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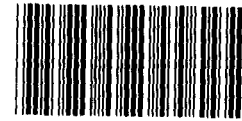
Testimony

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Environmental, Safety, and Health Aspects
of the Department of Energy's
Nuclear Defense Complex

Statement of
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Before the
Committee on Governmental Affairs
United States Senate



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Mr. Chairman and members of the Committee:

We are pleased to be here today to provide an overview of the General Accounting Office's (GAO's) work on environmental, safety, and health aspects of the Department of Energy's (DOE's) nuclear defense complex. Over the past several years GAO has issued over 20 reports (see attachment I), many prepared at your request, Mr. Chairman, on various aspects of the DOE nuclear defense complex.

These reports have described a variety of unresolved safety and environmental problems at DOE's nuclear defense facilities. But, more importantly, when considered together, they underline a series of critical issues that the Congress and the Administration need to face in determining the future of the DOE nuclear weapons complex.

These issues arise because (1) many of the facilities are old and some are already operating beyond their expected life, (2) unresolved concerns exist about the operational safety of many of the facilities, and (3) the lack of attention to environmental problems created by facility operations over the years has created an undefined backlog of clean-up actions needed. The cost of remodeling or building new facilities will be in the billions, as will the cost of bringing facilities into compliance with environmental laws. What the Congress needs from DOE is an overall strategic plan which defines the universe of problems it faces in rebuilding its nuclear defense complex. This strategy should include not only actions needed to rebuild or upgrade facilities with time frames and cost estimates, but also actions needed to

protect the environment and assure the Congress and the public of DOE's safe operation.

Let me briefly describe the types of problems we have identified in the safety and environmental areas, and some of the costs we have identified associated with addressing and resolving these and other problems at DOE's nuclear defense complex. I will begin with an overview of the complex.

DOE'S NUCLEAR DEFENSE COMPLEX

The basic mission, as you know, of DOE's defense complex is to produce nuclear material (e.g. plutonium and tritium) for defense purposes--primarily weapons and naval fuel. The overall complex can be described as costly, diverse, potentially dangerous, and aging. Let me explain.

DOE's funding request for such nuclear defense activities in each of the last 3 years has been over \$8 billion. The complex itself represents a public investment of about \$100 billion. It includes a wide variety of plants with interrelated purposes, such as nuclear reactors, specialized laboratories, uniquely designed plants for fabricating nuclear material, and nuclear waste facilities. The entire complex will likely grow in the future as new facilities, such as facilities for solidifying high-level radioactive waste, are added to the complex.

DOE's nuclear defense complex, considered in its entirety, is probably one of the more potentially dangerous industrial operations in the world. The operations routinely use and generate large quantities of a wide range of hazardous and radioactive

materials. These materials must be handled, transported, and disposed of carefully by workers not only to prevent exposure to themselves but also to prevent these materials from being released into the environment. Because of lethal levels of radiation and high-level heat generation, many of the materials must be handled with special shielded equipment to prevent worker exposure.

DOE operations also involve controlling nuclear reactions and handling highly fissionable nuclear material. The unfortunate Chernobyl accident demonstrates the more dangerous aspects of controlling nuclear reactions and nuclear material. Finally, DOE operations must be protected against the more commonplace industrial dangers, such as fires or other processing accidents.

Along with the inherent dangers of running DOE's complex is the complicating factor that many key aspects of it are aging. In this regard, many of DOE's more hazardous facilities--reactors and reprocessing plants--were built about 30 years ago. Some either have passed or are reaching the end of their designed useful life. For example, the N-reactor in Washington State has passed its originally designed life. So have some high-level waste storage tanks. Many other facilities, such as some buildings at Rocky Flats, Colorado, reactors at Savannah River, South Carolina, and the Fernald plant in Ohio, have safety concerns because of their age.

MAJOR SAFETY ISSUES

GAO's work on safety matters at DOE facilities over the last several years has resulted in several reports that have identified

important safety issues. These issues, in view of their importance and scope, raise serious questions about both the safety of individual facilities and DOE operations as a whole. Taken cumulatively they demonstrate the need for independent oversight of DOE operations. Such oversight would provide increased public assurance that DOE operations can be safely operated. I would now like to provide an example of a systematic DOE safety problem and some specific safety examples at a few DOE facilities.

