NATHAN M. NEWMARK
CONSULTING ENGINEERING SERVICES

1211 CIVIL ENGINEERING BUILDING
URBANA ILLINOIS 61801

20 July 1979

→ H. A. Levin
C. Hofmayer
F. J. Tokarz
R. Murray
J. D. Stevenson
R. P. Kennedy
N. M. Newmark

Re: Contract NRC-03-78-150
SEP Seismic Review Evaluation
Dresden 2

Gentlemen:

The attached material is a suggested replacement for the material beginning near the bottom of page 1-9 through the end of Section 1.2, i.e., pages 1-9 and 1-10 of the Dresden report. This material was drafted over a period of several days during the Oyster Creek review and reflects discussions of the past several days as well. It needs careful review by all of us.

Sincerely yours,

Bill

W. J. Hall

PS

Enclosure

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Hydraulic tubing for control rod drives and their support

Motor-operated valves mounted on piping less than 4 in. in diameter

Battery racks

Cable trays and supports

Electrical equipment cabinets and equipment mounted therein (including for example motor control centers and switch gear)

Pipe supports designed using lateral deflection and force evaluation curves

Concluding Evaluation and Assessment -- Based on the combined experience and judgment of the members of the SSRT, the reviews and spot checks of the original design analyses, and recent revisions and amendments to these analyses, and on comparisons with similar items of equipment and components in other more recently designed reactors, it is our conclusion that:

1) The structures and structural elements of the Dresden facility are adequate to resist an earthquake with an SSE value of acceleration of 0.2 g, with one possible exception as noted earlier.

2) The piping in the facility is adequate to resist an earthquake with an SSE value of about 0.15 g without being strained beyond elastic limits; and is adequate to resist 0.2 g with acceptable inelastic deformation.

Although we have not reviewed in detail the as-built piping supports to determine that they are fully in accord with the design criteria, in our judgment the piping and supports have sufficient margins of resistance to resist an SSE earthquake acceleration of 0.2 g without loss of function.

3) Based upon the examination of selected equipment that in our judgment represents a lower bound with respect to seismic fragility, we feel that the equipment in the facility is adequate to resist an earthquake with an SSE value of 0.20 g, and subject to satisfying several points which are discussed below, should remain functional. This conclusion is based upon consideration of modern criteria involving floor response spectra, especially at upper levels of the structures where amplified motions might be expected, and with the realization that the uncertainty bound for the seismic resistance of equipment is broad. It is felt that the margins for damage of equipment are probably less than specified by current criteria, but it is our assessment that the possible damage should not impair functional capability. We recognize that less rigorous design criteria existed when the equipment was manufactured, and there was also less attention paid in the design to support of equipment.

The above conclusions are predicated on the following additional points:

i) That all safety-related electrical equipment in the plant is checked to ensure that adequate positive anchorage exists.

ii) That remaining items identified previously are evaluated and upgraded if required.

iii) That a general reconnaissance of the plant be made to identify and upgrade if necessary any overhead or suspended items which could be dislodged or fall during an earthquake and impair capability of the plant to shut down safely.