although in a

few instances we found data of questionable reliability at some of the sites, we determined that, overall, these data were sufficiently reliable for the purposes of our report.

To determine what key challenges DOE faced and the steps officials have taken to address these challenges, we reviewed independent internal and external project reviews, program reviews, and corrective action plans. We attended an April 2010 Environmental Management conference at which site officials exchanged information on their experiences implementing Recovery Act cleanup projects. We reviewed DOE Office of Inspector General reports on the Recovery Act and conferred with Inspector General staff. We interviewed headquarters officials and officials at all 17 sites and reviewed responses to the data reliability questionnaires sent to and completed by contractor and federal project management officials for all 84 projects. To recalculate the life-cycle cost savings that would result from the Recovery Act, we obtained DOE's life-cycle cost estimates for each project before and after the Recovery Act. We converted these estimates to constant dollars using the appropriate inflation factors for each project provided to us by DOE. We then converted those estimates to present value using real discount rates from OMB. For each project, we used the discount rate for the time period that most closely corresponded with the length of the project under consideration.

We conducted this performance audit from June 2009 to July 2010, in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

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# Appendix II: Description of Four Projects Reviewed in Depth

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We selected four Recovery Act projects for an in-depth review of their cost and schedule estimates and the reliability of these estimates. These projects came from the list of projects funded at the two DOE's sites receiving the most Recovery Act funding—the Hanford and Savannah River sites.

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## Hanford

DOE's Hanford Site in southeastern Washington State was established in 1943 to produce nuclear materials for the nation's defense. Although DOE stopped producing nuclear material at Hanford in 1989, millions of gallons of high-level radioactive waste from production still remain on site. The primary mission at Hanford is site cleanup, including waste removal and containment and soil and groundwater remediation to protect the nearby Columbia River. The Richland Operations Office at the Hanford Site received \$1.6 billion from the Recovery Act for cleanup activities and is funding 10 projects.<sup>1</sup> The projects are to demolish nuclear and support facilities, clean up waste sites and contaminated groundwater, and retrieve solid waste from burial grounds. Recovery Act funding to accelerate cleanup of facilities, waste sites, and groundwater along the Columbia River will help the site decrease its active area of cleanup from 586 to 75 square miles or less by 2015, which is more than 5 years ahead of the current schedule. We selected the following two Hanford projects for in-depth cost and schedule reliability review:

- *U Plant D&D:*<sup>2</sup> The U Plant is a former processing facility on the site's Central Plateau, where special nuclear materials were recovered and converted for shipment to other sites for weapons manufacture and assembly. Plant facilities were built in 1944 and operated until 1964. Other than minor decontamination work, the facility has been unused and deserted since operations ceased. The Recovery Act project's scope includes preparing the U Plant for decommissioning by clearing the facility of equipment and grouting the reactor's cells, as well as deactivating, decommissioning, decontaminating, and demolishing 16 ancillary facilities. The project is expected to be completed by September 2011, at a cost of \$257 million.

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<sup>1</sup>This \$1.6 billion went solely to Hanford's Richland Operations Office, one of two DOE administrative units at Hanford.

<sup>2</sup>Project number RL-0040.R1.1 (see apps. III and IV). Projects labeled D&D by DOE generally consist of deactivation, decommissioning, decontamination, demolition, or a combination of these activities.

- *100 K Area remediation.*<sup>3</sup> The 100 K Area comprises two former plutonium production reactors along the Columbia River. None of the reactors is still operational, and contamination from the former production processes and facilities is a key cleanup objective. The scope of this Recovery Act project includes decontaminating and demolishing 30 industrial and radiological facilities associated with the reactors within the 100 K area, as well as cleaning up or characterizing 23 waste sites. The project is expected to be completed by September 2011, at a cost of \$203 million.

On the basis of our in-depth reviews, DOE partially met industry best practices for ensuring that the estimates were accurate, comprehensive, well documented, and credible as detailed in GAO cost estimating guide.<sup>4</sup> While DOE carried out many best practices for developing its estimates, in some instances, it did not. For example, when preparing estimates for both of these projects, DOE did not create a plan to ensure that the estimates were developed by people with expertise in cost and schedule estimating and did not test the reasonableness of its estimates against known costs for similar activities.

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## Savannah River

The Savannah River Site was constructed in the early 1950s to produce tritium and plutonium for use in nuclear weapons. Historically the site has supported five nuclear reactors, two chemical separation plants, a heavy-water extraction plant, a nuclear fuel and target fabrication facility, a tritium extraction facility, and waste management facilities. Although the site no longer produces plutonium, some of its missions continue, such as the extraction of tritium for nuclear warheads. The site received \$1.6 billion under the Recovery Act, which is funding 14 projects. Overall, Recovery Act projects at Savannah River are expected to accelerate transuranic waste disposal by 4 years, and the decommissioning of the nuclear facilities by at least 5 years. We selected two of Savannah River's Recovery Act projects for in-depth cost and schedule estimate and reliability review:

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<sup>3</sup>Project number RL-0041.R1.1 (see apps. III and IV).

<sup>4</sup>GAO, *GAO Cost Estimating and Assessment Guide: Best Practices for Developing and Managing Capital Program Costs*, GAO-09-3SP (Washington, D.C. Mar. 2, 2009).

- *Accelerated transuranic waste disposition.*<sup>5</sup> The purpose of this project is to accelerate the characterization, packaging, and disposal of 4,200 cubic meters of transuranic waste from the site's former production of nuclear weapons. The waste will then be shipped to DOE's Waste Isolation Pilot Plant for permanent disposal. In addition, the project's current scope includes repackaging of 800 cubic meters of transuranic waste into smaller containers in preparation for shipment. The project is expected to be completed in September 2012, at a cost of \$304 million.<sup>6</sup>
- *P&R Area completion general plant projects and operations.*<sup>7</sup> "P&R Area" refers to the P and R reactors, two of the site's first nuclear production reactors, which started operating in 1953 and 1954, respectively. The buildings and associated infrastructure, such as railroad tracks used to transfer radioactive material from the reactors to other site facilities, have remained unused since the facilities ceased operations in 1964 (R reactor) and 1988 (P reactor). The scope of the Recovery Act project includes decommissioning the two reactors, as well as removing the railroad tracks. The project also includes remediation of contaminated soil under the tracks. The project is expected to advance completion of the P and R area cleanup by 5 to 6 years.

On the basis of our in-depth reviews of these two projects, DOE partially met best practices for ensuring that the estimates were credible, comprehensive, and well documented and minimally met best practices associated with ensuring that the estimates were accurate. For example, DOE did not compare its cost and schedule estimates to an independent cost estimate, a step that helps ensure accuracy. Instead, the department relied on internal project reviews, which were not as rigorous.

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<sup>5</sup>Project number SR-0013.R1.2 (see apps. III and IV).

<sup>6</sup>As of June 2010, DOE is updating this project's cost and schedule targets because of changes to the allowable container size for shipping and disposing of transuranic waste.

<sup>7</sup>Project number SR-0030.R.1.1 (see apps. III and IV).