In June 1986,¹ we reported to you on DOE safety analysis reports for eight of DOE's operating facilities. These reports are important documents that DOE uses to show that its facilities are safely designed, constructed, and operated. Our review showed that some safety reviews have not been approved by DOE, some provided little or no comparison with safety design criteria, and different assumptions were used in analyzing serious accidents. We also noted that DOE's safety review process is an internal DOE function carried out primarily by DOE field offices. Because an effective and well-accepted safety review process is the key to demonstrating that a nuclear facility can be safely operated, we made a number of recommendations to ensure that DOE has a credible safety review process.

The situation at the N-reactor is an example of a facility-specific safety issue DOE faces. During the past year, because of the reactor's similarities with Chernobyl, it has come under

¹Safety Analysis Reviews for DOE's Defense Facilities Can Be Improved (GAO/RCED-86-175; June 1986).

increasing scrutiny. In our August 1986 report on the N-reactor,² we pointed out that the reactor had been operating for 3 years beyond its expected life, and many systems and components were deteriorating, which could become safety problems. In addition, we stated that if the reactor were to operate beyond the year 2000, major renovations would be required. The Roddis panel--an independent group requested by DOE to review the N-reactor--also raised a number of specific safety issues including the need for remote shutdown capability and systems to prevent hydrogen buildup. Two panel members suggested shutting down the reactor while the remaining four called for an accelerated program to upgrade the reactor's safety systems. Subsequently, in January 1987, DOE temporarily shut down the reactor ahead of schedule to upgrade safety systems.

DOE's Rocky Flats plant provides another example. At Rocky Flats, a new building (371) was to be built to lower workers' radiation exposure levels and reduce the danger to the public in the event of an earthquake and/or high winds. Because of technical and design problems, this new building never became fully operational. As a result, DOE is continuing to process plutonium in the old buildings, which the new one was to replace for safety and health reasons. This situation has raised safety concerns about Rocky Flats. DOE is currently studying the possible safety ramifications in the continued use of the Rocky Flats Plant.

²Comparison of DOE's Hanford N-Reactor with the Chernobyl Reactor (GAO/RCED-86-213BR, August 1986).

In our ongoing work at DOE's production reactors at Savannah River, which is being done at your request, new safety issues have been identified. For example, DOE has recently reduced reactor operating power for safety reasons. We are also concerned that DOE is depending too heavily on visual inspections to detect cracks in reactor vessels. These visual inspections may not clearly identify the extent and magnitude of problems. These concerns and others are to be discussed in detail before this Committee later today by Mr. Keith Fultz, GAO's Associate Director for Nuclear and Electricity Issues. In my view, the discovery of potential safety concerns at Savannah River, when coupled with the uncertainties of the continued operation of the N-reactor, raise questions about the ability of DOE to meet future production requirements for our national defense.

Independent oversight

GAO believes these examples show an important need for increased safety oversight of DOE operations. GAO has had a long history of recommending both internal and external improvements in safety oversight of DOE's defense production activities. In a 1981 report,³ we pointed out that one of the basic, underlying causes of shortcomings in DOE's safety programs was its structure within DOE. In that report, we argued for a separate office within DOE specifically set up to oversee safety matters within the department and that this office report to the Under Secretary at DOE.

³Better Oversight Needed For Safety and Health Activities At DOE's Nuclear Facilities (GAO/EMD-81-108; August 1981).

Although DOE originally disagreed with our recommendation, in September 1985, it established an Office of an Assistant Secretary for Environment, Safety, and Health, that reports to the Under Secretary. We believe that DOE's action, in effect, adopted our 1981 recommendation.

