United States General Accounting Office 136742

GAO

Testimony

For Release
on Delivery
Expected at
9:30 a.m. EST
Tuesday,
August 23, 1988

Extent of Problems and Cost To Revitalize the Nation's Nuclear Defense Complex

Statement of
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Before the National Academy of Sciences'
Committee to Provide Interim Oversight
of the DOE Nuclear Weapons Complex

We are pleased to be here today to provide our perspective on the adequacy of the Department of Energy's (DOE) efforts to strengthen its environmental, safety, and health (ES&H) oversight of its nuclear defense complex. Over the last several years, we have issued more than 30 reports and testimonies that address various ES&H aspects of DOE's nuclear defense complex.

Our reports have identified and described a variety of unresolved safety and environmental problems at individual facilities as well as throughout the entire DOE nuclear defense complex. Many of the facilities are old and some are already operating beyond their expected life. Unresolved concerns exist about the operational safety of many facilities and inadequate attention to environmental problems over the years has created an undefined backlog of needed clean-up actions.

The cost to address these concerns is enormous. We reported that costs could range from $100 billion to over $130 billion to upgrade existing facilities, clean up waste sites, dispose of radioactive waste, and decontaminate facilities.[1] An additional $15 to 25 billion could be required for new facilities to expand capacity and for relocation of existing capabilities within the complex. Furthermore, some of DOE's sites may be irreversibly contaminated and may require long-term institutional care.

To assist your committee with its task over the next year, let me briefly describe the types of problems we have identified in the safety and environmental areas, the costs for addressing the major problems facing the defense complex, our recommendations to improve DOE's internal oversight of its defense complex, the need for

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[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)

outside independent oversight, and the need for a comprehensive plan to resolve the problems at the complex.

SAFETY AND OPERATIONAL UPGRADES

Much of DOE's nuclear defense complex was built in the 1940s and 1950s, and many facilities are approaching the end of their useful life. Some have deteriorated to the point where they now have safety or operational problems. Others are expected to deteriorate rapidly in the near future. In addition to aging, many facilities were constructed to comply with less stringent codes and standards than exist today. Finally, some equipment and/or processes used within the complex have become obsolete, making repair work difficult and spare parts virtually impossible to procure. Overall, the current condition of some facilities in the complex has resulted in safety concerns that could lead to prolonged shutdowns, thus threatening the nation's ability to produce nuclear weapons.

In 1987, DOE assessed major facilities in the complex as part of a strategic planning effort. A key part of this effort was to assign a fragility rating to the facilities. The rating system used a scale of from one to five, where three meant the condition of the facility was "average for industry", four meant the condition was "marginal" in need of constant attention, and five meant the condition was "serious" with no near-term solution. The rating system allowed the flexibility of rating a facility below "industry average" (between three and four) and less than "marginal" (between four and five). The ratings were done by officials at the facilities and not by an outside, independent group.

Many DOE facilities were rated below the "industry average," "marginal," or less than "marginal." The Savannah River Plant reactors in South Carolina were rated less than "marginal." The

"marginal" facilities included a number of buildings at the Rocky Flats Plant in Colorado, a key operation at the F-area separations facility at the Savannah River Plant, some operations at the Feed Materials Production Center in Ohio, and some operations at the Y-12 Plant in Tennessee. Two other important facilities were rated below the "industry average"--the N-reactor in Washington and the Idaho Chemical Processing Plant in Idaho.

Because many of the facilities have been operating for 30 years or more, the equipment has deteriorated to the point where it requires constant attention. Some facilities have unique safety or operational problems. For example, concerns about the emergency core cooling system at the Savannah River reactors have resulted in those reactors having their power levels reduced three times since the Fall of 1986. They are now only allowed to operate at about half their designed power levels. In addition, according to DOE officials, the P-reactor at Savannah River was recently down for about 4 months while seismic upgrades were being made. Technical and design problems with one of the plutonium operations at Rocky Flats have resulted in operations being shut down, and the N-reactor in Washington state has been shut down because of safety concerns. Finally, safety, health, and environmental upgrades are necessary at these facilities to bring them into compliance with today's codes and standards. For example, areas at the Savannah River Plant reactors and the F-area separations facility do not meet fire protection codes.

