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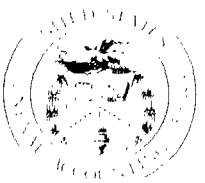
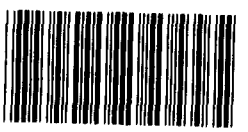
Report to the Chairman, Subcommittee on Oversight and Investigations, Committee on Energy and Commerce, House of Representatives

September 1990

NUCLEAR HEALTH AND SAFETY

Long-Term Plans to Address Problems of the Weapons Complex Are Evolving





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United States
General Accounting Office
Washington, D.C. 20548

Resources, Community, and
Economic Development Division

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September 28, 1990

The Honorable John D. Dingell
Chairman, Subcommittee
on Oversight and Investigations
Committee on Energy and Commerce
House of Representatives

Dear Mr. Chairman:

On January 3, 1989, you requested an update of the Department of Energy's (DOE) cost estimates for modernizing and cleaning up its nuclear weapons complex. As agreed with your office, we are providing information on existing cost estimates and DOE's current efforts to revise and update its modernization, environmental, and waste management plans.

Results in Brief

DOE's long-range studies, published in 1988, indicate that it could cost from $125 billion to about $155 billion to modernize and address environmental problems of the nuclear weapons complex over the next 20 to 30 years. Because DOE is continuing to assess its environmental problems and evaluate different modernization approaches for the complex, it has not updated these long-term cost estimates or developed long-term plans. However, DOE is developing comprehensive 5-year plans to address problems of the weapons complex. Eventually, DOE also intends to develop long-term plans for modernization, waste management, and selected environmental restoration projects.

In the modernization area, DOE plans to issue a 5-year plan by December 1990. This plan will include information about upgrades and construction projects necessary for environmental, safety, and health requirements, as well as projects to improve production capabilities within the complex. DOE will also issue in December 1990 a separate study that will discuss various options for modernizing the weapons complex by the year 2015. Eventually, DOE plans to prepare a long-range strategic plan (20 years) for reconfiguring the complex after it completes a programmatic environmental impact statement on modernization. This impact statement is scheduled to be completed in fiscal year 1994.

In the environmental area, DOE issued, on July 3, 1990, its updated 5-year plan for environmental restoration and waste management. This plan includes detailed information on DOE projects to be funded during

fiscal years 1992 through 1996 for correcting environmental problems, waste management, technology development, and transportation of radioactive and hazardous materials. This new plan shows that a substantial increase in funding is needed for fiscal years 1991 and 1992—totalling over $1.6 billion above the previous plan estimates for these years. The plan also indicates that long-term strategies will be prepared for waste management and selected environmental restoration projects.

DOE faces a difficult task in developing plans to correct problems of the weapons complex because of the various uncertainties that surround these problems. These include uncertainties about the future demand for special nuclear material, the nature and extent of contamination at weapons sites, the environmental standards that DOE will have to satisfy in cleaning up the contamination, and the effectiveness of research and development in providing more cost-effective means of cleaning up the contamination. Understandably, DOE's plans are in transition as it tries to address these uncertainties. The plans are likely to continue to evolve for several years as DOE studies and assesses it problems.

Cost of Addressing Problems of the Weapons Complex

The nuclear defense weapons complex consists of 17 major facilities that are located across the country. Collectively, these facilities design, test, produce, and retire nuclear weapons. To operate the complex in the future, DOE faces major challenges including modernizing facilities that have deteriorated over the 30 to 40 years since their construction. DOE must also upgrade the complex to ensure that it operates in compliance with current environmental, safety, and health standards. Additionally, DOE needs to clean up environmental contamination and dispose of accumulated wastes stored at its sites.

In July 1988 we reported to the Chairman, Senate Committee on Governmental Affairs, that, according to our analysis of DOE's data, addressing these problems confronting the nuclear weapons complex could cost from about $115 billion to over $155 billion.[1] Soon after the issuance of our report, DOE published reports proposing its plans and cost estimates for modernization and addressing environmental problems of the complex. These reports included the United States Department of Energy

[1]Nuclear Health and Safety: Dealing With Problems in the Nuclear Defense Complex Expected to Cost Over $100 Billion (GAO/RCED-88-197BR, July 6, 1988). We reported that the estimates, in constant 1990 dollars, were not budget quality and should be used only to illustrate the magnitude of the effort needed to address problems of the complex over the next 25 years. We also reported that the overall cost estimates did not include day-to-day operational costs to produce nuclear material and weapons and to comply with existing standards.

