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Long leadtimes in completing nuclear powerplants have contributed to high capital costs and sometimes to cancellation of units. Currently, 10 or more years of leadtime consists of about 2 years of planning, 2 or more years of construction permit review by the Nuclear Regulatory Commission (NRC), and 6 or more years of construction. The NRC operating license review parallels part of construction. To reduce leadtimes, the NRC has begun to (1) authorize limited construction following completion of the environmental and site suitability portions of reviews; (2) encourage development and use of standard nuclear powerplant designs; and (3) accept applications for site approvals up to 5 years before utilities apply to begin construction. Times have not been reduced as expected because of: delays in State approval; time consumed for environmental statements and public hearings; the fact that benefits from standard designs will take time; and because some issues, such as environmental factors, cannot be decided at an early stage. GAO concluded that many factors will continue to prevent reduction of leadtimes, including growing State and local requirements, public concern, court decisions, and technological changes. It was recommended that the NRC should work jointly with states to identify and compare legal and procedural requirements. (HTW)

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STATEMENT OF
MONTE CANFIELD, JR., DIRECTOR
ENERGY AND MINERALS DIVISION
BEFORE THE
SUBCOMMITTEE ON ENERGY AND THE ENVIRONMENT
HOUSE COMMITTEE ON INTERIOR AND INSULAR AFFAIRS
ON
OBSTACLES TO REDUCING NUCLEAR
POWERPLANT LEADTIMES

Mr. Chairman and Members of the Subcommittee:

We welcome the opportunity to be here today to discuss reforming the nuclear powerplant licensing process.

Currently, it takes utilities 10 or more years to plan, obtain necessary governmental licenses and approvals for, and construct nuclear powerplants. This long leadtime contributes greatly to the high capital costs of these plants, which in turn has contributed to utilities' decisions to defer or cancel planned units. Thus, the leadtime for constructing these plants is an important factor in the economics of nuclear power. Reductions in the present 10-year cycle would both reduce capital costs and enable utilities to more quickly begin recovering the costs of the plants as well as potentially reducing the cost of electricity to consumers.

In recent years, the Nuclear Regulatory Commission has made changes in its licensing procedures in an attempt to reduce leadtimes to 7 or 8 years. The Commission proposed

licensing reform legislation in the last session of the Congress which was intended to shorten the leadtime to as little as 6 years, while at the same time maintaining the quality of its safety and environmental reviews and preserving opportunities for public participation.

On March 2, 1977, we issued a report 1/ to the Congress discussing the many obstacles which we believe may prevent the Commission from achieving its stated goals for reducing powerplant leadtimes. The purpose of my testimony today is to describe for the Subcommittee these obstacles and their effect on the Commission's efforts to reduce leadtimes.

We will describe the major processes comprising the nuclear powerplant leadtime, the Commission's efforts to reduce it, the obstacles limiting the success of these efforts, and we will conclude with our observations on the prospects for future leadtime reductions.

THE NUCLEAR POWERPLANT LEADTIME

The 10 or more years of leadtime for constructing nuclear powerplants--which we define as starting on the date a utility decides to construct a plant and ending when it is licensed to operate--consists of about 2 years of utility planning, 2 or more years of Commission construction permit review, and 6 or more years for construction. The Commission's operating

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1/"Reducing Nuclear Powerplant Leadtimes: Many Obstacles Remain" (EMD-77-15, dated March 2, 1977).

license review parallels the final 2 to 3 years of construction. Also, parallel with these steps, utilities must obtain other required Federal, State, or local government approvals.

In the planning phase, a the utility selects a site and contractors, prepares an environmental report based on at least 1 year of collected environmental data, and prepares a safety report describing the plant's design and how it complies with Commission rules, regulations, and other safety requirements. Utilities may also have to gather data and prepare applications for other Federal, State, and local government approvals.

At the construction permit review phase, the Commission staff reviews the utility's safety and environmental reports, the Advisory Committee on Reactor Safeguards conducts its own safety review, the Commission and the Department of Justice assess the utility's compliance with antitrust laws, and the Commission's Atomic Safety and Licensing Board holds a public hearing on the application to consider both safety and environmental issues. If affirmative decisions follow each of the above reviews and hearings, the Commission issues a construction permit.

Construction permit reviews took an average of 2 years for 17 applications to construct 32 powerplants accepted during calendar years 1971 to 1975. Many of these applications were for more than 1 powerplant. Issuance of construction permits on the 17 applications were not contested in the

in the Commission's public hearings. In contrast, during the same period it took the Commission an average of 5 months longer to issue construction permits on 24 applications to construct 44 powerplants which were contested on safety and/or environmental grounds in the public hearings. The 5 months is somewhat significant in the context of the 2-year construction permit review but is not a long time in the context of the total time needed--10 years--to bring powerplants on line.