ENVIRONMENTAL CLEANUP NEEDED

Besides upgrading existing capabilities, DOE faces a massive cleanup effort at various locations around the country. For over 30 years, hazardous and radioactive wastes have been disposed of at many DOE locations. In many cases, wastes were disposed of in a manner that allowed them to enter the environment. These actions contaminated both groundwater and soil.

Groundwater at most DOE installations is contaminated to various degrees with hazardous and/or radioactive material. At many DOE installations, the on-site groundwater contamination levels are hundreds or, in some instances, thousands of times above the drinking water standards. Further, at a few installations, the groundwater contamination has spread off site or into rivers. Interrelated with the groundwater problem are inactive waste sites, one of the principal causes of groundwater contamination. These waste sites are a continuing problem in themselves because large amounts of hazardous and radioactive wastes are present and can cause further groundwater contamination or can spread into the surrounding soil and move off site. Virtually all DOE installations have inactive waste sites.

DOE's operations have also contaminated soil at six of the nine facilities we reviewed in 1986.[2] At four sites the contamination has migrated off site. Of the off-site contamination problems, the Y-12 plant in Tennessee poses a significant public health threat. Mercury from that plant's operations contaminated a stream bed and a flood plain. In some locations, the contamination is greater than 2,000 times background levels and over 150 times greater than the state's public health guidelines. To make matters worse, contaminated soil from the flood plain was used in various construction projects around the town of Oak Ridge, Tennessee.

COSTS TO ADDRESS MAJOR PROBLEMS ARE STAGGERING AND COULD INCREASE

As just described, DOE faces a number of problems that are costly and require long-term solutions. Current data indicate that it will cost anywhere from about $100 billion to over $130

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[2]Nuclear Energy: Environmental Issues at DOE's Nuclear Defense Facilities (GAO/RCED-86-192, Sept. 8, 1986).

billion to upgrade existing facilities, clean up the environmental contamination, dispose of radioactive wastes, and decontaminate existing facilities. Further, expanded production capabilities and relocation of facilities could add $15 billion to $25 billion to the overall cost. These estimates do not include the day-to-day costs to produce nuclear material and weapons or activities to ensure compliance with standards and laws.

This cost information is not budget quality and should be used only to illustrate the magnitude of effort needed to address the problems. Costs could increase as further assessments are conducted at DOE facilities and more detailed plans are developed. For example, in our July 8, 1988, report we pointed out that DOE has not clearly defined its nuclear facilities' safety policy, including what commercial standards should be applied to its facilities.[3] We further pointed out that DOE does not have a formal program to systematically assess the extent to which its nuclear facilities meet commercial standards. Although DOE has a new draft safety policy, until it is finalized and assessments are made to determine the extent to which the policy is met, DOE will not be in a position to identify all the necessary upgrades. In addition, the cost of cleaning up the environment could increase as DOE understands the full extent of environmental problems, chooses cleanup methods, or determines with the Environmental Protection Agency and the States the level of cleanup.

OUTSIDE INDEPENDENT OVERSIGHT

We have long supported the need for outside, independent oversight of various aspects of DOE's nuclear facilities, and our July 8, 1988, report recommended that the Congress legislatively establish such oversight for the defense complex.

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[3]Nuclear Health and Safety: Oversight at DOE's Nuclear Facilities Can Be Strengthened (GAO/RCED-88-137, July 8, 1988).

In a 1981 report and again in a 1986 report, we highlighted the need for outside, independent reviews of safety analysis reports--important documents which are designed to show that DOE facilities are safely designed, constructed, and operated.[4] We pointed out deficiencies in these documents as well as the fact that the approval of the documents was an internal DOE function carried out primarily by DOE field offices. In response to our 1986 report, DOE said that its Office of Assistant Secretary for ES&H provides sufficient independent oversight.