Nuclear Weapons Complex Modernization Report, dated December 1988 (referred to as the 2010 plan), and the Environment, Safety, and Health Needs of The U.S. Department of Energy, dated December 1988. The cost estimates in these 1988 studies had not been updated as of July 1990.

Our review of these studies show they support the reasonableness of our July 1988 cost estimates. In this regard, information contained in these reports shows that it would cost approximately

- $50 billion to upgrade and modernize the complex if DOE were to implement the recommendations of "the 2010 plan";
- $35 billion to about $65 billion to assess and clean up environmental contamination at inactive sites; and
- $25 billion to dispose of hazardous, radioactive, and mixed wastes through the year 2010.

Additionally, DOE officials in the Office of Environmental Restoration and Waste Management told us that, although they do not have a specific estimate of the eventual cost to decontaminate and decommission DOE nuclear facilities, they believe it may be as much as $15 billion or more. Thus, according to DOE's estimates, the total cost of modernizing and responding to environmental problems of the weapons complex could range from $125 billion to about $155 billion.[2]

These estimates are based on DOE's understanding of its modernization and environmental needs in 1988. It is important to note, however, that there is much uncertainty about (1) the nature and extent of environmental contamination at DOE's weapons facilities, (2) what environmental standards will be used to clean up waste sites, (3) the effectiveness of research and development to reduce the costs of environmental cleanup and waste management, and (4) the future demand for special nuclear material for defense needs. Accordingly, the estimates are highly preliminary and actual costs may differ significantly from the estimates.

In the case of environmental restoration, cost estimates will probably increase as more is learned about the nature and extent of contamination at DOE facilities. Approximately 3,600 inactive waste sites at DOE's weapons facilities may be contaminated to varying degrees with hazardous, radioactive, and mixed wastes. Our experience in auditing

[2]These estimates are in constant fiscal year 1990 dollars and are not discounted.

cleanup programs under the "Superfund" legislation shows that the less that is known about the extent of contamination, the more likely the cost estimates will increase. Further, DOE's Environmental Restoration and Waste Management Five-Year Plan issued in July 1990 shows that cost estimates to implement the plan during fiscal years 1991 and 1992 have increased about 25 percent—from $6.3 billion estimated in August 1989 to about $7.9 billion that is currently estimated.

DOE's Plans Are Evolving as It Addresses Uncertainties of Correcting Problems

DOE's plans to correct problems of the nuclear weapons complex are evolving and are likely to change over the years as DOE studies and assesses its problems and the uncertainties that surround them. DOE recognizes the importance of plans to correcting problems of the weapons complex and has several efforts ongoing to develop and/or update them. Specifically, to address modernization, DOE is preparing a 5-year plan to modernize and upgrade the complex and a study on long-term options to reconfigure the complex.[3] DOE also plans to issue a longer term (20-year) strategic modernization plan after it completes its assessment of the environmental impact of modernization options in fiscal year 1994. To address environmental restoration and waste management, DOE has issued a 5-year plan that it annually updates. For some key components of DOE's environmental restoration and waste management programs, DOE plans to eventually develop long-term strategies.

DOE Is Developing Modernization Plans

DOE issued a modernization plan in December 1988 that recommended to the Congress specific actions to modernize the nuclear weapons complex by the year 2010. The plan recommended (1) pursuing major new initiatives such as the construction of new reactor production capacity, and the closing and/or relocation of major facilities, and (2) annually upgrading the complex at the rate of 4 percent of replacement value. The estimated cost of implementing the modernization recommendations of the plan was about $50 billion.

In 1989 the Secretary of Energy directed the Department to reevaluate the plan and its recommendations to upgrade the complex. The Secretary ordered the reevaluation, in part, because of his concern that the plan did not reflect DOE's current funding priority for environment, safety, and health matters and his desire for more specificity in the plan for modernization activities. As part of its reevaluation, DOE is studying

[3]DOE officials, in commenting on the facts contained in this report, pointed out that, in the modernization area, DOE is now emphasizing the reconfiguration of the complex.

a range of scenarios affecting the demand for special nuclear materials including scenarios based on strategic arms reduction treaties with the Soviet Union, and the possible effects of these different scenarios on the complex's size and configuration.