Also in the 1981 report and again in a 1986 report, we highlighted the need for outside, independent reviews of safety analysis reports. DOE has been less responsive to this recommendation. In this regard, DOE believes that its own Office of Assistant Secretary for Environment, Safety, and Health provides sufficient independent review. In response to our recommendation, DOE stated

" . . . an additional level of oversight, over and above that already existing under the guidance of the Assistant Secretary for Environmental, Safety, and Health, would not provide any additional assurances of the safe operations of DOE facilities. . . ."

DOE's position on this matter is difficult to understand because DOE, on occasion, does use outside, independent reviews. For example, when faced with safety concerns about the N-reactor because of its design similarity to the Chernobyl reactor, DOE sought outside help. As stated earlier, the Roddis panel reviewed the safety of the N-reactor. More recently, DOE has requested the National Academy of Sciences to review other DOE reactors, including production reactors at Savannah River.

DOE's reluctance to allow for outside independent reviews carries with it important implications. First, there is no outside, independent scrutiny on a continuing basis. This places heavy reliance on DOE's information and views for ensuring safety, which may not be the same as an outside group's. The Roddis panel, demonstrated this difference in their reports, and its views led to accelerating the safety work at the N-reactor. Another implication is possible conflicts between production goals and safety functions. Conflicts can and do occur. The situation at the Fernald plant in Ohio demonstrates this problem. During the 1970's, DOE considered closing this plant. As a result, it did not make capital improvements, and equipment became obsolete. In the early 1980's, DOE's production goals increased, putting a strain on the plant's resources. According to DOE's own documents, Fernald management emphasized production over worker safety and health concerns. Finally, self-regulation provides only a minimum level of public assurance that these facilities can safely operate. This minimum level, I believe is becoming more unacceptable to the public and the Congress as more problems and issues surface in the DOE nuclear defense complex.

In view of the foregoing, I believe outside, independent oversight is critical if DOE wants to provide a high degree of public assurance that its operations are safe and conducted in an environmentally acceptable manner. We are aware that you are proposing legislation that would have the Nuclear Regulatory Commission's Advisory Committee on Reactor Safeguards review and

evaluate DOE's nuclear facilities. These hearings you are conducting today, as well as in the next couple weeks, will provide an excellent opportunity for your committee to hear testimony on this proposal and explore with DOE officials the reasons they believe outside oversight is not necessary.

ENVIRONMENTAL ISSUES

Besides safety issues, our reports also have identified important environmental problems needing corrective action. If not corrected, these problems can have a long-lasting effect on the environment and pose a health threat to the general public.

In a September 1986 report,⁴ we reported that DOE operations have contaminated groundwater at eight of the nine facilities reviewed. In many cases, the contamination included both hazardous and radioactive material and was at levels hundreds to thousands of times greater than drinking water standards. We also noted that at a few sites some contamination had migrated off-site, into rivers and into drinking water aquifers. We are concerned that the contamination can pose a health threat when it migrates into drinking water sources. Further, we found that the soil was contaminated at most of these facilities in areas not designed to become contaminated. While DOE does have some cleanup projects underway at a few facilities, at most it is studying the problem to

⁴Environmental Issues At DOE's Nuclear Defense Facilities (GAO/RCED-86-192; September 1986).

better characterize the extent, type, and movement of the contamination.

In a March 1986 report,⁵ we addressed DOE's plans to dispose of transuranic waste--a special type of radioactive waste. Basically, DOE set forth a plan to put this waste into a geological repository. We found, however, that DOE planned to send only about 19 percent of its transuranic waste inventory to the repository. DOE was noncommittal regarding the permanent disposition of the remaining 81 percent. Since this waste is buried only a few feet underground, it can pose environmental and/or health problems if it is disturbed or migrates. Remedial actions may be necessary to either remove this waste or better immobilize the waste in place.

In a September 1986 report,⁶ we found that four of nine facilities were not in full compliance with the Clean Water Act, and none had final permits for disposing of waste under the Resource Conservation and Recovery Act. As a result, at some facilities DOE is discharging waste into rivers and streams above state limits and is continuing to dispose of waste in a manner that adds to the groundwater contamination. In addition, we found that Hanford⁷ had been slow to identify all units that should be

⁵DOE's Transuranic Waste Disposal Plan Needs Revision (GAO/RCED-86-90; March 1986).

