

May 24, 1985

AEOD/E508

MEMORANDUM FOR: Karl V. Seyfrit, Chief
Reactor Operations Analysis Branch
Office for Analysis and Evaluation
of Operational Data

FROM: Stuart D. Rubin, Chief
Reactor Systems Section 1
Reactor Operations Analysis Branch
Office for Analysis and Evaluation
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SUBJECT: ENGINEERING EVALUATION FOR NUCLEAR PLANT DISTURBANCES
CAUSED BY BUMPED ELECTRO-MECHANICAL COMPONENTS

Enclosed for your consideration is an Engineering Evaluation Report concerning nuclear plant operating experience involving system disturbances caused by bumped electro-mechanical components. The engineering evaluation found that enclosed switches, relays, transmitters and possibly relays in circuit breakers are among the most sensitive electro-mechanical devices in a nuclear plant. A physical disturbance will frequently change the output states of these components. Bumped components have resulted in reactor scrams, safety system isolations, trips and initiations, and loss of power to safety systems. A reactor scram, caused by bumped reactor protection system switches, was found to be among the most common occurrences for BWRs. Follow-up investigations of several bumped components which tripped or disabled a safety system, found that the component did not appear to meet current seismic qualification standards in all cases. The data collected indicates that enclosed switches, relays, transmitters and possibly relays in circuit breakers would be among the most sensitive (i.e., most likely to change state) electro-mechanical components in a plant during a major seismic disturbance. It is suggested that these

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classes of components, and their potential for causing unacceptable system transients or conditions, be considered by the NRC staff during the Phase II review of the proposed resolution for USI A-46, "Seismic Qualification of Equipment in Operating Plants."

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Enclosure:
As Stated

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