# Appendix III: Recovery Act Project Cost Data through March 2010

Dollars in thousands			
Project number	Project description	Total estimated project cost <sup>a</sup>	Cumulative spent (percentage of total cost)
<b>Argonne National Laboratory (IL)</b>			
1. CH-ANLE-0040.NEW.R1.1	D&D: <sup>b</sup> Building 310	\$14,017	\$1,602 (11%)
2. CH-ANLE-0040.NEW.R1.2	D&D: Building 330	34,200	2,459 (7%)
3. CH-ANLE-0040.NEW.R1.3	D&D: Alpha-Gamma Hot Cell Facility	26,482	4,042 (15%)
4. CH-ANLE-0040.NEW.R1.4	TRU <sup>c</sup> waste processing	23,567	7,458 (32%)
<b>Total</b>		<b>98,266</b>	<b>15,561 (16%)</b>
<b>Brookhaven National Laboratory (NY)</b>			
5. BRNL-0040.R1	D&D: Brookhaven Graphite Research Reactor	17,208	14,378 (84%)
6. BRNL-0041.R1	D&D: High Flux Beam Reactor	20,932	8,842 (42%)
7. BRNL-0041.NEW.R1	D&D: High Flux Beam Reactor	4,215	3,469 (82%)
<b>Total</b>		<b>42,355</b>	<b>26,689 (63%)</b>
<b>Energy Technology Engineering Center (CA)</b>			
8. CBC-ETEC-0040.R1.1	D&D: EPA radiological characterization	38,300	2,775 (7%)
9. CBC-ETEC-0040.R1.2	Soil and groundwater cleanup	15,875	3,332 (21%)
<b>Total</b>		<b>54,175</b>	<b>6,107 (11%)</b>
<b>Hanford Site: Office of River Protection (WA)</b>			
10. ORP-0014.R1.1	Tank waste support: Tank farm infrastructure upgrades	100,983	20,968 (21%)
11. ORP-0014.R1.2	Tank waste support: Other infrastructure upgrades	26,089	3,473 (13%)
12. ORP-0014.R1.3	Tank waste support: Facility upgrades	92,786	13,808 (15%)
13. ORP-0014.R1.4	Tank waste support: Waste feed infrastructure upgrades	62,351	9,093 (15%)
14. ORP-0014.R1.5	Tank waste support: SY transfer line upgrade	17,900	988 (6%)
<b>Total</b>		<b>300,109</b>	<b>48,330 (16%)</b>
<b>Hanford Site: Richland Operations Office (WA)</b>			
15. RL-0011.R1	D&D: Plutonium Finishing Plant	330,200	79,470 (24%)
16. RL-0013C.R1.1	Solid waste disposal: Mixed low-level waste treatment	50,389	20,873 (41%)
17. RL-0013C.R1.2	TRU waste processing	178,110	57,159 (32%)
18. RL-0030.R1	Soil and groundwater cleanup: Treatment and monitoring	145,771	44,267 (30%)
19. RL-0040.R1.1	D&D: U Plant/other	256,500	70,579 (28%)
20. RL-0040.R1.2	D&D: Outer Zone	114,900	15,222 (13%)
21. RL-0041.R1.1	D&D: 100 K Area	266,417	44,293 (17%)
22. RL-0041.R1.2	D&D: Disposal facility expansion	36,683	25,412 (69%)
23. RL-0041.R1.3	D&D: Remedial action/footprint reduction	139,117	7,896 (6%)
24. RL-0041.R2	D&D: 618-10 burial grounds	77,814	11,345 (15%)

**Appendix III: Recovery Act Project Cost Data  
through March 2010**

Dollars in thousands			
<b>Project number</b>	<b>Project description</b>	<b>Total estimated project cost<sup>a</sup></b>	<b>Cumulative spent (percentage of total cost)</b>
<b>Total</b>		<b>1,595,901</b>	<b>376,516 (24%)</b>
<b>Idaho National Laboratory (ID)</b>			
25. ID-0013.R1	TRU waste processing	30,000	16,935 (56%)
26. ID-0013.NEW.R1	TRU waste processing	100,000	39,501 (40%)
27. ID-0030B.R1.1	Soil and groundwater cleanup: Buried waste	75,428	13,860 (18%)
28. ID-0030B.R1.2	Soil and groundwater cleanup: In-situ grouting	22,666	1,693 (7%)
29. ID-0030B.R1.3	Soil and groundwater cleanup: Operations	21,900	17,520 (80%)
30. ID-0040B.R1.1	D&D: 39 facilities	47,969	30,314 (63%)
31. ID-0040B.R1.2	D&D: 29 facilities	53,481	18,518 (35%)
32. ID-0040B.NEW.R1.3	D&D: Nuclear Energy facilities	118,061	21,110 (18%)
<b>Total</b>		<b>469,505</b>	<b>159,451 (34%)</b>
<b>Los Alamos National Laboratory (NM)</b>			
33. VL-LANL-0030.R1.1	Soil and groundwater cleanup: Material Disposal Area B	93,988	17,820 (19%)
34. VL-LANL-0030.R1.2	Soil and groundwater cleanup: Groundwater wells	44,977	16,272 (36%)
35. VL-LANL-0040-D.R1	D&D: Defense-related facilities	58,022	11,681 (20%)
36. VL-LANL-0040-N.R1	D&D: Nondefense-related facilities	14,775	4,315 (29%)
<b>Total</b>		<b>211,762</b>	<b>50,088 (24%)</b>
<b>Moab UMTRA Site (UT)</b>			
37. CBC-MOAB-0031.R1	Soil and groundwater cleanup: Mill tailings	108,350	38,214 (35%)
<b>Total</b>		<b>108,350</b>	<b>38,214 (35%)</b>
<b>Mound Site (OH)</b>			
38. OH-MB-0031.NEW.R1	Soil and groundwater cleanup: Operable Unit 1	19,700	9,242 (47%)
<b>Total</b>		<b>19,700</b>	<b>9,242 (47%)</b>
<b>Nevada Test Site (NV)</b>			
39. VL-NV-0030.R1	Soil and groundwater cleanup	45,069	20,024 (44%)
<b>Total</b>		<b>45,069</b>	<b>20,024 (44%)</b>
<b>Oak Ridge Reservation (TN)</b>			
40. OR-0013B.R1.1	TRU waste processing	124,500	31,578 (25%)
41. OR-0040.R1	D&D: East Tennessee Technology Park	118,000	18,885 (16%)
42. OR-0041.R1.1	D&D: Y-12 facility	5,000	2,417 (48%)
43. OR-0041.R1.2	D&D: Y-12 remediation preparation	43,000	14,326 (33%)
44. OR-0041.R1.3	D&D: Disposal facility expansion	45,000	16,026 (36%)
45. OR-0041.NEW.R1.1	D&D: Y-12 excess material	147,000	41,025 (28%)
46. OR-0041.NEW.R1.2	D&D: Y-12 biology complex	29,853	7,224 (24%)
47. OR-0041.NEW.R1.3	D&D: Y-12 9206 filter house	7,000	3,503 (50%)

