APR 20 1976

John A. Harris, Director
Office of Public Affairs

FACT SHEET ON REACTOR SAFETY

As requested in your memorandum of April 6, 1976, we have reviewed your proposed Reactor Safety Fact Sheet. As a result of this review, changes are recommended. For example, the descriptions used for the "defense in depth" levels should agree with those used by Chairman Anders in his recent testimony before the Joint Committee.

Enclosed is the rewritten Reactor Safety Fact Sheet incorporating our recommended changes.

/S/

James R. Miller
Assistant to the Director
Office of Nuclear Reactor Regulation

Enclosure:
As stated

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ENCLOSURE

REACTOR SAFETY FACT SHEET

In more than 280 reactor years of operation, no one, neither a member of the public nor the operating staff of a licensed power reactor has been killed as a result of a nuclear accident or normal operations involving radiation exposure. In no case has exposure to radiation at a licensed commercial nuclear power plant resulted in significant injury or disablement to a member of the public.

The safety record is due, in part, to stringent standards applied to the nuclear industry. Each application by a utility for a permit to build and a license to operate a nuclear plant receives in-depth examination by the Nuclear Regulatory Commission.* In every case, protection of the health and safety of the public is paramount.

Besides the NRC's intensive reactor safety reviews, independent studies are conducted by experts of the Advisory Committee on Reactor Safeguards, and quasi-judicial licensing hearings are held by Atomic Safety and Licensing Boards and by Appeal Boards.

The NRC's review of a proposed plant is based on a concept that is referred to as "defense in depth." Under this concept, three successive and mutually reinforcing levels of defense against accidents and their consequences are considered.

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* In January 1975, the Atomic Energy Commission was abolished. Its regulatory functions were transferred to the newly created NRC, and its development activities were transferred to the Energy Research and Development Administration.

The first level of defense is to provide a large margin of safety for possible human error, as well as for defects in materials and equipment and for acts of nature. This involves conservative design of the plant--including liberal allowance for the possibility of system malfunctions--the materials, the fabrication methods, the construction practices, and the testing and operation.

The second level is to provide backup systems that will compensate automatically for failure of essential equipment or human error that might occur in correcting any potentially unsafe condition. The aim, at this second level, is to prevent minor accidents from escalating into major accidents.

At the third level of defense, the design must provide equipment to limit the public consequences of even highly unlikely accidents. Engineered safety features, such as the containment building, the standby electrical power sources and emergency core cooling systems are provided to limit the consequences of accidents.

Of overriding importance in the design, construction, and operation of all three levels of safety protection is a vigorous program for quality assurance. The NRC audits the quality assurance performance of utility management on a continuing basis throughout the life of the plant from prior to receipt of the construction permit through plant construction, startup testing and operations. This program requires participation by all the organizations involved, including architect-engineers, nuclear steam system suppliers, component vendors, subcontractors, and constructors.

After completing its review of an application for a permit to build a nuclear plant, the NRC's staff prepares a detailed safety evaluation and

environmental impact statement. These are based on comprehensive technical reviews that require extensive exchanges of information with the applicant, its suppliers and contractors, the Advisory Committee on Reactor Safeguards, and interested members of the public. A large number of technical people on the NRC staff including metallurgists, physicists, geologists, seismologists, mechanical and electrical engineers--become involved in the review. On the average, about 1400 professional man-days are spent reviewing an application.

Many amendments to the application are submitted before the project goes forward to an Atomic Safety and Licensing Board for public hearings and an initial decision.

After a period of several years of plant construction, the utility files its application to operate the facilities. Again the staff undertakes a detailed review of the design. This review again entails about 1400 man-days of technical, professional effort and is similar to the construction permit review except it entails an evaluation of the final design of the facility.

Other actions are taken to assure the safe and reliable operation of nuclear reactors. Continuing training and requalification programs for plant personnel, extensive programs for periodic testing of plant equipment and systems, and regular inspections of operating nuclear power plants by NRC inspectors afford assurance that safe practices are being employed by the plant owner and operator.

Under the NRC's safety program, research is conducted to test and confirm data used in the design, siting, operation and licensing of commercial nuclear plants. In this connection, the NRC works closely with national laboratories of the Energy Research and Development Administration and with the Advisory Committee on Reactor Safeguards.

The combination of research, engineering, technical review and inspection activities provides a high degree of assurance that the public health and safety are adequately protected and that the safety record which has been achieved by the nuclear industry to date is the result of sound engineering, responsible operation and effective regulation. Thus there is every reason to expect that the impressive safety record will continue.

This assurance is supported by a three-year independent study of nuclear reactor safety--the most definitive ever undertaken--which concludes that the risks to the public associated with nuclear power are "very small," and that the likelihood of reactor accidents is much smaller than many types of non-nuclear accidents with similar consequences. (The risk of a fatality from a nuclear accident is only 1 chance in 5 billion per year.) These findings results from a study directed by Professor Norman C. Rasmussen of the Massachusetts Institute of Technology, using a technical staff of about 60 scientists and engineers, plus a large number of specialized consultants. The study is titled "Reactor Safety Study, An Assessment of Accident Risk in U.S. Commercial Nuclear Power Plants," WASH-1400. It was issued in October 1975.