Our work on safety matters at DOE facilities over the past year has reinforced our position on the need for oversight of the defense complex. Serious questions have been raised about the safety of individual DOE facilities. We have already described the situation at Savannah River concerning the emergency core cooling system. These concerns may be compounded by recent events at the P-reactor at Savannah River. DOE officials told us that reactor operators, on two separate occasions in early August 1988, continued to increase the power level of the reactor while unexplained reactor conditions were being reviewed. DOE officials were concerned that they were not notified of these incidents until after the fact.

The Secretary of Energy established the Advisory Committee on Nuclear Facility Safety to provide DOE with technical advice on its nuclear facilities. We recently assessed whether this committee meets our key elements for an effective oversight organization--(1) independence, (2) technical expertise, (3) ability to perform reviews of DOE facilities as needed, (4) clear authority to require

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[4]Better Oversight Needed for Safety and Health Activities at DOE's Nuclear Facilities EMD-81-108, Aug. 1981); Safety Analysis Reviews for DOE's Defense Facilities Can Be Improved (GAO/RCED-86-175, June 1986).

DOE to address the organization's findings and recommendations, and (5) a system to provide public access to the organization's findings and recommendations.

The Advisory Committee does not meet at least two of our criteria: independence and clear authority to require DOE to address the organization's findings and recommendations. In our view, the Advisory Committee is more of an extension of DOE's own safety oversight program than a separate and distinct entity. However, questions arise as to the extent to which DOE is allowing the Advisory Committee to play even that role. For example, the Chairman of the Advisory Committee told us that a reporter for The Washington Post, not DOE, notified him about the recent incidents at the Savannah River P-reactor. The reporter's notification was seven days after DOE was notified by DuPont. In addition, the Advisory Committee does not appear to have any authority to require DOE to address any of its recommendations.

We recommended in our July 8, 1988, report that the Congress legislatively establish independent oversight of DOE's nuclear defense complex which meets our five criteria. The fiscal year 1989 Defense Authorization Bill contained a provision for such an independent safety board to be established. However, the President vetoed that bill.

DOE'S INTERNAL OVERSIGHT PROGRAM NEEDS TO BE STRENGTHENED

In addition to the need for independent, external oversight of DOE's defense complex, we believe a strong internal program is needed to ensure that its facilities are operated in a safe and environmentally acceptable manner. This includes upgrades and building new facilities, as appropriate. We have identified several weaknesses in DOE's oversight of its facilities.

In December 1987, we reported that DOE cannot readily identify funds budgeted or expended for bringing its facilities into compliance with two environmental laws--the Resource Conservation and Recovery Act of 1976 (RCRA) and the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA).[5] Funds expended on RCRA or CERCLA activities are commingled with funds expended under existing programs (e.g., nuclear material production). Because DOE cannot readily identify its RCRA and CERCLA funds, it cannot demonstrate compliance with Executive Order 12088 (requiring federal agencies to ensure that sufficient funds are requested in their budget for environmental requirements) or good internal controls. Further, it is difficult for DOE to promptly respond to the Congress on the amount of funds being expended for environmental restorations. We recommended in this report that DOE budget and account for all RCRA and CERCLA dollars. It is our understanding that DOE has agreed with our recommendation.

In our July 8, 1988, report we stated that the current Secretary of Energy established the position of Assistant Secretary for ES&H with responsibility for safety and health. However, the Department of Energy Organization Act did not establish safety and health as a responsibility for an assistant secretary-level position as it did for other functions such as waste management and energy research and development. Therefore, unless this position is legislatively mandated, a newly appointed secretary could assign the safety and health functions to a lower level official within DOE. This could reduce the visibility and attention given to these important issues by top DOE management, especially when compared with nuclear material production. Therefore, we recommended that the Congress legislatively establish the position of Assistant Secretary for ES&H.

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[5]Environmental Funding: DOE Needs to Better Identify Funds for Hazardous Waste Compliance (GAO/RCED-88-62, Dec. 16, 1987).

