



AEC REGULATORY STAFF RESPONSE TO
QUESTIONS RAISED BY PERSONS MAKING LIMITED APPEARANCES
AT THE HEARING FOR A CONSTRUCTION PERMIT FOR
THE DAVIS-BESSE NUCLEAR POWER STATION

The following comments are offered in response to questions raised by persons making limited appearances at the Davis-Besse hearing. The regulatory staff has reviewed the responses of the applicants to these questions and is offering comments only on those questions either not covered by the applicants or to which further comment by the staff is appropriate.

Question

Miss Pausic on pages 167 and 168 of the transcript and Mr. Webb on page 198 raised the question of protection of the station against acts of sabotage. Mr. Tedesco, would you please comment.

Answer

The applicants' plans to assure plant security during construction and operation are discussed in the PSAR. The plans include the use of perimeter fences with certain openings to allow controlled access to the plant and the use of security guards. These actions should be adequate to assure that random access to the plant by the general public will be controlled.

With regard to possible acts of sabotage that could result in a serious reactor accident, including the uncontrolled release of large quantities of radioactivity, the engineered safety features

provided in the design, construction and operation of the plant make it extremely unlikely for such a result to occur. The development of strict quality assurance and control programs on all phases of plant design, construction and operation, the reactor protection systems that function to prevent accidents, and the accident mitigation systems that serve to mitigate the consequences of accidents if they do happen-- (e.g. containment, ECCS) are all examples of precautions taken to assure the safety of the plant. In addition the construction of this plant involves extensive use of concrete and steel to provide adequate shielding and protection against earthquakes, floods and winds. These design aspects also make it extremely unlikely that an act of sabotage would cause a serious safety problem.

Adequate operator training will be given to the station operating personnel by the applicants. With this proposed training program and the successful completion of AEC operator licensing examinations, the station personnel will be highly-skilled and competent to operate the plant. This matter is discussed in section 10 of our Safety Evaluation. In light of these features, we believe that it would be highly unlikely that an act of sabotage would result in a serious safety problem.

Question

Miss Pausic on page 167 of the transcript, Mrs. Breckner on page 189, Mr. Webb on pages 216,221 and 228 and Mrs. Stebbins on page 390, all

raised questions as to the views of the insurance industry and the Federal Government with respect to the safety and the insurability of nuclear power plants.

Answer

It has been the judgment of the Congress, the AEC, and the insurance industry that power reactors licensed by the AEC are extremely unlikely to have accidents which could affect the general public, but that the possibility of a large accident cannot be dismissed as zero.

These persons may be concerned because accidents are postulated for purposes of AEC's safety evaluation. The staff assumes and evaluates such accidents not because it believes that they will occur, but because the AEC insists that power reactors should be so designed that even improbably malfunctions or rare natural phenomena will not cause accidents and also be so designed to limit the consequences of accidents even if they should occur.

In June of 1965, the Congressional Joint Committee on Atomic Energy (JCAE) held extensive public hearings relating to the proposed ten-year extension of the Price-Anderson indemnity legislation. In its report recommending extension of the Price-Anderson Act, the JCAE stated:

"The regulatory review process employed in the atomic energy program is such that no reactor would be licensed if there was a reasonable likelihood that its operation might result in an accident of the severity contemplated by the Price-Anderson legislation. However, the experience in this field

is not sufficiently great, nor the technology sufficiently developed, that it is possible to deny the theoretical possibility of such an accident. Thus, the AEC has recently reiterated that...

'it is possible to postulate extremely unlikely, theoretical nuclear accidents which under certain circumstances, conceivably could cause damage considerably in excess of \$60,000,000.'

i.e., the maximum amount of nuclear liability insurance currently available from commercial sources. Accordingly, the principal reason for enacting the Price-Anderson legislation--the need to assure the availability of funds for the payment of claims arising out of a catastrophic nuclear accident--still persists."

When the Price-Anderson amendments were enacted in 1957, the liability insurance industry made available an underwriting capacity up to \$60 million for each reactor. The capacity was increased in 1966 to \$74 million, and again in 1969 to \$82 million. Each of these figures for its respective date represents one of the largest amounts of liability insurance ever assembled by the insurance industry for a single risk. It should be noted also that the insurance industry provides up to \$84 million in property insurance coverage for damage to a reactor and associated property of the utility. Taken together, the total commitment of \$166 million in liability and property insurance for a nuclear facility is, we understand, the largest insurance commitment to a single risk.

Power reactor operators licensed by AEC are required under the law to provide proof of financial protection in an amount equal to the maximum amount of nuclear liability insurance available which, to date, has meant that these licensees have purchased the full amount of insurance.