The powerplant construction and operating license review phase takes 6 or more years during which the utility completes detailed design work, construction, preoperational testing, and applies for a Commission operating license. Design changes often occur at this time to enhance methods of powerplant operation or maintenance, incorporate new or revised regulations or other Commission safety requirements. These changes may affect utilities' construction schedules.

Other factors which may affect construction schedules include project financing, utility and construction contractor management abilities, procurement and delivery of materials, availability of labor skills, labor productivity, labor strikes, and the weather.

COMMISSION ACTIONS TO REDUCE NUCLEAR POWERPLANT LEADTIMES

To reduce nuclear powerplant leadtimes, the Commission has begun to

--authorize utilities to begin limited construction work following completion of the environmental and site suitability portions of its construction permit reviews;

--encourage the development and use of standard nuclear powerplant designs; and

--accept applications for site approvals up to 5 years before utilities apply to begin construction at the sites.

Only the limited construction work and standardization programs have been in effect long enough to have affected powerplant leadtimes--primarily at the construction permit stage. To date, construction permit review times have not been reduced as expected. I will now discuss some of the reasons why they have not.

Limited work authorization

In April 1974, the Atomic Energy Commission--the present Commission's predecessor--began authorizing limited construction work as soon as staff reviews and public hearings on environmental and site suitability were completed. It expected that construction could begin in about 10 months--or about 14 months before staff reviews and public hearings on design safety were usually completed.

Nonetheless, it has taken an average of over 18 months for the 22 authorizations issued to date. Furthermore, three utilities withdrew limited work authorization requests because

they could not obtain timely State approvals which they needed before beginning construction.

Several factors have prevented the Commission from achieving its 10-month goal. Project environmental statements and several contested public hearings have taken longer to complete than expected. A major change in Commission regulations aimed at reducing radioactivity levels to "as low as reasonably achievable" affected other projects. Other factors were outside of the Commission's control. For example, the Commission had to defer five limited work authorizations until the utilities obtained State water quality certificates--a requirement of the Federal Water Pollution Control Act Amendments of 1972.

Standard nuclear powerplant designs

Under the standardization policy initiated by the Atomic Energy Commission in 1973, the Commission's staff reviews and approves standard powerplant designs. No modifications are to be made to approved designs unless they offer "significant" safety improvements, or are directed by the Atomic Safety and Licensing Board or the Commissioners.

The Commission expects that standard designs can shorten leadtimes by at least 1 year because less time would be needed for utility planning and Commission licensing reviews, and there would be fewer time-consuming construction-stage design modifications. Commission officials believe, however, that these benefits will not be realized for some time.

The Commission has received 7 applications to construct 21 nuclear powerplants using standard designs and has issued construction permits on 3 of them. Its construction permit reviews of the 7 applications either took or will take from 18 to 39 months--as long as its reviews take without standardization.

It is important at this point to explain the concept of standard designs. The Commission intends that eventually the entire powerplant design can be standardized. For the 7 applications, however, the only portions of plant designs that were standardized were the reactor vessels. In addition, the unique characteristics associated with each site also affected the total powerplant design. For these reasons the Commission has had to review the 7 applications using "standard designs" in the same manner as other plant designs.

Early site approval

Effective June 6, 1977, the Commission changed its regulations to allow utilities to seek site suitability reviews up to 5 years before they planned to construct powerplants at these sites. The Commission believes that most site suitability issues (environmental and safety) can be resolved at this early stage. By referencing a previously reviewed site in its construction permit application, the Commission expects that a utility could begin construction work almost immediately --if all of the environmental and site suitability issues, such

as need for power, are conclusively resolved at the early site review stage.

We question the Commission's optimism in the amount of leadtime reductions attainable from early site reviews. Some environmental factors--such as need for power--which are frequently contested in its public hearings, are subject to change over relatively short time periods. It may not be possible to conclusively decide these issues at the early site review stage. Deciding them after utilities apply to begin construction may limit early starts on construction. Indeed, in three recent cases, the Atomic Safety and Licensing Board either reopened or held up the public hearings in order to consider changes in utilities' "need for power" projections.

Furthermore, increasing stringent State and local government requirements may prevent many utilities from even seeking early site approvals, or from starting construction. Since 1970, 23 States have enacted legislation. These laws often conflict with the Commission's early site approval concept because they do not authorize complete State reviews at this earlier time. Under New York State law, for example, the State may not begin its 2 years of more of review until a utility applies to construct a specific powerplant at a selected site. This requirement precludes early site review by the State.

