



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

AEOD/E212

FEB 24 1982

MEMORANDUM FOR: Richard H. Vollmer, Director
Division of Engineering
Office of Nuclear Reactor Regulation

Roger J. Mattson, Director
Division of Systems Integration
Office of Nuclear Reactor Regulation

FROM: Carlyle Michelson, Director
Office for Analysis and Evaluation
of Operational Data

SUBJECT: SPURIOUS TRIP OF THE GENERATOR LOCKOUT RELAY
ASSOCIATED WITH A DIESEL GENERATOR UNIT

- References:
- (1) Arkansas Power and Light Company, "Licensee Event Report: 81-014/01T-0 dated December 16, 1981," Plant Unit: Arkansas Nuclear One Unit Number 1, Docket No.: 50-313
 - (2) Arkansas Power and Light Company, "Licensee Event Report: 81-014/01T-1 dated December 31, 1981," Plant Unit Arkansas One Unit Number 1, Docket No: 50-313

The reference license event reports provide a description and also other information relating to an event which occurred at Arkansas Nuclear One (Unit Number 1) involving the generator lockout relay associated with a diesel generator unit.

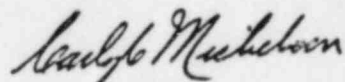
On November 19, 1981 while operating at approximately 90% of full power, an alarm actuated alerting operations personnel that the generator lockout relay associated with the Number 1 diesel generator unit had tripped. Further, investigation into this occurrence by the licensee revealed that the C phase high speed differential relay had activated and this action in turn caused a generator lockout relay to trip even though the associated diesel generator unit was not operating at the time. A walk-through by persons in the area revealed that the diesel generator exciter cubicle door may have been opened and reclosed, possibly with sufficient force to cause spurious operation of this differential relay (General Electric Model 12 CFD12BIA). Subsequent investigation demonstrated sensitivity of this relay to mechanical shock. In addition, a preliminary result of this investigation concluded that this relay did not meet seismic qualifications as applied in this design when the diesel generator unit is in the standby mode. This conclusion was based on a review of the seismic qualifications for this relay which indicated that this qualification was performed with the relay in an energized state but no such qualification was performed with the relay in a de-energized state.

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Based on our review of the referenced licensee event reports we believe there is a need to explicitly verify that the seismic qualification for all protective devices used in the control and protection circuitry for diesel generator units has been acceptably performed with these devices in their energized, de-energized, tripped and non-tripped states. This verification is recommended since for a given device, details relating to its specific application may not have been factored into the seismic qualification of that device. We also believe that in the verification of seismic qualification of these devices, special consideration should be given to those designs which use solid state circuitry, since this type of circuitry is more susceptible to spurious actuations due to normal or abnormal levels of in-plant vibrations and any associated electromagnetic interference. This verification should preclude related random and common mode failures of diesel generator units during and following a seismic event.

Further, based on our review we propose, for your consideration, that the design of the diesel generator system in a nuclear plant should include provisions to preclude spurious operation of protective devices from actuating the diesel generator lockout and/or diesel engine shutdown circuit when the associated diesel generator is not in operation. This could be achieved by the use of appropriate permissive interlocks in the protective circuitry. For example, in the above occurrence, the generator lockout circuit could be modified to include an engine speed relay interlock to preclude spurious operation of the generator differential relay from actuating the lockout when the diesel engine is not running.



Carlyle Michelson, Director
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