Our July 8, 1988 report also discussed DOE's nuclear safety policy. We believe that the policy is not clearly defined and that DOE orders are incomplete concerning what commercial standards should be applied to DOE nuclear facilities. In the case of the reactors, this had led to inconsistent application, and in some cases, nonapplication of important safety standards. While DOE has drafted a new safety policy and begun to better identify standards that might apply to its facilities, DOE has no formal systematic program for assessing its nuclear facilities to determine the extent to which they meet current commercial standards. In addition, once it is determined that a facility does not meet certain standards, no criteria exist to determine whether the facility should be upgraded to meet that standard.

This is particularly important as DOE develops the strategy for the future of its defense complex. Without the two components--the safety policy and standards and a systematic assessment program--there will be no clear benchmark from a safety standpoint to determine what needs to be upgraded, what the level of the upgrade should be, or what needs to be replaced. Therefore, we recommended that DOE establish meaningful safety standards and implementation policies to guide continued operation of existing facilities and to use as baseline safety criteria for developing its future strategy for the defense complex.

COMPREHENSIVE PLAN NEEDED TO RESOLVE SAFETY AND ENVIRONMENTAL PROBLEMS

DOE faces a formidable task to correct the safety and environmental problems that exist at its defense complex. Because of the enormous costs of addressing these problems, the new administration and the Congress must weigh these costs against the competing budgetary priorities. In addition, uncertainties still exist because DOE has not fully identified its problems and/or

solutions to correct them. Given this situation, we have recommended that DOE develop an overall strategic plan that sets forth the projected facility requirements for continued nuclear weapons production, a comprehensive picture of the ES&H issues facing DOE, and solutions to resolve them.[6]

The Congress has required DOE to develop a modernization plan for the defense complex. According to DOE, the plan will include actions necessary to ensure that the operation of the facilities in the complex is safe and environmentally acceptable. It will also include the estimated cost to modernize the complex. The plan is scheduled to be issued in December 1988.

While we believe the plan could meet the intent of our recommendation, we would like to point out that DOE's plans have not always been as thorough or as timely as we would like. For example, in developing a congressionally mandated plan on transuranic waste DOE did not address 81 percent of the waste that was already buried at various locations around the country. Also, DOE's information about the complex is evolving--additional information concerning environmental problems is being developed, decisions about cleanup will be made and the safety policy will be finalized. This new information could change priorities within the strategy and impact Congressional funding decisions. Therefore, we believe it is important for DOE to provide updated information to the Congress as it becomes available and for the Congress to closely monitor DOE's efforts.

SUMMARY

DOE is faced with rebuilding its nuclear defense complex which produces nuclear weapons for the national defense. Many of the

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[6]Environmental, Safety, and Health Aspects of DOE's Nuclear Defense Complex (GAO/T-RCED-87-4, Mar. 12, 1987).

facilities that make up the complex are old. They need to be upgraded or replaced; in some cases safety and/or operational concerns have already closed facilities or reduced their operations.

Over the last 30 years, the operation of these facilities has also contaminated the environment. Hazardous and radioactive wastes in soil and groundwater must be cleaned up, wastes currently being stored must be properly disposed of, and buildings contaminated with radioactivity must be decontaminated once they are no longer in use.

Rebuilding the complex in this deficit-conscious environment will be a great challenge. Addressing these safety, environmental, and operational problems is estimated to cost from $100 billion to over $130 billion and these estimates will probably increase. Therefore, a strategy with clear priorities and time frames must be established so that the critical problem areas are funded promptly and so that the Congress can assess the scope and direction of the future of the complex. Since the information on which priorities will be based is still evolving, it is important that the Administration periodically update its strategy so that priorities are based on the most current information.

In addition, both a strong internal as well as independent, external oversight program is needed to ensure that the facilities in the complex are operated safely and in an environmentally acceptable manner. ES&H must remain a separate entity legislatively established within DOE to provide high visibility to these important issues. We also continue to believe that external independent oversight is critical to provide the Congress and the public the assurance they need that existing facilities as well as upgraded or new facilities are safe.

We will be happy to work with the Academy in its efforts during the next year. We will be pleased to respond to any questions.