

**Nuclear**

GPU Nuclear Corporation  
Post Office Box 480  
Route 441 South  
Middletown, Pennsylvania 17057-0191  
717 944-7621  
TELEX 84-2386  
Writer's Direct Dial Number:

July 5, 1990  
C311-90-2060

U. S. Nuclear Regulatory Commission  
Attn: Document Control Desk  
Washington, DC 20555

Dear Sir:

Three Mile Island Nuclear Station, Unit (TMI-1)  
Operating License No. DPR-50  
Docket No. 50-289  
Heat Sink Protection System

As discussed with NRC Region I personnel on February 27, 1990, GPUN discovered a condition during the Cycle 8 Refueling (SR) Outage which deviates from our system description of the Heat Sink Protection System (HSPS) submittal dated April 29, 1985 (Reference 1) where we stated that a single active failure will neither inadvertently initiate Emergency Feedwater (EFW) nor isolate Main Feedwater (MFW). Inadvertent actuations on partial loss of power were found during post maintenance testing of the system as part of a modification to the HSPS. This letter documents the action GPUN has taken to improve the HSPS system and the current status of the system.

The HSPS is a safety-grade system that performs the functions of MFW isolation and EFW initiation. The system has four analog channels that provide input to two logic trains. The normal train logic is 2 out of 4. During the SR outage, it was discovered that a partial loss of power to the HSPS could actuate one train of MFW isolation or initiate one train of EFW. Partial loss of power is the loss of power to a single physical row (nest) of solid state logic printed circuit boards as opposed to a complete loss of power to the logic train which is made up of many such rows.

The probability of partial loss of power to the HSPS resulting in a MFW isolation was considered to be low. However, since MFW isolation was an undesirable transient, the MFW logic circuits were modified prior to startup from the SR Outage to eliminate the potential for inadvertent MFW isolation. Tests were then performed which confirmed that the HSPS now meets the criteria of no inadvertent isolation of MFW on partial or total loss of power.

Component failures or partial loss of power could result in inadvertent EFW initiation even though a total loss of power to the train would not. The potential for inadvertent EFW initiation in this manner existed prior to the SR modifications but was brought to light during installation of the SR modifications.

The potential for a single failure actuating one train of EFW still exists where the EFW initiation signal is provided by a single input to the train. The signals for EFW initiation on 1) Loss of MFW Pumps and 2) Loss of RC Pumps are single input signals which subject the HSPS to inadvertent initiation in this manner. Therefore, components associated with these features could fail in a state that would actuate the train. Under normal conditions

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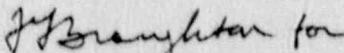
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however, inadvertent EFW actuation would not result in EFW injection into the steam generators because OTSG level would be above the level setpoint.

These design considerations have been evaluated for the TMI-1 system and our evaluation confirms that the consequences of EFW actuation are acceptable. Partial loss of power does not result in loss of the safety function and does not result in a safety hazard. The criteria for no inadvertent EFW initiation resulting from single failure was a GPUN criteria and not a regulatory requirement. Therefore the system is considered to be operable without meeting this criteria.

Additional modifications of the HSPS logic to prevent EFW actuation on partial loss of power is currently being considered. However, GPUN does not believe that EFW actuations resulting from single failures represent a concern which on the basis of safety would require further modification.

Sincerely,



H. D. Hukill

Vice President and Director, TMI-1

References:

1. GPUN Letter, Hukill to Stolz, dated April 29, 1985
2. NRC Letter, Stolz to Hukill, dated February 18, 1987

HDM/MRX

cc: J. Stolz  
R. Hernan  
F. Young  
T. Martin