**Appendix III: Recovery Act Project Cost Data  
through March 2010**

Dollars in thousands			
<b>Project number</b>	<b>Project description</b>	<b>Total estimated project cost<sup>a</sup></b>	<b>Cumulative spent (percentage of total cost)</b>
48. OR-0042.R1.1	D&D: Defense legacy material removal	10,450	170 (2%)
49. OR-0042.R1.2	D&D: Defense facility demolition	38,922	12,366 (32%)
50. OR-0042.R1.3	D&D: Defense remedial actions	83,100	7,868 (9%)
51. OR-0042.NEW.R2.1	D&D: Nondefense legacy material removal	35,769	649 (2%)
52. OR-0042.NEW.R2.2	D&D: 2000 complex	12,968	4,968 (38%)
53. OR-0042.NEW.R2.3	D&D: Misc. facility demolition	22,000	3,493 (16%)
<b>Total</b>		<b>722,562</b>	<b>164,498 (23%)</b>
<b>Paducah Site (KY)</b>			
54. PA-0040.R1.1	D&D: C-410	11,040	3,001 (27%)
55. PA-0040.R1.2	D&D: C-340	36,301	8,319 (23%)
56. PA-0040.R1.3	D&D: C-746-A	31,500	9,212 (29%)
<b>Total</b>		<b>78,841</b>	<b>20,532 (26%)</b>
<b>Portsmouth Site (OH)</b>			
57. PO-0013.R1	Solid waste disposal: UMC disposition	15,700	4,767 (30%)
58. PO-0040.R1.1	D&D: X-701B plume remediation	48,600	15,191 (31%)
59. PO-0040.R1.2	D&D: X-533	20,600	5,456 (26%)
60. PO-0040.R1.3	D&D: X-633	17,400	6,381 (37%)
61. PO-0040.R1.4	D&D: X-760	15,900	2,282 (14%)
<b>Total</b>		<b>118,200</b>	<b>34,077 (29%)</b>
<b>Savannah River Site (SC)</b>			
62. SR-0011C.R1.1	TRU waste processing: Canyon complex support	33,974	25,692 (76%)
63. SR-0013.R1.1	Solid waste disposal	324,469	167,678 (52%)
64. SR-0013.R1.2	TRU waste processing	303,596	82,830 (27%)
65. SR-0014C.R1.1	Tank waste support: Waste systems recapitalization	174,000	24,958 (14%)
66. SR-0014C.R1.PEN	Tank waste support: Contractor pension payment	26,000	4,919 (19%)
67. SR-0030.R1.1	D&D: P and R Area completion	165,490	85,393 (52%)
68. SR-0030.R1.2	D&D: P reactor	142,200	1,052 (1%)
69. SR-0030.R1.3	D&D: P ash basin	30,000	5,188 (17%)
70. SR-0030.R1.4	D&D: R reactor	149,200	3,727 (2%)
71. SR-0030.R1.5	D&D: R ash basin	11,800	3,668 (31%)
72. SR-0030.R2.1	D&D: M and D Area completion	17,070	8,255 (48%)
73. SR-0030.R3.1	D&D: Sitewide completion	220,704	94,260 (43%)
74. SR-0030.R3.2	D&D: Test reactor decommissioning	10,720	708 (7%)
75. SR-0040.R1.1	D&D: Surveillance and maintenance	5,846	2,567 (44%)
<b>Total</b>		<b>1,615,069</b>	<b>510,895 (32%)</b>

**Appendix III: Recovery Act Project Cost Data  
through March 2010**

Dollars in thousands			
Project number	Project description	Total estimated project cost <sup>a</sup>	Cumulative spent (percentage of total cost)
<b>Separations Process Research Unit (NY)</b>			
76. VL-SPRU-0040.R1.1	D&D: Building G2 and H2	37,000	13,274 (36%)
77. VL-SPRU-0040.R1.2	D&D: Contaminated soil removal, North Field	14,775	4,829 (33%)
<b>Total</b>		<b>51,775</b>	<b>18,103 (35%)</b>
<b>SLAC National Accelerator Laboratory (CA)</b>			
78. CBC-SLAC-0030.R1	Soil and groundwater cleanup	7,925	5,225 (66%)
<b>Total</b>		<b>7,925</b>	<b>5,225 (66%)</b>
<b>Waste Isolation Pilot Plant (NM)</b>			
79. CB-0080.R1	Operate waste disposal facility	53,287	17,953 (34%)
80. CB-0081.R1	Waste characterization	102,868	31,660 (31%)
81. CB-0090.R1	TRU waste processing	16,200	2,248 (14%)
<b>Total</b>		<b>172,355</b>	<b>51,861 (30%)</b>
<b>West Valley Demonstration Project (NY)</b>			
82. OH-WV-0013.R1	TRU waste processing	4,200	2,234 (53%)
83. OH-WV-0040.R1.1	D&D: Main plant	42,400	11,802 (28%)
84. OH-WV-0040.R1.2	D&D: Other facilities	27,300	7,961 (29%)
<b>Total</b>		<b>73,900</b>	<b>21,997 (30%)</b>
<b>Complexwide total</b>		<b>\$5,785,819</b>	<b>\$1,577,410 (27%)</b>

Source: GAO analysis of DOE data.

<sup>a</sup>Total estimated and cumulative project cost does not generally include contractor fee, management reserve, or contingency funds. As a result, these totals may not equal the amounts of Recovery Act funds allocated and costed overall to each site.

<sup>b</sup>D&D = deactivation, decommissioning, decontamination, demolition, or a combination of these activities.

<sup>c</sup>TRU = transuranic.

# Appendix IV: Recovery Act Project Performance through March 2010

Project number	Project description	Cost target	Schedule target	Performance measures <sup>a</sup>
<b>Argonne National Laboratory (IL)</b>				
1. CH-ANLE-0040.NEW.R1.1	D&D: Building 310	●	●	○○○
2. CH-ANLE-0040.NEW.R1.2	D&D: Building 330	●	●	●○○
3. CH-ANLE-0040.NEW.R1.3	D&D: Alpha-Gamma Hot Cell Facility	●	●	○
4. CH-ANLE-0040.NEW.R1.4	TRU waste processing	●	●	●●●○
<b>Brookhaven National Laboratory (NY)</b>				
5. BRNL-0040.R1	D&D: Brookhaven Graphite Research Reactor	●	●	●○○○
6. BRNL-0041.R1	D&D: High Flux Beam Reactor	●	●	●●●○
7. BRNL-0041.NEW.R1	D&D: High Flux Beam Reactor	●	●	●●●
<b>Energy Technology Engineering Center (CA)</b>				
8. CBC-ETEC-0040.R1.1	D&D: EPA radiological characterization	●	●	
9. CBC-ETEC-0040.R1.2	Soil and groundwater cleanup	●	●	○
<b>Hanford Site: Office of River Protection (WA)</b>				
10. ORP-0014.R1.1	Tank waste support: Tank farm infrastructure upgrades	●	●	●●●●●●
11. ORP-0014.R1.2	Tank waste support: Other infrastructure upgrades	●	●	○
12. ORP-0014.R1.3	Tank waste support: Facility upgrades	●	●	●●●●●●
13. ORP-0014.R1.4	Tank waste support: Waste feed infrastructure upgrades	●	●	●○
14. ORP-0014.R1.5	Tank waste support: SY transfer line upgrade	○	○	
<b>Hanford Site: Richland Operations Office (WA)</b>				
15. RL-0011.R1	D&D: Plutonium Finishing Plant	●	●	●○
16. RL-0013C.R1.1	Solid waste disposal: Mixed low-level waste treatment	●	●	●●
17. RL-0013C.R1.2	TRU waste processing	●	○	●●●
18. RL-0030.R1	Soil and groundwater cleanup: Treatment and monitoring	●	●	●●
19. RL-0040.R1.1	D&D: U Plant/other	●	●	●●○○○○
20. RL-0040.R1.2	D&D: Outer Zone	●	○	●●●●●○○
21. RL-0041.R1.1	D&D: 100 K Area	●	●	●○○○
22. RL-0041.R1.2	D&D: Disposal facility expansion	●	●	●
23. RL-0041.R1.3	D&D: Remedial action/footprint reduction	●	●	○○○
24. RL-0041.R2	D&D: 618-10 burial grounds	○	●	○

