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United States Nuclear Regulatory Commission  
Document Control Desk  
Washington, D.C. 20555

Perry Nuclear Power Plant  
Docket No. 50-440  
Response to the Request for Additional Information from the NRC Regarding Compensatory  
Actions Taken When Emergency Closed Cooling System Leakage Necessitates Operator Actions  
to Refill the System

Ladies and Gentlemen:

During a telephone conference call on June 11, 1997, discussions were held between members of the Nuclear Regulatory Commission (NRC) staff and Perry Nuclear Power Plant (PNPP) personnel regarding compensatory actions to be taken when Emergency Closed Cooling (ECC) system leakage necessitates operator actions to refill the system. In a letter dated June 17, 1997, the NRC staff requested that the questions discussed in the conference call be addressed in writing.

The Attachment provides a written response to the questions attached to the June 17, 1997 letter. Please note that during the recent PNPP shutdown, ECC system leakage rates were determined to be less than 0.5 gallons per hour.

If you have questions or require additional information, please contact Mr. Henry L. Hegrat, Manager - Regulatory Affairs, at (216) 280-5606.

Very truly yours,

Attachment

cc: NRC Region III Administrator  
NRC Resident Inspector  
NRC Project Manager

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## **Background**

During a telephone conference call on June 11, 1997, discussions were held between members of the Nuclear Regulatory Commission (NRC) staff and Perry Nuclear Power Plant (PNPP) personnel concerning compensatory actions to be taken when Emergency Closed Cooling (ECC) system leakage necessitates operator actions to refill the system. In a letter dated June 17, 1997, the NRC staff requested that the questions discussed in the conference call be addressed in writing.

## **Questions and Responses**

The following are the questions posed by the NRC and responses to the questions.

**Question 1: Is it correct that the operator actions are a temporary compensatory measure?**

**Response:** Yes, the operator actions are a temporary compensatory measure. The intent of the Nonconforming Condition (NCC) disposition was to be temporary, and was intended to define a degraded yet OPERABLE condition pending restoration of system leakage to nominal values.

**Question 2: What events would require these actions to be taken (i.e., operator dispatched to manually fill the tank and maintain tank level)?**

**Response:** A postulated Design Basis Accident would require these actions to be taken. This accident would involve a Loss of Coolant Accident (LOCA), Loss of Offsite Power (LOOP), Safe Shutdown Earthquake (SSE), and the postulation of a single failure. The LOOP and/or SSE would result in the normal non-safety/non-seismic source of makeup being lost. The Control Room annunciation and the power supply is considered highly reliable and is consistent with the Regulatory Guide 1.97, "Instrumentation for Light-Water-Cooled Nuclear Power Plants to Assess Plant and Environs Conditions During and Following an Accident," requirements for Category 2 Post Accident Instrumentation. Availability of this instrumentation during the Design Basis Accident would reduce the need for these actions; however, no credit for non-safety/non-seismic systems, structures, or components, including the Control Room annunciation, was assumed in the analysis.

**Question 3: Please explain the staffing requirements discussed on p. 16/26 of the 10 CFR 50.59 evaluation.**

**Response:** Plant Administrative Procedure (PAP)-0110, "Shift Staffing and Overtime," requires a minimum of five Perry Plant Operators/Assistants for the operation of PNPP Unit 1. Prior to this NCC disposition, three operator actions were required within the thirty minute timeframe. These actions involved one operator to shutdown the underdrain pumps for the Updated Safety Analysis Report (USAR) Chapter 15 liquid radwaste tank failure event, one operator to initiate the Main Steam Isolation Valve Leakage Control system, and one operator to shutdown a ventilation system for radiological control.

**Question 4:** Have you determined what the workload is expected to be for the operators over the range of events which would require them to take these actions? Would there be sufficient time and resources (i.e., operators) to carry out the activities?

**Response:** Yes, a staffing availability evaluation was conducted. The cumulative actions required within the 30 minute action are within the minimum staffing resources. After one hour, staffing levels would increase due to manning of the Technical Support and Operational Support Centers. (Also, refer to the response for Question 3.)

**Question 5:** What indications are used in the Control Room (CR) other than alarm indication (LO SURGE TK LVL) by the operators to determine if actions need to be taken?

**Response:** For the purpose of the evaluation, no other control room indications were assumed for credit in the analysis. However, indications, in the form of pump discharge pressure and ECC system flow, are available in the control room.

**Question 6:** What local indications are used by operators to assess tank level?

**Response:** The analysis took credit for the safety-related, seismically qualified level indicators at the surge tanks.

**Question 7:** Are these indications qualified?

**Response:** Yes, the local indications are safety-related and seismically qualified.

**Question 8:** What procedures are in place to direct operator actions? Under what conditions (e.g., SBO [Station Blackout], LOOP, Seismic, LOCA, etc.) would operators need to implement such procedures?

