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Docket No. 50-289

Mr. Henry D. Hukill
Vice President
GPU Nuclear Corporation
Post Office Box 480
Middletown, Pennsylvania 17057

Dear Mr. Hukill:

We have reviewed your submittals dated March 10, 1983 and April 14, 1983, which, in response to NRC Order dated December 10, 1982, propose an inadequate core cooling system, including a reactor coolant system Inventory Trending System for your facility. We find your submittals responsive to the requirements of the order, and further find that the proposed dp concept to be used for hot leg level monitoring and for reactor head level monitoring is tentatively acceptable. However, there are some concerns, identified in Attachment 1 to the enclosed evaluation, that you should consider during final design. We request that you specifically address these concerns in your final design submittal. Additionally, the evaluation identifies some minor items for which clarification is needed. Please provide this requested clarification within 30 days of receipt of this letter.

We have also reviewed your February 18, 1983 submittal which describes your difficulties in obtaining seismically qualified digital indicators for the subcooling margin monitor. As discussed in the evaluation, our review of this item with respect to the requirements of the December 10, 1982 order remains open pending receipt of clarifying information. However, we do find your existing indicators acceptable with respect to restart certification since alternate means, described in your February 18 submittal, exist to determine subcooling.

The reporting and/or recordkeeping requirements contained in this letter affect fewer than ten respondents; therefore, OMB clearance is not required under P.L. 96-511.

Sincerely,

"ORIGINAL SIGNED BY
JOHN F. STOLZ"

John F. Stolz, Chief
Operating Reactors Branch #4
Division of Licensing

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PDR ADOCK 05000289
P PDR

Enclosure:
As stated

OFFICE	cc w/enclosure: See next page	ORB#4:DL	ORB#4:DL			
SURNAME		JVanVliet:dk	JStolz	LPhillips		
DATE		6/14/83	6/14/83	6/14/83		

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ENCLOSURE

EVALUATION OF GPU RESPONSE TO
"ORDER FOR MODIFICATION OF LICENSE,"
DECEMBER 10, 1982
- NUREG-0737 ITEM II.F.2 FOR THREE MILE ISLAND UNIT 1

The staff in conjunction with our contractor, Oak Ridge National Laboratory (ORNL), have reviewed the GPU Nuclear submittals dated March 10, 1983 and April 14, 1983 in response to the subject order. In these submittals, GPU Nuclear has proposed a differential pressure measurement concept for monitoring of coolant inventory with the pumps not running and a RC pump motor power monitor to indicate void fraction with the Reactor Coolant Pumps turned on.

All of the differential pressure monitors use a common tap to the decay heat drain line which is representative of the bottom of the hot leg as the low point for system inventory measurement. High point taps extend from each hot leg candy cane to measure hot leg coolant inventory and from the reactor vessel head to measure reactor vessel coolant inventory. Two identical independent instrument loops are provided from the reactor vessel head tap.

GPU proposes to complete their final design description and control room design review in December 1983. Procurement and installation of the Reactor Inventory Tracking System (RITS) will be completed in September 1984. Preparation of Operator Guidelines, modification of Operating and Emergency Procedures and Technical Specifications, operator training for RITS, and testing and calibration of the system are all scheduled for completion by September 1984. The system would then be operable for Cycle 6 pending NRC approval in the last quarter of CY84. GPU Nuclear has requested that NRC concur in their conceptual design for RITS by June 1, 1983 so that they can proceed on their proposed schedule.

The staff has concluded that the proposed approach to the RITS design is tentatively satisfactory. However, we have identified some concerns which relate primarily to level measurement errors and to the vulnerability and potential consequences of a break in any of the instrument lines leading to the single tap in the decay heat line. During final design, GPU Nuclear should be aware of these concerns and modify the design if necessary to assure that conditions which could mislead the operator will not exist. Before final approval of the design, GPU should supply an analysis of the level measurement errors for both the reactor head level and the hot leg level measurements and provide the additional information requested in Attachment 1. This information may be included with the final design description which is scheduled for completion in December 1983.

The staff has also concluded that the GPU submittals are responsive to the December 10, 1982 "Order for Modification of License" and address in detail all of the information requested by the staff. However, some clarification is needed on the following:

(1) Refer to GPU letter 5211-83-071 dated March 10, 1983.
   (a) Attachment 1 page 6 - Surveillance requirements should be provided. The amendment referred to as item 4 is not dated. What is the proposed surveillance interval?
   (b) Attachment 1 page 6 and 7 - The specific data for surveillance, ease of repair and periodic testing should be provided for review as soon as it becomes available. It is not clear which items are referred to in the attachment's explanation. Discussion of these points should be provided.

(2) A design deviation has been identified in the upgrade design of the Saturation Margin Monitor. This was first reported in GPU letter 5211-83-039 from H. D. Hukill, Director, TMI-1, dated February 18, 1983. GPU Nuclear indicated that the T_{sat} margin digital indicators will not be seismically qualified because none are available in the industry. This seems inconsistent with information received from other licensees. We understand that

Westinghouse offers an SMM display which they will qualify for a price, and that Combustion Engineering offers a display which is already qualified in accordance with Regulatory Guide 1.100.

Clarification of the above items is needed so that our review of the existing instrumentation upgrade design can be completed.

ATTACHMENT 1

REQUEST FOR ADDITIONAL INFORMATION
TMI-1 PROPOSED INADEQUATE CORE COOLING INSTRUMENTATION

1. Provide an analysis of the expected errors in the hot leg and reactor vessel head level measurements. This analysis should include not only an overall estimate of the measurement uncertainty, but estimates of each contributing factor, i.e., temperature of the impulse lines, common mode pressure effects on the differential pressure transducer, and uncertainties associated with the transducer. Explain how the individual errors are combined to give an estimate of the overall error.

2. Suppose an impulse line on one hot leg was broken that would tend to drive the dp transducer full scale. How would this condition be detected? When would a level be defected in the other leg?

3. Provide specifications for the proposed dp transducers.

4. Provide an analysis to show the effects of flashing or dissolved gases in the impulse lines.

5. Discuss the ability of the transmitters to withstand a LOCA environment within the containment and be available for post-accident monitoring - consider the loss of the pressurizer transmitters in the TMI-2 accident in this discussion.

6. On page 6, "Temperature element will be installed in the reference leg, ... to correct for water density as a function of water temperature ..."

   Provide an analysis of the error that would be expected both with and without the temperature compensation.

7. On page 7, "A "caution" sign will be mounted by the inventory indication stating that readings are valid only when the reactor coolant pumps are idle."

   Describe the location of an indication of the state of the reactor pumps with respect to the location of the inventory readouts in the control room. Does "idle" mean pumps are off?

8. On page 8, "A "caution" sign will be mounted by (the void fraction) ... indicators stating that readings are valid only when the reactor coolant pumps are in operation."

   Describe the location of an indication of the state of the reactor pumps with respect to the location of the void fraction readouts in the control room.

9. On page 9, the void fraction measurement is stated to be more important for trending than absolute accuracy. In this case, is the trend available on a chart recorder for reference by the operator?

10. The analyses presented for SMLOCA's are for 0.01 square foot breaks. Describe the range of breaks for which the RITS may be useful to the operator. Specifically what is the largest sized break for which the transient proceeds slowly enough for operator action? What is the area of a stuck open PORV?

11. On page 11, "... fuel temperature rise to the point of fuel damage."

    Discuss the range of possible values of clad temperatures which you consider to be indicative of fuel damage.

12. Discuss the tap in the decay heat drop line from the standpoint of a single failure of a line leading to this tap.

13. How many of the level dp transducers will be conducted to a single tap?