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History and Management of the DOE/Air Force  
Small Reactor Project

Statement of  
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Before the  
Subcommittee on Environment, Energy, and Natural  
Resources of the House Committee on Government  
Operations



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Mr. Chairman and Members of the Subcommittee:

We appreciate the opportunity to be here today to discuss our report entitled Nuclear Science: History and Management of the DOE/Air Force Small Reactor Project (GAO/RCED-88-138, May 26, 1988). At the request of the Chairman, we reviewed the origin, history, and sources of funding of the small reactor project. The project was a joint effort, the intent of which was for DOE, in coordination with the Air Force, to develop, build, and operate a prototype 10-megawatt electric (MWe) nuclear reactor, which is small in comparison to today's commercial reactors, to help meet the Air Force's need for a source of secure power<sup>1</sup> at its installations. DOE's Los Alamos National Laboratory initiated the project in 1983 using internal Los Alamos discretionary funds. Responsibility for the project was subsequently shifted from Los Alamos to DOE's Idaho National Engineering Laboratory, and the Air Force terminated the project in May 1987.

In summary, the project ran for 4 years at a cost of about \$3.75 million and, despite the time and money spent, made little progress toward its intended goal. We believe that several factors contributed to DOE's and the Air Force's unsuccessful attempt to develop a prototype reactor and to the eventual termination of the project. In short, we believe the project was ill-conceived, lacked continuity in management, and never obtained the degree of management support necessary to continue.

I would now like to briefly go over some of the events that we feel led to the project's termination.

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<sup>1</sup>A secure power source is one that can be more easily protected from outside threats, such as sabotage, natural disaster, and airplane crashes.

## FEASIBILITY NEVER ESTABLISHED

We believe the small reactor project was ill-conceived because the choice and feasibility of using nuclear power was never clearly established and documented prior to the decision to proceed with the project. A DOE-led task force had recommended that the Air Force investigate the feasibility of using nuclear power to meet its secure power needs. The Los Alamos National Laboratory provided technical support for this task force. DOE volunteered to conduct the feasibility study and, according to Air Force officials, DOE also offered to fund the development of a prototype reactor.

Los Alamos initiated a feasibility study in 1983, which included an evaluation of various options available for the Air Force to meet its secure power needs. Los Alamos was aided by six domestic nuclear vendors,<sup>2</sup> five of which prepared and submitted preconceptual designs to Los Alamos. The study was never completed and published in final form, although a final draft was completed.

The final draft concluded among other things that for most applications a nuclear reactor was the best option available to meet the Air Force's secure power needs. The other options being evaluated were eliminated primarily because of a requirement that the power supply be capable of operating for 1 year independent of off-base fuel supplies. This requirement effectively skewed the analysis toward the choice of nuclear power by establishing the need to store and protect huge supplies of fuel for the other conventional power sources.

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<sup>2</sup>In total, six reactor vendors were associated with the project throughout its existence: Babcock and Wilcox, Combustion Engineering, GA Technologies, General Electric, Rockwell International, and Westinghouse.

Los Alamos established the 1-year requirement through a consultant's study. This study also noted, however, that the 1-year requirement was based on a large-scale war scenario and that scenarios requiring a power source to operate independently for periods longer than 90 days are highly unlikely.

The draft feasibility study recommended that DOE proceed with the development of a prototype reactor and included a program plan to accomplish this. As the feasibility study was being drafted, Los Alamos was already taking a number of steps in anticipation of managing the development of a prototype reactor, such as drafting a request for proposals and appointing a source evaluation board to recommend a contractor from the proposals received. Los Alamos estimated that \$200,000 of the \$450,000 in internal discretionary funds it spent during the preparation of the draft feasibility study were actually spent on these activities in anticipation of its eventually managing the project.

Los Alamos received a number of unfavorable comments on the draft feasibility study from the Air Force, DOE headquarters, and DOE's Idaho National Engineering Laboratory. While some of these comments questioned some of the methodologies and assumptions included in the study, none disputed the study's conclusion that nuclear power was the best choice for this application.