Government indemnity is provided in excess of the financial protection to a total of insurance and indemnity of \$560 million, at which point Congress limited liability. The limitation of liability, which provides an opportunity for after-the-fact assessment of the situation, was an alternative to an open-ended commitment to provide further relief, should it ever become necessary, only through the mechanism of indemnification. Every nation which has undertaken to provide governmental indemnification for civil liability for nuclear incidents has limited the indemnification undertaking, and to a much lower figure.

Finally, we would call attention to the nuclear power's safety record. Operating experience with licensed power reactors in the United States has been unblemished by any accident that has caused personal injury or property damage to members of the public, or indeed interference with the public in any way.

Question

Mr. Lucas on page 239 of the transcript, Mr. Brown on page 267 and Dr. Davies on page 273 all were concerned about AEC regulatory limits and their application to nuclear power reactors.

Answer

The regulations of the AEC, 10 CFR Part 20, "Standards for Protection Against Radiation", are based, upon the recommendations of the Federal Radiation Council (FRC),* as approved by the President. The FRC was

*The President's Reorganization Plan No. 3 of 1970 which became effective December 2, 1970, transferred the functions performed by the FRC to the Environmental Protection Agency.

established in 1959 to advise the President of the United States with respect to radiation matters affecting health, including guidance for all Federal agencies in the formulation of radiation protection standards. The membership of the FRC includes the Secretaries of: Agriculture, Commerce, Defense, HEW, Interior and Labor, and the Chairman of the AEC.

The guidance of the FRC is compatible with the recommendations of the National Council of Radiation Protection and Measurements (NCRP) and the International Commission on Radiological Protection (ICRP). The membership of these organizations consist of internationally prominent men in the areas of physics, biology (including geneticists), and medicine.

The Radiation Protection Guide (RPG) recommended by the FRC for whole body doses to individuals in the population is 500 millirems per year. When exposure to individual organs is involved, organ dose limits somewhat higher, depending on the organ, are appropriate. For convenience, in this discussion, attention is directed to whole body exposures only. It is not normally feasible to measure the exposure to each individual in the general population. However, it is feasible to determine average amounts of radioactive materials in air, water, and food, and to estimate these amounts from average exposures to other groups of similarly exposed individuals. As an operational technique,

when individual exposures are not known, the Radiation Protection Guide (RPG) recommended by the FRC for the average dose to a suitable sample of the exposed population is one-third of the individual limit, or 170 millirems per year.

As stated by the FRC, "It is recognized that our present scientific knowledge does not promote a firm foundation within a factor or two or three for selection of any particular numerical value in preference to another value. It should be recognized that the FRC Guides are well below the level where biological damage has been observed in humans".

The provisions of 10 CFR Part 20 applicable to control of releases of radioactive materials to the environment are based upon the individual whole body guide of 500 millirems per year. The regulations specify limiting concentrations of various radionuclides in air or water to which people may be exposed. An individual, all of whose drinking water is at these concentrations, or who breathes air at these concentrations continuously would not incur a whole body exposure in excess of 500 millirems per year. Release limits based on these concentrations are derived for each licensed nuclear power plant.

In addition, the Atomic Energy Commission may further limit releases to the environment if it appears that average intakes in air, food, and water by a suitable sample of the exposed population would otherwise

exceed one-third of that which would result from drinking water or breathing air continuously at the limiting concentration values. This provides a mechanism for the AEC to implement the FRC's Guide of 170 millirems per year for such average exposures. However, levels of radioactive materials in the environment as a result of nuclear power plant operation have been so low, as verified by environmental monitoring, that it has not been necessary to make use of this provision.

Experience to date with routine operation of licensed nuclear power reactors indicates that releases have been, for the most part, less than a few percent of release limits derived on the basis of the concentrations in 10 CFR Part 20.

In addition to requiring limitations on releases of radioactive materials to the environment, the AEC requires licensed nuclear power plants to monitor the plant environs routinely, to detect sudden changes or long-term buildup in environmental levels. Particular attention is paid to levels in fish and aquatic biota in streams where reactor effluents are a factor. This environmental information obtained by licensees is supplemented by national surveillance data collected by the AEC and the Department of HEW, as well as by environmental programs operated by other Federal, state and local agencies.

Amendments to 10 CFR Parts 20 and 50 of the Commission's rules which became effective on January 2, 1971, require that the releases of radioactive effluents from nuclear power reactors be "as low as practicable". Though no numerical values have been set at this time for "as low as practicable", the present level of releases from nuclear power reactors which are small percentages of Part 20 limits may be used for guidance in determining acceptable release limits.