**Appendix IV: Recovery Act Project  
Performance through March 2010**

Project number	Project description	Cost target	Schedule target	Performance measures <sup>a</sup>
<b>Idaho National Laboratory (ID)</b>				
25. ID-0013.R1	TRU waste processing	●	●	●●●
26. ID-0013.NEW.R1	TRU waste processing	●	●	●
27. ID-0030B.R1.1	Soil and groundwater cleanup: Buried waste	●	○	
28. ID-0030B.R1.2	Soil and groundwater cleanup: In-situ grouting	●	○	
29. ID-0030B.R1.3	Soil and groundwater cleanup: Operations	●	●	●
30. ID-0040B.R1.1	D&D: 39 facilities	●	●	●●●●
31. ID-0040B.R1.2	D&D: 29 facilities	●	●	●●●●
32. ID-0040B.NEW.R1.3	D&D: Nuclear Energy facilities	○	○	●●●○
<b>Los Alamos National Laboratory (NM)</b>				
33. VL-LANL-0030.R1.1	Soil and groundwater cleanup: Material Disposal Area B	●	●	○●○
34. VL-LANL-0030.R1.2	Soil and groundwater cleanup: Groundwater wells	●	●	●
35. VL-LANL-0040-D.R1	D&D: Defense-related facilities	○	●	●●●
36. VL-LANL-0040-N.R1	D&D: Nondefense-related facilities	●	○	●●○
<b>Moab UMTRA Site (UT)</b>				
37. CBC-MOAB-0031.R1	Soil and groundwater cleanup: Mill tailings	●	●	●●
<b>Mound Site (OH)</b>				
38. OH-MB-0031.NEW.R1	Soil and groundwater cleanup: Operable Unit 1	●	●	●○
<b>Nevada Test Site (NV)</b>				
39. VL-NV-0030.R1	Soil and groundwater cleanup	●	●	●○●○●○
<b>Oak Ridge Reservation (TN)</b>				
40. OR-0013B.R1.1	TRU waste processing	●	●	●●●○
41. OR-0040.R1	D&D: East Tennessee Technology Park	●	●	
42. OR-0041.R1.1	D&D: Y-12 facility	●	●	●○●○
43. OR-0041.R1.2	D&D: Y-12 remediation preparation	●	●	●●○●
44. OR-0041.R1.3	D&D: Disposal facility expansion	●	●	
45. OR-0041.NEW.R1.1	D&D: Y-12 excess material	●	●	●○●○
46. OR-0041.NEW.R1.2	D&D: Y-12 biology complex	●	●	○●○●
47. OR-0041.NEW.R1.3	D&D: Y-12 9206 filter house	○	●	●●
48. OR-0042.R1.1	D&D: Defense legacy material removal	●	●	
49. OR-0042.R1.2	D&D: Defense facility demolition	○	●	●○○

**Appendix IV: Recovery Act Project  
Performance through March 2010**

<b>Project number</b>	<b>Project description</b>	<b>Cost target</b>	<b>Schedule target</b>	<b>Performance measures<sup>a</sup></b>
50. OR-0042.R1.3	D&D: Defense remedial actions	○	●	○ ○ ○ ○ ○ ○
51. OR-0042.NEW.R2.1	D&D: Nondefense legacy material removal	●	●	
52. OR-0042.NEW.R2.2	D&D: 2000 complex	●	●	● ○ ○ ○
53. OR-0042.NEW.R2.3	D&D: Misc. facility demolition	○	●	
<b>Paducah Site (KY)</b>				
54. PA-0040.R1.1	D&D: C-410	●	●	○ ○ ○ ○
55. PA-0040.R1.2	D&D: C-340	●	●	○ ○ ○ ○ ○
56. PA-0040.R1.3	D&D: C-746-A	●	●	○ ○ ○ ○
<b>Portsmouth Site (OH)</b>				
57. PO-0013.R1	Solid waste disposal: UMC disposition	●	●	●
58. PO-0040.R1.1	D&D: X-701B plume remediation	●	●	● ○
59. PO-0040.R1.2	D&D: X-533	●	●	● ○ ○
60. PO-0040.R1.3	D&D: X-633	○	●	● ○ ○ ○
61. PO-0040.R1.4	D&D: X-760	●	●	● ○ ○
<b>Savannah River Site (SC)</b>				
62. SR-0011C.R1.1	TRU waste processing: Canyon complex support	●	●	
63. SR-0013.R1.1	Solid waste disposal	●	●	● ● ○ ○ ○ ○
64. SR-0013.R1.2	TRU waste processing	○	○	● ● ● ●
65. SR-0014C.R1.1	Tank waste support: Waste systems recapitalization	●	●	
66. SR-0014C.R1.PEN	Tank waste support: Contractor pension payment	●	●	
67. SR-0030.R1.1	D&D: P and R Area completion	○	○	
68. SR-0030.R1.2	D&D: P reactor	●	○	○ ○ ○ ○ ○ ○
69. SR-0030.R1.3	D&D: P ash basin	○	○	
70. SR-0030.R1.4	D&D: R reactor	●	○	● ○ ○ ○ ○
71. SR-0030.R1.5	D&D: R ash basin	○	●	
72. SR-0030.R2.1	D&D: M and D Area completion	○	●	○
73. SR-0030.R3.1	D&D: Sitewide completion	○	○	● ● ● ● ● ○ ○ ○
74. SR-0030.R3.2	D&D: Test reactor decommissioning	●	●	○ ○ ○
75. SR-0040.R1.1	D&D: Surveillance and maintenance	●	●	
<b>Separations Process Research Unit (NY)</b>				
76. VL-SPRU-0040.R1.1	D&D: Building G2 and H2	●	●	● ○ ○
77. VL-SPRU-0040.R1.2	D&D: Contaminated soil removal, North Field	●	●	● ○

**Appendix IV: Recovery Act Project  
Performance through March 2010**

Project number	Project description	Cost target	Schedule target	Performance measures <sup>a</sup>
<b>SLAC National Accelerator Laboratory (CA)</b>				
78. CBC-SLAC-0030.R1	Soil and groundwater cleanup	○	○	
<b>Waste Isolation Pilot Plant (NM)</b>				
79. CB-0080.R1	Operate waste disposal facility	●	○	
80. CB-0081.R1	Waste characterization	●	●	●○
81. CB-0090.R1	TRU waste processing	●	●	●○○
<b>West Valley Demonstration Project (NY)</b>				
82. OH-WV-0013.R1	TRU waste processing	○	○	●
83. OH-WV-0040.R1.1	D&D: Main plant	●	○	○○○
84. OH-WV-0040.R1.2	D&D: Other facilities	○	○	○○○○

Source: GAO analysis of DOE data.