⁶Environmental Issues at DOE's Nuclear Defense Facilities (GAO/RCED-86-192, September 1986).

⁷Unresolved Issues Concerning Hanford Waste Management Practices (GAO/RCED-87-30; November 1986).

regulated under the Resources Conservation and Recovery Act, and it has not identified all potential Comprehensive Environmental Response, Compensation, and Liability Act waste sites that may require corrective actions. As a result, Hanford does not know and cannot ensure the regulatory agencies, that it is appropriately managing or disposing of its radioactive and hazardous waste.

In these past reports, GAO has made recommendations to ensure that DOE operations are carried out in an environmentally acceptable manner. Specific recommendations have included that DOE develop an overall groundwater and soil protection strategy, and provide the Congress a comprehensive report on its plans, milestones, and cost estimates for bringing its facilities into compliance with applicable environmental laws. We have also previously recommended that DOE allow outside independent inspections of the disposal practices used for any waste it self-regulates. DOE has not yet decided on outside, independent inspections of waste disposal because of an ongoing study. We hope one result of this ongoing study will be to allow outside independent inspections of DOE disposal practices as we have previously recommended.

FUTURE COSTS

The cost of dealing with safety issues and environmental problems at DOE facilities will be substantial. In some cases the total cost is speculative because the solutions to problems have not yet come before the Congress. To provide a perspective, some cost estimates are summarized below.

Facility upgrades and modifications are needed at many DOE facilities to enhance safety. Currently, a \$50 million safety upgrade program is underway at the N-reactor. Planned safety upgrades for the other production reactors at Savannah River will also cost several million dollars. Safety upgrade programs are also underway at other DOE facilities, such as Fernald in Ohio. Larger expenditures will also be needed in the future. For example, if the N-reactor is to continue operating beyond the year 2000, major renovations costing as much as \$1.2 billion will be needed. A new production reactor--which DOE is considering--could also cost billions, even if DOE modifies and finishes construction of the partially completed commercial nuclear reactor owned by the Washington Public Power Supply System. Repairing Building 371 at the Rocky Flats plant could cost about \$450 million dollars. If DOE decides to move the entire Rocky Flats plant operation for safety reasons, that move could cost billions of dollars.

Correcting environmental problems will also be costly. At the three facilities we reviewed (Fernald, and Mound in Ohio, and Y-12 in Tennessee) DOE plans to spend over \$60 million to bring them into full compliance with the Clean Water Act. To get final permits at the nine facilities we reviewed DOE is changing its disposal operations, at a possible cost of \$200 million. The eventual cost could be much higher depending on how site-specific environmental problems are resolved. For example, groundwater cleanup cost can easily amount to hundreds of millions of dollars at a single site. Overall, we believe the eventual cost to bring

these DOE facilities into full compliance with environmental laws may be over a billion dollars.

OVERALL STRATEGY

As I said at the outset of my testimony, DOE needs an overall strategic plan that sets forth the projected facility requirements for continued nuclear weapons production; a comprehensive picture of the environmental, safety, and health issues facing DOE; and solutions to resolve them. The plan should provide a comprehensive picture of what DOE's nuclear defense complex will look like in the year 2000 and beyond, and provide a road map of how we get from here to there. The many issues and problems our work has identified that have to be addressed clearly support the need for such a road map. Also, such a strategy would be helpful to maintain continual budgetary oversight. In the longer term billions of dollars will likely be needed to assure that the DOE nuclear defense complex can safely operate; additionally, billions will be needed to bring DOE facilities into compliance with environmental laws.

Some of the broader issues that need to be addressed in this strategic plan are:

- What are the facility requirements for continued operation of DOE's nuclear defense complex?
- What is the full scope and extent of the environmental and safety issues facing DOE?
- What actions will DOE take to ensure that its facilities are operated in a safe manner?

-- To what extent will DOE develop a groundwater and soil protection strategy and clean up contamination at its facilities?