The immediate results of DOE's reevaluation will be a 5-year modernization plan proposing specific actions and a spending plan to implement those actions, according to DOE officials. These actions will include upgrading facilities needed during the transition to a fully modernized complex. The 5-year spending plan will also include funds for major construction projects that DOE believes are needed regardless of how the weapons complex is configured in the long term, such as the construction of new nuclear reactor production capacity. DOE plans to issue the 5-year plan by December 1990.

DOE will also issue, in December 1990, a separate study that discusses the options of reconfiguring the complex by the year 2015. According to a DOE official, this study will also discuss cost estimates for the options. The level of detail that will be provided about the options to reconfigure the complex and cost estimates is now unclear because DOE has not completed its reevaluation. However, the Secretary, in August 1990 guidance about the reevaluation, stated that "Such a reconfiguration could result in a complex that is smaller, less diverse, and less expensive to operate than it is today."

In the longer term, DOE will develop a 20-year strategic plan. As part of its reevaluation of the complex, DOE is conducting a programmatic environmental impact statement (PEIS) on modernization. The PEIS is scheduled to be completed early in fiscal year 1994. According to the Deputy Director of the Modernization Task Force, DOE plans to develop refined modernization cost estimates by the time it completes its PEIS. At that time, the Secretary will make his final decisions about DOE's long-term approach for modernization. DOE plans to issue a long-term (20-year) modernization plan soon after.

The plans that DOE is developing for modernization are needed by the Congress to make informed budget decisions on DOE's modernization funding. In this regard, DOE is requesting about $1.9 billion in fiscal year 1991 to modernize and upgrade facilities and to restart other facilities closed because of environmental and safety concerns. Some of these projects are controversial, including $65 million for design and development work on a proposed plutonium recovery modification project at Rocky Flats. Both the House and Senate have passed legislation that, at

the very least, would restrict most of these funds until after the Secretary provides further information on his long-range plans for the nuclear weapons complex. This action was prompted by congressional concerns over the total cost of the project and possible alternatives to the project, as well as the long-term future of Rocky Flats as part of the weapons complex.

DOE Is Updating the Environmental Restoration and Waste Management 5-Year Plan

DOE has adopted a process of annually updating its 5-year plan for environmental restoration and waste management. The plan was first issued in August 1989. This 1989 plan outlined a $20 billion program for fiscal years 1991 through 1995 to bring facilities into compliance with applicable environmental regulations; assess and clean up inactive waste sites; treat, store, and dispose of wastes; and develop new and improved technologies to minimize waste and restore the environment. DOE believes that new technologies are needed to reduce the cost of responding to the environmental problems it faces. The 1989 plan also called for annual updates of information on environmental restoration and waste management projects.

DOE's 1990 update outlines DOE's plans through fiscal year 1996 for correcting environmental problems, environmental restoration, waste management, and technology development and also discusses DOE's plans for the transportation of radioactive and hazardous material (not contained in the 1989 plan). The updated plan shows substantially higher estimates for environmental restoration and waste management activities than were projected in the 1989 plan. For example, from the 1989 plan to the 1990 update, the total estimated cost for the period 1991 through 1995 increased from about $20 billion to about $30 billion.[4] According to DOE's Deputy Director, Office of Environmental Restoration and Waste Management, the increases are due, in part, to facilities managers' uncertainty over what regulators will require for the cleanup. According to this official, the facilities managers are estimating higher costs to implement more stringent cleanup actions than may be necessary. DOE officials also attribute the cost increases to the expanded scope of the plan to include activities such as the transportation of radioactive and hazardous material.

[4]The estimates in the 1990 update include estimates from DOE field operations offices that DOE headquarters has not validated and approved.

The new 5-year plan also indicated that long-term strategic plans will eventually be developed for key components of the environmental restoration and waste management program. For example, the plan notes that DOE intends to have a strategic plan for waste management and plans to develop "roadmaps" showing DOE's approach to completing certain environmental restoration projects. The 5-year plan does not specify when such strategic plans will be issued. According to DOE officials, they expect to issue a waste management study in February 1991 that is a first step in preparing a strategic plan for the management of wastes over the next 25 years. These officials also told us that they do not yet have a schedule to issue "roadmaps" for restoration projects.

