UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

In the Matter of DUQUESNE LIGHT COMPANY OHIO EDISON COMPANY PENNSYLVANIA POWER COMPANY (Beaver Valley Power Station, Unit No. 1)	)))))))	Docket No. 50-334

ORDER TO SHOW CAUSE

I.

The Duquesne Light Company, Ohio Edison Company, and Pennsylvania Power Company (the licensee) is the holder of Facility Operating License No. DPR-66, which authorizes operation of the Beaver Valley Power Station, Unit No. 1 (the facility) at power levels up to 2652 megawatts thermal (rated power). The facility, which is located at the licensee's site in Beaver County, Pennsylvania, is a pressurized water reactor used for the commercial generation of electricity.

II.

On December 6, 1978 the licensee filed a Licensee Event Report, LER 78-53, indicating that there were two piping systems for which stress computations inadvertently had not been completed using a piping analysis computer code. These systems have since been reanalyzed and design modifications have been completed. In the course of this reanalysis, significant discrepancies were observed between the original computer code used to analyze earthquake loadings and a currently acceptable computer code developed for this purpose.

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In the course of a meeting on March 8, 1979 to discuss these matters, the Licensee informed the NRC staff that the differences in predicted piping stresses between the two computer codes is attributable to the fact that the piping analysis code specified in the application for an operating license uses an algebraic summation of the loads predicted separately by the computer code for both the horizontal component and for the vertical component of seismic events. This incorrect treatment of such loads was not recognized at that time. Such loads should not be alegbraically added (with predicted loads in the negative direction offsetting predicted loads in the positive direction) unless far more complex time-hist ory analyses are performed. Rather, to properly account for the effects of earthquakes, as required by General Design Criterion 2 for systems important to safety, such loads should be combined absolutely or, as is the case in newer codes, using techniques such as the square root of the sum of the squares. This conforms to current industry practice.

The inappropriate analytical treatment of load combinations discussed above becomes significant for piping runs in which the horizontal seismic component can have both horizontal and vertical components on piping systems, and the vertical seismic component also has both horizontal and vertical components. It is in these runs that the predicted earthquake loads may differ significantly.

Although the greatest differences in predicted loads would tend to be limited to localized stresses in pipe supports and restraints or in weld attachments to pipes, there could be a substantial number of areas of high stress in piping, as well as a number of areas in which there is potential for damage to adjacent restraints or supports, which could have significant adverse effects on the ability of the piping system to withstand seismic events.

In order to ascertain the specific systems that are potentially affected by this error, members of the NRC staff on March 10, 11 and 12 accompanied the Licensee's representatives to the offices of Stone and Webster, the architect-engineer of the facility to review detailed designs and computations for some of the piping systems of principal potential concern. Concurrently, on March 9, 1979 the Licensee suspended power operation of the facility. Based on this more detailed review, the NRC staff has concluded that until full renaalysis of all potentially affected piping systems important to safety has been completed with a piping analysis computer code which does not contain the algebraic summation error, the potential for serious adverse effects in the event of an earthquake is sufficiently widespread that the basic defense in depth provided by redundant safety systems may be compromised.

In view of the safety significance of this matter as discussed above, the Director of the Office of Nuclear Reactor Regulation has concluded that the public health and safety requires that the present suspension of operation of the facility should be continued: (1) until such time as the piping systems for all affected safety systems have been reanalyzed for earthquake events to demonstrate conformance with General Design Criterion 2 using a piping analysis computer code which does not contain the error discussed above, and (2) if such reanalysis indicates that there are components which deviate from applicable ASME Code requirements, until such deviations are rectified.

III.

Accordingly, pursuant to the Atomic Energy Act of 1954, as amended, and the Commission's Rules and Regulations in 10 CFR Parts 2 and 50, IT IS HEREBY ORDERED THAT the Licensee show cause, in the manner hereinafter provided,

(1) Why the Licensee should not reanalyze the facility piping systems for seismic loads on all potentially affected safety systems using an appropriate piping analysis computer code which does not combine loads algebraically;

(2) Why the Licensee should not make any modifications to the facility piping systems indicated by such reanalysis to be necessary; and

(3) Why facility operation should not be suspended pending such reanalysis and completion of any required modifications.

In view of the importance to safety of this matter, as described herein, the Director of the Office of Nuclear Reactor Regulation has determined that the public health safety or interest require that this action be effective immediately, pending further Order of the Commission. Accordingly, within 48 hours of the receipt of this Order, the facility shall be placed in cold shutdown condition, and shall remain in such mode until further Order of the Commission.

The Licensee may, within twenty days of the date of this Order, file a written answer to this Order under oath or affirmation. Within the same time, the Licensee or any interested person may request a hearing. If a hearing is requested, the Commission will issue an Order designating the time and place for hearing. Upon failure of the Licensee to file an answer within the time specified, the Director, Office of Nuclear Reactor Regulation will, without further notice, issue an order suspending further activities under Operating License DPR-66.

In the event a hearing is requested, the issues to be considered at such hearing shall be:

Whether operation under Facility License No. DPR-66 should be suspended until (1) the piping systems for all affected safety systems are reanalyzed for earthquake events using an appropriate piping analysis computer code which does not combine seismic loads algebraically, and until (2) any modifications required to restore the system to conformance with applicable ASM Code requirements are completed.

FOR THE NUCLEAR REGULATORY COMMISSION

Harold R. Denton, Director
Office of Nuclear Reactor Regulation

Dated at Bethesda, Maryland
this day of