Although the need for such a power source was not clearly established and the choice of nuclear power was based on a questionable draft feasibility study, DOE and the Air Force chose to proceed with the design of a prototype reactor and DOE prepared to start funding the project. However, DOE made some significant management changes, which we believe resulted in a lack of continuity in the management of the project. I will now discuss those changes.

## PROJECT MANAGEMENT LACKED CONTINUITY

The Los Alamos program manager had gotten the impression from DOE that funds to continue the project would be provided in early 1984 as soon as the Los Alamos staff completed, and DOE approved, a more formal program plan. However, as Los Alamos was preparing this plan, DOE assigned the management of the project to its Idaho National Engineering Laboratory. At about the same time, DOE shifted headquarters responsibility for the project from its Office of Defense Programs to the Office of Nuclear Energy. These offices are headed by different assistant secretaries.

With these management changes the project essentially started anew. Los Alamos had no further involvement with the project, and its feasibility study was never finalized or published. No coordination occurred between the Los Alamos and Idaho Laboratories during and after the transition. None of Los Alamos' files or documents were sent to the Idaho Laboratory and, to our knowledge, no discussions occurred between the two offices concerning the project.

The Los Alamos program manager told us that he believed the project was switched from Los Alamos to the Idaho Laboratory because of conflicts between Los Alamos and Air Force staffs. Air Force officials confirmed that problems did exist, and these problems basically related to Los Alamos's trying to market the project to the Congress and other Air Force commands without going through proper Air Force channels. Air Force officials added that when contacted by DOE, they posed no objections to DOE's proposed transfer of the project.

We asked Air Force officials why they proceeded with the project if they were dissatisfied with the Los Alamos feasibility study. They said that Idaho Laboratory officials met with the Air Force project management in the spring of 1984 to determine their

interest and intentions in developing a nuclear power source. An Air Force official at this meeting told us that the Idaho staff convinced them that they had a good relationship with the DOE Office of Nuclear Energy, extensive experience in the area of reactor development, and that it was definitely feasible to build a 10-MWe reactor to meet the needs of the Air Force. When we asked the Idaho project manager why the laboratory did not validate or redo the Los Alamos feasibility study, he responded that no one had asked the laboratory to do this.

A major factor in the change in DOE headquarters responsibility for the project was the departure of the then-Assistant Secretary of Energy for Defense Programs, who was a strong advocate of the project. After he departed, the Secretary of Energy decided the project was more properly within the area of responsibility of the Assistant Secretary of Nuclear Energy.

Shortly after taking over responsibility for the project, DOE's Office of Nuclear Energy negotiated an agreement with the Air Force, which included a provision to share the project's cost. No formula for doing so was included in the agreement. The cost-sharing provision was a significant departure from the Air Force's understanding of its prior discussions with DOE, which was that DOE would fund the development of a prototype reactor. The agreement, signed on August 20, 1984, was a condition for the approval by a House Armed Services Subcommittee of DOE's plans to reprogram \$2 million for the project within the Atomic Energy Defense Activities Appropriation account.

Up until the signing of the Memorandum of Agreement, the only funds that had been spent on the project were about \$450,000 of Los Alamos discretionary funds used for the draft feasibility study and other activities in anticipation of its managing the project. DOE had not yet provided any direct funds. However, on August 24, 1984, DOE provided the Idaho office authorization to spend

\$1.2 million to pay for conceptual designs from the six vendors who participated in the Los Alamos feasibility study only a year earlier. On September 4, 1984, the Idaho office issued a request for proposals for the conceptual design of the reactor. All six contractors were chosen to develop conceptual reactor designs, which were evaluated by DOE and the Air Force.

After DOE and the Air Force reviewed the conceptual designs, the Air Force decided to proceed to the next phase of the project, which was developing a preliminary design. The Air Force was also assessing several Air Force bases to decide the eventual placement of the prototype reactor and, among other things, determine the power needs of the bases.<sup>3</sup> Air Force officials told us that, had the project proceeded, the prototype reactor would have been built at one of these bases because they are bases that consume large amounts of power. However, DOE was also seeking to have the prototype built at its Idaho National Engineering Laboratory.