Legend: ● = Positive, ○ = Negative, ○= Performance measure with no planned work

Notes:

Positive cost performance means that the value of work performed is greater than what the work actually cost to accomplish. For example, if the earned value of work completed by a contractor is \$5 million, and the work actually cost \$5 million or less to complete, then cost performance is considered positive. Schedule performance is also measured in dollars, but in this case, positive performance means that the value of the work completed in a given period is greater than what had been planned. For example, if the contractor is given 1 month to complete \$5 million of work and completes that earned value of work by that deadline or earlier, then schedule performance is considered positive. DOE considers cost and schedule targets to be positive until they drop below 90 percent of the target. That is, work could come slightly under expectations—but not less than 90 percent of the target—and still be considered positive.

Negative cost performance means that the value of work performed is less than what the work actually cost to accomplish. For example, if the earned value of work completed by a contractor is \$5 million, but the work actually cost \$6.7 million, cost performance would be considered negative. Schedule performance is also measured in dollars, but in this case, negative performance means that the value of the work completed in a given period is less than what had been planned. For example, if the contractor is given 1 month to complete \$10 million of work but completes only \$5 million in earned value of work by that deadline, then schedule performance is considered negative.

Performance measures are currently in place for the associated projects, but the planned work associated with these measures has not yet begun. As a result, these measures do not yet provide a meaningful way to monitor progress made on the projects. DOE considers performance targets to be positive until they drop below 90 percent of the target. That is, work could come slightly under expectations—but not less than 90 percent of the target—and still be considered positive.

<sup>a</sup>Number of circles shows number of performance measures per project.

# Appendix V: Comments from the Department of Energy



## Department of Energy

Washington, DC 20585

July 16, 2010

Mr. Gene Aloise, Director  
Natural Resources and Environment  
U.S. Government Accountability Office  
Washington, DC 20548

Dear Mr. Aloise:

Thank you for your effort in reviewing and reporting on Recovery Act work by the Department of Energy's (DOE) Office of Environmental Management (EM) and the opportunity to review your draft report: *Recovery Act, Most DOE Cleanup Projects Appear to be Meeting Cost and Schedule Targets, but Assessing Impact of Spending Remains a Challenge* (GAO 10-784). DOE appreciates the opportunity to provide feedback on the statements, conclusions, and recommendations in the report.

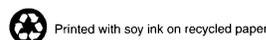
DOE responses to the report recommendations and divergent statements are summarized below:

**Project Management** - DOE concurs with GAO recommendations regarding evaluating the effectiveness of additional project management and oversight steps adopted for Recovery Act projects and determining if these steps would be effective for the EM Base Program funded under annual appropriations. EM has already evaluated and taken several steps to more broadly implement Recovery Act initiatives beginning as early as June 2009. These include increased review and engagement by management; and restructuring the EM portfolio of programs, projects and activities into more appropriate and manageable sizes. Other steps are still being developed and evaluated. As Recovery Act work continues, more data will be available upon which to base quantitative analysis of Recovery Act practices.

**Jobs Creation** - EM agrees with GAO's recommendation to ensure methodology for calculating job creation is clear and will articulate this to the public. EM communicates three figures when presenting the number of workers impacted with Recovery Act funding. These three are prime contractor full time equivalents (FTEs), prime contractor and subcontractor FTEs, and total headcount.

Both prime contractor and subcontractor FTEs are calculated strictly in accordance with Office of Management and Budget guidance, and therefore there is no ambiguity in the methodologies employed between prime and subcontractor FTE data. Changes to Federal Acquisition Regulation (FAR) clause 52.204-11 will result in both prime and subcontractor jobs being reported in FederalReporting.gov, thus negating GAO's concern on the matter.

It is also important to note that a number of EM Recovery Act workers may not be employed full-time nor for the full duration of the EM Recovery Act program. Headcount is the method employed by EM to account for these workers. Headcount is the cumulative number of workers, full-time, part-time, and temporary workers that benefitted from Recovery Act with direct labor



charges to Recovery Act funds. EM's collection and reporting of this figure augments and facilitates transparency and accountability of Recovery Act job creation.

**Footprint Reduction** – DOE agrees with GAO's recommendation to have in place clear, quantifiable and consistent measures for footprint reduction, which, as a brand new measure, has taken some time to fully define. Footprint reduction is a measure intended to objectively track incremental progress (number of square miles cleaned up) toward completing DOE's large site remediation effort that will not be totally finished for many years. Footprint reduction has now been defined, communicated with all the sites, and is being reported to show progress on a regular basis.

Successful site cleanup, area closure, and footprint reduction as a result of soil and groundwater remediation and facility decontamination and decommissioning meets DOE's long term goals by maximizing the reduction of environmental, safety, and health risks. EM measures its success in reducing these risks by tracking quantifiable outputs of its cleanup process. Among others, these include installing groundwater wells for remediation systems, decontaminating, decommissioning, and demolishing contaminated facilities, disposing of contaminated debris piles, and remediating soil units.

**Life-Cycle Cost** - EM agrees with the GAO's recommendation and will continue to use the DOE and OMB guidance to calculate cost savings and to develop and portray life-cycle cost estimates. EM develops life-cycle cost, scope, and schedule estimates for projects in accordance with DOE Order 413.3A. The Order specifies that cost estimates include escalation and therefore are in current year dollars. Current (escalated) dollars are used in DOE's budget requests and within reports provided to Congress and our stakeholders. Therefore in order to remain consistent with our Orders and our entire budget reporting, any cost savings or reductions to our life-cycle cost estimates that are achieved because of Recovery Act Funding are also reported in current dollars.

**Spending Versus Spend Plans** - The initial project spend plans for the EM Recovery Act were developed prior to contracts being finalized. After pricing and technical proposals were negotiated and approved between the Department of Energy and the Prime Contractors affiliated with each of the EM sites, Recovery Act projects baselines were adjusted to reflect the approved contracts. The current project spend plans reflect an overall "spend rate" of approximately \$200M per month, which the program is achieving. EM's internal goal established at the beginning of the Recovery Act was to have a majority of Recovery Act funds spent by the end of Fiscal Year 2011. With the exceptions of 9 projects, due to scope changes, EM is on-track to spend over 95 percent of project funds per the original goal.

**Performance Measures** - DOE has concern over the method GAO appears to be using to determine project cost and schedule status. It appears that GAO is classifying performance as negative unless measure actual are "exactly" equal to or greater than the planned target. This is inconsistent with DOE and consensus project management best practices.