In-house actions to streamline licensing process

The Commission has taken steps which, while not specifically designed to shorten leadtimes, are intended to reduce chances for delay in utility planning, Commission licensing, and powerplant construction phases. These include (1) adding predictability to its process of applying new safety requirements to powerplant projects in various stages of development, (2) requiring utilities to submit antitrust information at at least 9 months in advance of construction permit applications, and (3) encouraging joint State-Commission public hearings in construction permit applications.

The Commission's efforts to make its safety reviews more predictable have not been entirely successful. We found examples wherein the Commission staff imposed certain safety requirements which had not yet been approved by the Commission. Since they are unpredictalbe, these changes adversely affect the utilities' plans since they may call for redesign, work stoppage, or costly construction modifications.

Early submission of antitrust information should preclude this problem from holding up Commission construction permits. For one project, however, the contested antitrust proceeding took 42 months to complete.

Joint State-Commission hearings are intended to expedite Commission and State decisionmaking processes while reducing the total time, effort, and expenditures of all parties.

However, in one of the two joint hearings held to date, major differences in Commission and State procedural requirements will actually lengthen the time it takes the Commission to issue a construction permit.

OBSERVATIONS ON THE PROSPECTS FOR REDUCING NUCLEAR POWERPLANT LEADTIMES

We commend the Commission's attempts to reduce nuclear powerplant leadtimes while maintaining the quality of its reviews and opportunities for public participation. We recognize that some of the measures taken are long term and have not been fully implemented. In our opinion, however, there are simply too many other factors involved--many beyond the Commission's control--that limit the Commission's ability to reduce the leadtime. These factors will, we believe, prevent the Commission from realizing a general reduction in leadtimes to its 7-to-8-year goal under existing licensing legislation and the 6-year goal with changes in its licensing legislation. In fact, with the present licensing process, we believe that both the Commission and the industry will have difficulty in maintaining current timeframes of 10 years.

These factors include:

--Growing State and local government requirements which may prevent many utilities from taking full advantage of the Commission's actions to shorten powerplant leadtimes. In six recent licensing actions, State rather than Commission

requirements have precluded utilities from getting earlier construction starts.

--Public concern about nuclear power as shown by recent State nuclear moratorium initiatives. Expressions of the concern through widespread intervention in Commission nuclear powerplant licensing proceedings have added about 5 months to the 2-year construction permit review period. The added 5 months is almost insignificant when viewed in the context of the 10-year timeframe.

--Changes resulting from court decisions invalidating Commission regulations. A July 1976 Federal Court of Appeals decision invalidated portions of an existing Commission regulation for considering the environmental effects of waste management and reprocessing operations in the nuclear fuel cycle in construction and operating license proceedings. As a result of this decision, the Commission stopped issuing limited work authorizations, construction permits, and full-power operating licenses until it completed an internal study and prepared a proposed interim rule. On November 5, 1976, the Commission resumed licensing activities conditioned on the outcome of the rulemaking proceeding.

--Changes resulting from technological advances and nuclear powerplant operating experience. For example, new emergency core cooling system regulations and fire protection standards were developed as a result of the Brown's Ferry Nuclear Station fire. Because of its overriding responsibility to protect the public health and safety, the Commission will continue to apply new regulations and other safety requirements in its construction and operating license reviews as solutions to outstanding safety issues are developed. Since December 1972, the Advisory Committee on Reactor Safeguards has identified 72 safety issues applicable to all, or a large number of, nuclear powerplants. To date, 41 of these issues have been completely resolved through additional regulations or other safety requirements. Applying important new safety requirements to powerplant projects in various stages of completion contributes to leadtimes, and will continue to limit the success of the Commission's efforts to add predictability to its safety reviews.

In our report, we concluded that the effectiveness of the Commission's proposals will depend on their compatibility with State and local governments' legal and procedural requirements, which vary among the States. Clearly, many States

intend to actively participate--from land use planning and environmental perspectives--in regulating nuclear powerplants. We recommended that the Commission should work jointly with all the States to identify and compare the various legal and procedural requirements as a first step in developing some commonality in the licensing process and in reducing the timeframe for getting nuclear powerplants on line.

The Commission has taken some positive actions. For example, it established an Office of State Programs to strengthen its relations with the States in powerplant siting and licensing. In addition, the Commission is completing a study to identify areas where new legislation may be needed to shorten nuclear powerplant leadtime. Whether or not the Commission can reduce licensing leadtimes will depend to a large extent on (1) how effectively the recently established office carries out its responsibilities and (2) how quickly the Commission acts on the proposals developed by the study.

Mr. Chairman, this concludes my prepared statement. We would be glad to answer any questions you may have at this time.