In March 1986, DOE's Idaho Operations Office sent out requests for proposals to the same six vendors for proposals to design, construct, test, and start up, a 10-MWe reactor. On October 30, 1986, Westinghouse was selected for contract negotiations. However, 3 weeks later the Air Force project management responsibility was moved from Tyndall Air Force base in Florida to Bolling Air Force base in Washington, D.C. The Bolling group immediately proposed that the Air Force withdraw its participation and future funding support for the project. Although the project was not officially terminated at this time, it was the beginning of the end.

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<sup>3</sup>These bases were Shemya Air Force Base, Alaska; Mountain Home Air Force Base, Idaho; and five Air Logistics Centers at Hill Air Force Base, Utah; Kelly Air Force Base, Texas; McClellan Air Force Base, California; Robins Air Force Base, Georgia; and Tinker Air Force Base, Oklahoma.

LACK OF SUPPORT CONTRIBUTED  
TO TERMINATION

From November 1986, when the Air Force initially proposed to withdraw its support, until the project was officially terminated in May 1987, several events took place which increased the likelihood of the project's termination.

One of the earliest events occurred on December 30, 1986, when the staff at Bolling listed specific reasons why the Air Force should withdraw from the project. The reasons were basically divided into three categories: (1) delays and costs resulting from the environmental review process, (2) other uncertainties adding to rising costs, and (3) unclear requirements for the power plant.

In January 1987 the effort to terminate the project was elevated to the Assistant Secretary level at the Air Force. A memo from the Air Force's Office of the Assistant Secretary for Research, Development, and Logistics to the Air Force's Assistant Secretary for Manpower, Reserve Affairs, and Installations, pointed out flaws in the methodology used to support nuclear power as being more economical than other options. The memo also pointed out that the political aspects of placing nuclear power plants throughout the United States should be considered.

In spite of the doubts expressed by some Air Force officials, the Air Force was still committed to participating in the project through the completion of the preliminary design, contingent on its receiving Congressional approval to spend certain funds on the reactor design. However, on April 9, 1987, the Chairman of the Senate Appropriations Committee's Subcommittee on Military Construction responded unfavorably to the Air Force's request to use Military Construction Program planning and design funds for the design of a prototype reactor. The Chairman noted that the Subcommittee's policy is to support projects for which funds are



programmed in future budgets and that the Air Force had no funds programmed in future military construction budgets for the construction of facilities related to this request for design funds. The Chairman also noted that this was not an appropriate source of funding for what was clearly a research and development activity.

The Air Force officially terminated the project on May 22, 1987, citing the denial by the congressional Subcommittee of its request to spend certain funds and anticipated budgetary constraints as reasons. The Chairman of the Subcommittee, however, wrote to the Air Force, after hearing that it intended to terminate the project, that he had not intended for the Air Force to cancel the project but to seek the appropriate research and development funding for it. The Air Force then downplayed the denial of its funding request and cited anticipated budgetary constraints as the primary reason for terminating the project. Air Force officials also stated in internal correspondence that they did not view nuclear power as a viable option for this application because of environmental, economic, budgetary, and technical constraints. It is noteworthy that at this point, April and May 1987, the Air Force had yet to contribute any of its own funds for the design of the prototype reactor.

#### CONCLUSION

Mr. Chairman, we believe that the circumstances surrounding this project warrant our conclusion that the project was ill-conceived, lacked consistent management, and did not have the degree of management support necessary for its successful completion. Although our report makes no recommendations, we do believe that the Air Force decision to terminate the project was an appropriate one. In addition, this project provides what we believe are some important lessons from which future projects can benefit. Specifically, this project demonstrates the importance of

- having a solid foundation for a project by firmly establishing the need for and feasibility of the item being developed;
- formal agreements between agencies involved in projects such as this to prevent the types of misunderstandings and disagreements encountered in the early stages of this project and to further document the need for the project; and
- continuity, to the extent practicable, in project management, especially when multiple agencies and contractors are involved.

The Air Force is now planning another study of energy technologies in order to identify a potential power source to meet its secure power needs. Even today, the Air Force is unsure of the extent of its need for secure power.

Mr. Chairman, this concludes my prepared statement; we would be pleased to respond to any questions you or Members of the Subcommittee may have.