**Project Metrics** – DOE has concerns with GAO statements such as "inconsistencies exist between some projects' cost and schedule performance and progress shown by other performance measures..." and "...we found that the results as assessed by performance measures

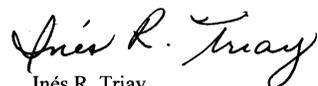
were sometimes inconsistent with the results shown by earned value data..." DOE uses Earned Value Measurement Systems (EVMS) and performance metrics as important components of a tool kit which includes numerous performance indicators (milestones, project risk status, use of management reserve and contingency, etc.) in assessing project health and performance. Project performance information provides different, but complementary insight into essential aspects of overall project performance. EM project managers and senior program managers take in all available information to arrive at a complete picture of project health.

DOE's review has identified several statements and text corrections that should be addressed prior to release of the GAO report.

Attachment 1 provides DOE's detailed response to GAO's recommendations and statements, and Attachment 2 provides a summary of DOE review comments discovered in the draft reports. EM remains committed to the objectives of the Recovery Act program – to create jobs and accelerate cleanup of legacy waste sites from the nuclear weapons production program.

If you have any further questions, please contact Cynthia Anderson, Director, EM Recovery Act Program, at 202-586-2083.

Sincerely,



Inés R. Triay  
Assistant Secretary  
for Environmental Management

Attachments

ATTACHMENT 1

**Department of Energy**  
**Comments on the Draft Government Accountability Office (GAO) Report GAO-10-784**

**DOE Responses to GAO-10-784 Recommendations for Executive Action**

**GAO Recommendation 1:** *Determine whether additional project management and oversight steps adopted for the Recovery Act projects, such as more frequent reporting, have proven beneficial and whether these steps would be effective and appropriate for DOE's cleanup projects funded under annual appropriations.*

**DOE Response 1:** The Office of Environmental Management (EM) fundamentally agrees with the recommended action. The increased review and engagement by EM senior management for Recovery Act work provided an opportunity for early qualitative evaluation of the success of Recovery Act initiatives, and EM has already taken several steps to more broadly implement Recovery Act initiatives beginning as early as June 2009. As Recovery Act work continues, more data will be available upon which to base quantitative analysis of Recovery Act practices.

The budget and management structure of the EM portfolio of programs, projects, and activities (PPA) is fundamental to the management and oversight of the EM mission work. The EM Recovery Act Program, Portfolio Management Framework (July 10, 2009), was developed to provide a structure to enable greater review, oversight, and control of Recovery Act projects. While this Framework was still draft, EM signaled the intent to utilize this Framework for the entire EM portfolio (also referred to as the Base program) via the distribution of a memo from Dr. Ines Triay, dated June 5, 2009. Additional memos and guidance to the field from Dr. Triay and senior managers in June 2009, November 2009, and April 2010 have continued the evolution of the EM portfolio toward a clear definition of capital projects and operations activities, and a decomposition of large projects into more appropriate and manageable sizes.

The evolution of the EM portfolio described above is being complemented by a reworking of the reporting and review mechanisms. Quarterly Project Reviews (QPRs) were the standard for review of the EM projects. The Recovery Act began with monthly project reviews which provided for more direct and immediate EM oversight and corrective action. Monthly reviews which included the Base program capital projects which utilized back-to-back reporting, Recovery Act and Base program, began in March 2010. In May 2010 these reviews advanced to a combined Recovery Act/Base program monthly review. Efforts continue to refine the data analysis and formatting to provide for a full monthly review of the entire EM portfolio, including capital projects and operations activities for both, Recovery Act and Base program, to begin in October 2010.

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The tighter control of funds for Recovery Act work was necessitated by the nature of the Recovery Act funding and additional Office of Management and Budget restrictions. The new EM management portfolio of projects and operations activities inherently will provide more discreet funding control because of the smaller size of individual budget elements. Whether the controls for release of spending authority to the field used for Recovery Act will provide additional benefit to the Base program is still under evaluation.

Additional Federal oversight staff, particularly in the form of Recovery Act Site Representatives (RASRs) physically located at the largest Recovery Act sites, has been a very successful practice for the Recovery Act. The RASR role in the monthly evaluation and review process, as well as providing immediate feedback on site challenges and opportunities, has allowed EM senior management to shorten the analysis and decision cycle on field issues, thus being more responsive. The EM Office of Program and Site Support has similar oversight staff assigned to liaison with field locations for the Base program, but these staff are located in EM headquarters and thus do not have the same direct access and oversight as the RASRs for the Recovery Act work. An opportunity is being evaluated to merge these oversight efforts to capture the best features of both.

Finally, EM notes that the GAO report and recommendation only mentions a few of the management and oversight steps which EM has employed under Recovery Act. EM has developed Lessons Learned guidance which has been issued to the field sites. EM has developed a path forward and template which has been issued to the sites to capture Lessons Learned on Recovery Act Projects. EM is also in the process of developing Lessons Learned guidance which will first be implemented on Recovery Act Projects and then evaluated and modified if necessary, for use within the Base Program. Lessons learned on the Recovery Act Program initiation and contract management are also being captured for incorporation where applicable into the EM Base program and other DOE programs as deemed applicable. Lessons learned will be tracked in a searchable and reportable database that has been used and been proven to be an effective tool in tracking lessons learned for health and safety issues. EM has conducted two lessons learned information exchanges, in November 2009 and April 2010, to further advance the knowledge exchange.

EM views the Recovery Act Program as a rare opportunity to accelerate completion of EM work, to reduce risk and reduce the footprint of EM, but also as an incubator for focused and responsive management and oversight practices. EM has already put some lessons from the Recovery Act in place for the Base program, and, as the Recovery Act work continues to completion, EM is fully committed to making full use of the future lessons.

**GAO Recommendation 2:** *When reporting the impact of Recovery Act funding on job creation, clearly indicate the methodology used to calculate each of the figures reported: prime contractor FTEs, subcontractor and prime contractor FTEs combined, or headcount.*

**DOE Response 2:** EM agrees with the recommendation to ensure the methodology for calculating job creation is clear. EM communicates three figures when presenting the number of workers impacted with Recovery Act funding. These three include prime contractor full time equivalents (FTEs), prime contractor and subcontractor FTEs, and headcount.

Prime contractor FTEs are reported into FederalReporting.gov on a quarterly basis and are calculated in accordance with the Office of Management and Budget (OMB) M-10-08, “*Updated Guidance on the American Recovery and Reinvestment Act – Data Quality, Non-Reporting Recipients, and Reporting of Job Estimates,*” issued December 18, 2009. Basically, this calculation takes into account the total number of hours worked that are funded by the Recovery Act divided by the number of hours in a full-time schedule.

Subcontractor FTEs are calculated in accordance with the same OMB guidance and are reported together with prime contractor FTEs by EM in newsletters, new flashes, press releases, monthly reviews, and public presentations to stakeholders. To date, subcontractor FTEs have not been required to be reported into FederalReporting.gov and as noted in the GAO report account for as much as 50% of EM Recovery Act total job creation. However, subcontractor FTE figures will begin being reported in the third quarter 2010 in accordance with recent changes to the FAR clause 52.204-11 to implement section 1512 reporting requirements of the Recovery Act.

The intent of EM’s initiative to collect and report both prime and subcontractor FTEs has always been to reflect a more accurate figure for the total number of FTEs saved or created under EM Recovery Act funds. This represents a more credible total number of EM Recovery Act full-time jobs.