Of course, the strategy should address the resolution of these questions, time frames, and total implementation cost.

Once the strategy is presented to the Congress, it will be useful in making effective legislative and budgetary decisions. Without such a plan, piecemeal solutions to issues and/or problems will occur, as they have in the past. A comprehensive strategy will also place the Congress in a better position to judge the acceptability of the scope and direction of the DOE nuclear defense complex. I hope in these hearings the Committee has the opportunity to explore the need for an overall strategy for the solution of these issues with DOE officials.

In closing, Mr. Chairman, the issues and problems we have identified today are very significant, and the Secretary of Energy needs to take corrective action immediately. Accordingly, we have today forwarded a copy of this testimony to him along with a recommendation that he initiate action on the overall strategy for the DOE nuclear defense program.

That concludes my testimony for today. We would be pleased to respond to any questions you or members of the Committee may have.

GAO REPORTS RELATED TO
ENVIRONMENTAL, SAFETY, & HEALTH
ASPECTS OF DOE OPERATIONS

NUCLEAR WASTE: Unresolved Issues Concerning Hanford's Waste Management Practices (GAO/RCED-87-30; Nov. 1986)

NUCLEAR ENERGY: Environmental Issues at DOE's Nuclear Defense Facilities (GAO/RCED-86-192; Sept. 1986)

NUCLEAR SAFETY: Comparison of DOE's Hanford N-Reactor With the Chernobyl Reactor (GAO/RCED-86-213BR; Aug. 1986)

NUCLEAR WASTE: Impact of Savannah River Plant's Radioactive Waste Management Practices (GAO/RCED-86-143; July 1986)

NUCLEAR ENERGY: A Compendium of Relevant GAO Products on Regulation, Health, and Safety (GAO/RCED-86-132; June 1986)

NUCLEAR SAFETY: Safety Analysis Reviews for DOE's Defense Facilities Can Be Improved (GAO/RCED-86-175; June 1986)

ENVIRONMENT, SAFETY, & HEALTH: Status of Department of Energy's Implementation of 1985 Initiatives (GAO/RCED-86-68FS; Mar. 1986)

NUCLEAR WASTE: Department of Energy's Transuranic Waste Disposal Plan Needs Revision (GAO/RCED-86-90; Mar. 1986)

ENVIRONMENT, SAFETY, & HEALTH: Environment and Workers Could Be Better Protected at Ohio Defense Plants (GAO/RCED-86-61; Dec. 1985)

ENVIRONMENT, SAFETY & HEALTH: Information on Three Ohio Defense Facilities (GAO/RCED-86-51FS; Nov. 1985)

DOE's Plutonium Facility (GAO/RCED-85-3; Sept. 1985)

Department of Energy Acting To Control Hazardous Waste At Its Savannah River Nuclear Facilities (GAO/RCED-85-23; Nov. 1984)

DOE's Safety and Health Oversight Program At Nuclear Facilities Could Be Strengthened (GAO/RCED-84-50; Nov. 1983)

Decommissioning Retired Nuclear Reactors At Hanford Reservation (GAO/RCED-83-104; Apr. 1983)

Cleaning Up Nuclear Facilities--An Aggressive and Unified Federal Program Is Needed (GAO/EMD-82-40; May 1982)

GAO's Response to DOE on EMD-81-108, "Better Oversight Needed for Safety and Health Activities at DOE's Nuclear Facilities" (EMD-82-36; Jan. 1982)

Congress Should Increase Financial Protection to the Public From Accidents at DOE Nuclear Operations (EMD-81-111; Sept. 1981)

Better Oversight Needed For Safety and Health Activities At DOE's Nuclear Facilities (EMD-81-108; Aug. 1981)

GAO's Analysis of Alleged Health and Safety Violations At The Navy's Power Training Unit At Windsor, Connecticut (EMD-81-19; Nov. 1980)

Department of Energy's Safety and Health Program For Enrichment Plant Workers Is Not Adequately Implemented (EMD-80-78; July 1980)

Decommissioning Hanford Reactor (EMD-79-20; Jan. 1979)