According to DOE, it is not yet able to project the long-term costs of the cleanup because of uncertainties about the nature and extent of contamination and about the effectiveness of research and development in improving cleanup technologies that DOE believes may reduce the cost of cleanup. DOE also points out that the techniques for estimating the cost of the cleanup are poor. Because of such uncertainties, DOE has focused on identifying and assessing contaminated sites, evaluating existing cleanup technologies, and developing new ones. In addition, DOE is developing a consensus about what should be done to clean up the complex through negotiated agreements with affected parties, public comment on its plans, and environmental impact statements on its activities including a PEIS on its environmental restoration and waste management program. It is also working to develop better techniques to estimate the cost of the cleanup.

Resolving the uncertainties that surround the environmental problems of the weapons complex can only be achieved over time through progress in assessing the extent of environmental contamination, initiating cleanup and waste disposal projects, and developing new technologies for waste cleanup. Until more complete information is available, the Congress will be making decisions based on DOE's current 5-year plans. Eventually, increased understanding about the problems of the complex and the solutions should enable DOE to provide the Congress with the long-term information it needs to make better informed budget decisions about DOE's approaches, techniques, and costs for correcting environmental problems.

Conclusions

DOE's plans for modernizing the weapons complex and restoring the environment at nuclear facilities are in transition. It is developing or updating 5-year plans to modernize and clean up the weapons complex

and plans to eventually develop long-term strategies to guide its actions over the next 20 to 30 years.

The development of these plans is a difficult task and is an evolutionary process because of the many uncertainties that surround the problems of the weapons complex. For example, fundamental questions such as "What should our nuclear capabilities be?"; "How clean is clean?"; and "How safe is safe?" will continually be asked as DOE develops, updates, and implements plans to restructure, rebuild, and clean up the weapons complex. Although difficult, we believe these plans are critical for the Congress. In this regard, the Congress needs DOE's plans and approaches to make informed budget decisions and to weigh the enormous cost of correcting problems of the nuclear weapons complex against competing budget priorities in a deficit-conscious era.

We discussed the information in this report with DOE officials, who agreed that it is factually accurate. However, as agreed with your office, we did not obtain official agency comments on a draft of this report. Our work was performed between December 1989 and July 1990 in accordance with generally accepted government auditing standards. (Appendix I provides a discussion of our objectives, scope, and methodology.)

We are sending copies of this report to the appropriate congressional committees; the Secretary of Energy; and the Director, Office of Management and Budget. We are also making copies available to others upon request. If you have any questions about the information in this report, please call me at (202) 275-1441. Major contributors to this report are listed in appendix II.

Sincerely yours,

Victor S. Rezendes
Director, Energy Issues

Objectives, Scope, and Methodology

Our objectives were to update cost estimates for modernizing and addressing the environmental problems of the nuclear weapons complex and to obtain information on DOE's planning to deal with these tasks.

In conducting our work, we reviewed DOE's plans and studies dealing with modernization and environmental restoration and waste management, including the United States Department of Energy Nuclear Weapons Complex Modernization Report (December 1988) and the Environmental Restoration and Waste Management Five-Year Plan (August 1989). We also reviewed relevant DOE studies and studies conducted by organizations other than DOE, including studies by the Congressional Research Service and the National Research Council of the National Academy of Sciences, in order to identify uncertainties facing the complex and funding issues associated with modernization.

We obtained information about DOE's current planning from DOE officials in the Secretary of Energy's Modernization Task Force and the Office of Environmental Restoration and Waste Management. We also discussed uncertainties and funding issues with officials in these offices and in the Office of Defense Programs. We reviewed DOE's fiscal year 1991 budget request to identify current modernization projects. We discussed the rationale for major projects with officials in the Modernization Task Force and Defense Programs.

We discussed the information in this report with DOE officials, who agreed that it is factually accurate. However, as requested, we did not ask for official DOE comments on the report.

We conducted our review between December 1989 and July 1990 and in accordance with generally accepted government auditing standards except that we did not validate DOE's systems that generated cost estimates.

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