In regards to the EM headcount figure, a significant number of EM Recovery Act workers will work on projects or subprojects that will not last the entire duration of the EM Recovery Act program. However, these workers’s have benefitted from EM Recovery Act funding. Therefore a headcount figure of number of the workers, full-time, part-time and temporary workers compensated with Recovery Act funding has been collected and reported by EM communication venues noted above. The methodology EM utilizes to determine headcount is a cumulative number of workers who have benefitted from Recovery Act funds.

The change to the FAR clause will result in both prime and subcontractor (combined) jobs being reported in FederalReporting.gov thus negating GAO’s concern on the matter. As for the EM headcount, collection and reporting of this figure continues to facilitate transparency and accountability of EM Recovery Act funded impact on job creation.

To more clearly articulate the methodologies for calculating EM job creation, the EM guidance for calculating jobs has been posted on the EM Recovery Act website. In addition, a one-page explanation sheet will be included whenever job numbers are presented to stakeholders and/or the public.

**GAO Recommendation 3:** *Develop clear, quantifiable, and consistent measures for determining the impact of Recovery Act funding on environmental risk. As part of this effort, clearly define what the DOE footprint consists of, determine how changes to the footprint will be measured, and ensure that all DOE sites report changes to their footprint in a consistent and comparable manner.*

**DOE Response 3:** Prior to initiation of any Recovery Act field activities, EM required all sites to develop a project-specific risk register for each project. Identification and quantification of risks were developed consistent with applicable DOE risk management guides and with guidance provided by both OMB and the office of the DOE Chief Financial Officer (CFO). This guidance required that all projects receiving Recovery Act funding to identify risks for each of the following category and/or sub-categories:

Category	Sub-Category
People	<ul style="list-style-type: none"> <li>➤ Human capital</li> <li>➤ Organizational structure</li> </ul>
Processes	<ul style="list-style-type: none"> <li>➤ Procedures</li> <li>➤ Funds control</li> <li>➤ Reporting</li> </ul>
Governance	<ul style="list-style-type: none"> <li>➤ Project structure</li> <li>➤ Administration and management</li> <li>➤ Monitoring</li> <li>➤ Special concerns</li> <li>➤ Performance metrics</li> </ul>
Technology	<ul style="list-style-type: none"> <li>➤ Systems</li> </ul>
Project Specific	<ul style="list-style-type: none"> <li>➤ Regulatory</li> <li>➤ Conflict of interest</li> <li>➤ Safety &amp; health</li> <li>➤ Other special concerns</li> </ul>

EM also implemented a system to store/sort all project related risks from all sites in a headquarters controlled risk repository. As a follow-up to the original site-provided risk registers, EM also initiated a detailed review and update at each site during late June and through the month of July 2010. During this review, sites had the opportunity to update previously reported risks and the inclusion of new risks from recently added projects. Each site received training and software licenses to allow input to be provided to the repository directly by the site for those projects located at the specific site. This repository provides EM Headquarters the ability to review the disposition of risks by site; types of risks; and potential magnitude/impact of risks by site or category of risks, including appropriate mitigation strategies. EM uses this ongoing valuation of risks to monitor the use of project-specific management reserve and DOE contingency.

Following completion of the July site training and update, EM will post the top-25 risks on the portal.

EM agrees with this GAO recommendation and has implemented a system that clearly defines EM's cleanup mission/scope through a number of processes, including agreements with regulatory agencies. This scope is defined through EM's life-cycle performance metrics (Base scope plus ARRA scope), which quantify the measurable and necessary steps in the cleanup process and have been in place for nearly 15 years. These performance measures are focused on outputs. The specific outputs chosen are directly tied to cleanup of the site, which results in environmental risk reduction. Therefore, as we measure achievement of cleanup steps, we are thereby measuring progress toward cleanup and reducing overall environmental risks.

Historically, EM has tracked area closures in terms of the number of geographic sites completed. EM's responsibility has included 107 geographic sites, and through 2010 has closed 89 of these sites. Since EM's ARRA work scope is largely centered on the largest sites, the Hanford and Savannah River Sites, where the cleanup mission will not be completed for many years, EM adopted a footprint reduction tracking system in order to measure incremental progress in completing these large sites.

EM has established footprint reduction as a High Priority Performance Goal (HPPG) for the department to demonstrate progress. Specifically, EM has committed to a 40% footprint reduction in the square mileage under EM control by September 30, 2011 (i.e., reducing footprint from 900 square miles to 540 square miles). Performance against the HPPG is reported to OMB and is updated on a quarterly basis. Specific measures tracked by EM for the performance of this goal includes number of soils units remediated and debris piles removed, and number of industrial/radioactive facilities decontaminated and decommissioned. OMB will make the HPPG performance available through its release of Performance.gov by the fall of 2010.

Footprint reduction is a high-level benefit to the nation and the respective communities. Achieving EM footprint reduction as a result of soil and groundwater remediation and facility decontamination and decommissioning maximizes the reduction of environmental, safety, and health risks in a safe, secure, compliant, and cost-effective manner. Removal of contamination also reduces monitoring and maintenance life-cycle costs and liabilities.

**GAO Recommendation 4:** *Ensure that savings estimates over the life of the cleanup projects are calculated according to OMB and DOE guidance, so that those estimates accurately represent potential savings and reflect cost adjusted for both inflation and the time value of money.*

**DOE Response 4:**

EM agrees with the GAO's life-cycle cost calculation recommendation and will continue to utilize the Department's and OMB's guidance to calculate cost savings, and develop and portray life-cycle cost estimates where applicable.

EM develops the life-cycle cost, scope and schedule required to complete specific cleanup projects captured in a Project Baseline Summary (PBS) in accordance with DOE Order 413.3A, Program and Project Management for the Acquisition of Capital Assets. The Order and supporting Guides specify that project cost estimates include escalation and, therefore, are in current year dollars. These cost estimates are utilized to portray the life-cycle cost associated with the cleanup of the Cold War legacy.

EM recognizes the importance of taking into account the time value of money when comparing specific projects or activities. EM will continue to use OMB Circular A-94, Guidelines and Discount Rates for Benefit-Cost Analysis of Federal Programs, when conducting alternative analysis to determine the cost/benefit and return on investment associated with project activities. In fact, EM utilized this methodology to determine candidates for receipt of ARRA funding.

In addition, EM will continue to portray its life-cycle cost based on the life-cycle cost estimates developed in accordance with DOE Order 413.3A. EM reports its life cycle cost in current (escalated) dollars in its annual Congressional Budget Request and other congressionally mandated reports to Congress such as the January 2009 *Status of Environmental Management Initiatives to Accelerate the Reduction of Environmental Risks and Challenges Posed by the Legacy of the Cold War* and the June 2010 updated appendices to this report which included a listing of life-cycle cost by Site and PBS.

To be consistent with the life-cycle cost projections Congress and our stakeholders are seeing in our budget requests and Congressional Reports, any reduction in the life cycle cost is also reported in current dollars. Our life cycle cost reported in the June 2010 update to *Status of Environmental Management Initiatives to Accelerate the Reduction of Environmental Risks and Challenges Posed by the Legacy of the Cold War* factored in the \$4B in cost savings attributed to the acceleration of cleanup work as a result of ARRA funding.

In addition to the \$4B in life-cycle cost savings, EM has also estimated cost avoidances of more than \$3 billion that have resulted from the receipt of Recovery Act funding. These cost avoidances should also be accounted for in the final report. For example ARRA funding at Idaho, Oak Ridge, Savannah River Site, and Hanford has enabled these transuranic waste generator sites to accelerate shipments to the Waste Isolation Pilot Plant (WIPP) by many years, avoiding a schedule extension and continued operating costs. The reduced operating time resulting in an estimated cost avoidance of \$2.5 billion at WIPP, compared to what the cost would have been had ARRA funding not been received.

**GAO Statements:**

*DOE Response to GAO 2012 Spending Statements* - The initial EM Recovery Act spend plans were developed prior to contract definitization. As project price and technical proposals were negotiated and approved, EM re-baselined spending plans. As project price and technical proposals were negotiated and approved, EM revised these spending plans. The current plans

reflect an overall “burn rate” of approximately \$200M per month, which the program is achieving. With the following exceptions (due to scope changes), EM expects Recovery Act projects will be complete (and funds expended) by the end of FY 2011.

- INL D&D of EBR II (June 2012)
- Title X Uranium/Thorium Reimbursements (April 2013)
- OR Y-12 D&D (December 2011)
- ORNL Defense D&D (December 2011)
- ORNL Non-Defense D&D (Defense 2011)
- OR Uranium Enrichment Facility D&D (December 2011)
- SRS Solid Waste and Accelerated TRU Disposition (December 2012)
- SRS P and R Area Completions (September 2012)
- EPA’s Radioactive Site Characterization of Area IV of the Santa Susana Field Lab (December 2011)

Fluctuations in the total amount of allotted funds that are obligated are due to downward adjustments to make obligation authority available for OMB re-apportionment. These re-apportionments primarily occur within site allocations to realign funding between projects when cost efficiencies are realized or scope additions/deletions are required. The de-obligation process must be followed before reappportionment action can be approved at OMB. When all de-obligation and re-obligation actions are completed, there will be a net effect of zero to EM’s allocation of \$6 billion.

*DOE Response to GAO Project Metrics Statements* – DOE has concerns with GAO statements such as “...inconsistencies exist between some projects’ cost and schedule performance and progress shown by other performance measures...” (bottom of pg 12) and “...we found that the results as assessed by performance measures were sometimes inconsistent with the results shown by earned value data...” (top of pg 19) Project performance information, including such data elements as EVMS, performance metrics, milestones, project risk status, use of management reserve and contingency, etc., each provide different, but complementary, insight into different aspects of overall project performance. EM project managers and senior program managers take in all available information to arrive at a complete picture of project health, before rendering an assessment. Performance measures were selected to provide visibility into a distinct but important aspect of the project, in some cases, a relatively minor percentage of the project cost value; Earned Value (EV), on the other hand, typically encompasses the entire scope basis. While the last sentence in the paragraph on page 19 is the most important and reflects a more accurate response, the term “inconsistencies” is still inappropriate and should be replaced with “differences in indicators”.

At the bottom of page 16, the GAO report states that as of March of 2010, “DOE reported that across the complex, progress on five of seven selected performance measures was meeting or exceeding targets...” DOE believes strongly this should read “five out of six” performance measures are meeting or exceeding their targets. As previously explained to GAO, “Demolition debris and soil permanently disposed” was specifically not established as a performance

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**Appendix V: Comments from the Department  
of Energy**

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measure, but rather as a measurable unit useful in planning and estimating, as well as in conveying overall progress against cleanup (e.g., when rolled up to the site or complex-wide level). Using waste minimization best practices and avoiding generation and disposal of wastes is in the best interest of the government and overall project performance is actually improved when these estimates are NOT realized; for actual values to be lower than original estimates is a good outcome. So to include this metric in the same category as the other true performance measures is misleading and understates the actual performance. While the footnote in Figure 5 recognizes this, the accompanying text should be accurate as well.

As a demonstration of the overall health of the EM project portfolio, many sites are beginning to realize efficiencies and have brought forth additional scope that may be completed within the FY2011 timeframe.

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# Appendix VI: GAO Contact and Staff Acknowledgments

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## GAO Contact

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## Staff Acknowledgments

In addition to the individual named above, Janet Frisch, Assistant Director; Antoinette Capaccio; Ellen W. Chu; Heather Dowey; Jennifer Echard; Jeff Larson; Mehrzad Nadji; John G. Smale Jr.; Stacey Steele; Kiki Theodoropoulos; and Ginny Vanderlinde made key contributions to this report.

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# Related GAO Products

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*Department of Energy: Actions Needed to Develop High-Quality Cost Estimates for Construction and Environmental Cleanup Projects.* [GAO-10-199](#). Washington, D.C.: January 14, 2010.

*Nuclear Waste: Uncertainties and Questions about Costs and Risks Persist with DOE's Tank Waste Cleanup Strategy at Hanford.* [GAO-09-913](#). Washington, D.C.: September 30, 2009.

*Department of Energy: Contract and Project Management Concerns at the National Nuclear Security Administration and Office of Environmental Management.* [GAO-09-406T](#). Washington, D.C.: March 4, 2009.

*Nuclear Waste: Action Needed to Improve Accountability and Management of DOE's Major Cleanup Projects.* [GAO-08-1081](#). Washington, D.C.: September 26, 2008.

*Nuclear Waste: DOE Lacks Critical Information Needed to Assess Its Tank Management Strategy at Hanford.* [GAO-08-793](#). Washington, D.C.: June 30, 2008.

*Department of Energy: Office of Science Has Kept Majority of Projects within Budget and on Schedule, but Funding and Other Challenges May Grow.* [GAO-08-641](#). Washington, D.C.: May 30, 2008.

*Hanford Waste Treatment Plant: Department of Energy Needs to Strengthen Controls over Contractor Payments and Project Assets.* [GAO-07-888](#). Washington, D.C.: July 20, 2007.

*Department of Energy: Consistent Application of Requirements Needed to Improve Project Management.* [GAO-07-518](#). Washington, D.C.: May 11, 2007.

*Department of Energy: Major Construction Projects Need a Consistent Approach for Assessing Technology Readiness to Help Avoid Cost Increases and Delays.* [GAO-07-336](#). Washington, D.C.: March 27, 2007.

*Hanford Waste Treatment Plant: Contractor and DOE Management Problems Have Led to Higher Costs, Construction Delays, and Safety Concerns.* [GAO-06-602T](#). Washington, D.C.: April 6, 2006.

*Nuclear Waste: Better Performance Reporting Needed to Assess DOE's Ability to Achieve the Goals of the Accelerated Cleanup Program.* [GAO-05-764](#). Washington, D.C.: July 29, 2005.

*Department of Energy: Further Actions Are Needed to Strengthen Contract Management for Major Projects.* [GAO-05-123](#). Washington, D.C.: March 18, 2005.

*Nuclear Waste: Absence of Key Management Reforms on Hanford's Cleanup Project Adds to Challenges of Achieving Cost and Schedule Goals.* [GAO-04-611](#). Washington, D.C.: June 9, 2004.

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