**Response:** Off-Normal Instructions (ONIs) ONI-D51, "Earthquake (Unit 1);" ONI-R61; "Loss of Control Room Annunciators (Unit 1);" Alarm Response Instructions (ARIs) associated with low surge tank levels, and the ECC System Operating Instruction (SOI) SOI-P42 had been structured to account for this temporary condition. Loss of offsite power and/or seismic events would be the precursors for implementation of the ONI procedures. Actual low surge tank levels would result in implementation of the ARIs.

**Question 9:** At what point, following the transient, would an operator be dispatched to check on tank status? What would be the proposed dose to individual?

**Response:** Procedures were structured to require these actions within 30 minutes of a potential initiator. Under design basis accident radiation levels, dose to the individual verifying surge tank status would be approximately 0.1 rem. Dose to the individual opening valve 1P42-F508A(B) to provide emergency makeup to the surge tank would be approximately 1.3 rem.

**Question 10: What is the ingress/egress path for the operators to get to tank indication and to the valve which must be opened?**

**Response:** The path for the tank indication is: Unit 2 Control Room to Control Complex door at IB-682', down stairs to IB-654', up the stairs to the IB-665' ECC Surge tank area, read the tanks' gauges, then return back to the IB-682'/Control Complex door.

The path for valve 1P42-F508A(B) is : Unit 2 Control Room to Control Complex CC-599', traverse to IB-599' to 1P42-F508A(B), open valves, and exit the area.

**Question 11: Must the operators dress-out to access the valves? Was this activity included in the timing evaluation conducted?**

**Response:** No, the operators do not need to dress-out to access the valves. The areas of concern are not normally contaminated and do not require dress-out. The same is expected during accident conditions; the dose is due to containment shine and activated piping systems.

**Question 12: Is the valve(s) to be opened in close proximity to any similar valve(s)? What provisions are in place to ensure operators do not make an error of omission or commission in performing the activity?**

**Response:** Both loops' makeup valves are in this area. No other valves of similar size are in the immediate area. Provisions in the form of training and feedback are employed.

**Question 13: Is the valve(s) routinely manipulated by operators? Is this action considered to be within the skill of the craft for the operators?**

**Response:** This valve is normally closed; the Emergency Service Water system is utilized only as an emergency makeup source, if required. The activity of opening a 2 inch manual valve is considered within the skill of the craft for operators.

**Question 14: Are there any provisions for independent verification of the manual operator actions in the field?**

**Response:** Provisions in the form of feedback and communication are present. Training continually stresses these activities. Consistent with Plant Administrative Procedure (PAP)-0205, "Operability of Plant Systems," no second field verification would be implemented due to the expected high radiation levels.

**Question 15:** Describe the training provided to the operators. Have all operators been trained on the evolution?

**Response:** All operators received specific training on the method of supplying emergency makeup to the ECC surge tanks. The revised instructions were reviewed with the operators during the normal procedural update training provided to the operators.

**Question 16:** Once the valve(s) is opened, what provisions are in place to ensure that tank overfill does not occur?

**Response:** The potential for overfilling has been analyzed, and it is expected that overfilling will occur during the evolution.

**Question 17:** What operator actions are required if overfill does occur? What is the dose projected to operators in the event this occurs?

**Response:** The procedures require 30 minute action intervals to account for potential overfill. Overfill would be non-radioactive inventory. Dose to an individual to perform valve manipulation at a time of 60 minutes to 90 minutes would be approximately 1.3 to 4.4 rem. Dose to an individual at time 90 minutes to 120 minutes for this same evolution would be approximately 1.3 to 2.3 rem.

**Question 18:** If the CR annunciation system is lost, what provisions are in place to ensure tank status is recognized, and what actions are necessary to maintain the tank level within operating band?

**Response:** ONI-R61, "Loss of Control Room Annunciators (Unit 1)" directs action to verify surge tank levels within thirty minutes, and thirty minutes thereafter, if required. ARIs are also in place to account for this loss.

**Question 19:** In the 10 CFR 50.59 review, 5 minutes is stated as being sufficient to accomplish the tasks. What is this assumed time based on?

**Response:** A time motion study was conducted for this analysis. The study was based on solicitation from plant operators and a field walk-through by the person performing the time motion study.

**Question 20:** What is the impact on the ECCS [ECC system] if the operator does not fill the tank at 54/57 minutes? What is the expected outcome at approximately 55 or 65 minutes?

**Response:** A margin of 24 minutes and 27 minutes were built into the analysis for the "A" loop and the "B" loop, respectively. Operator actions are completed within thirty minutes. At 55 minutes or 65 minutes, based on the analysis conducted, the surge tank inventories could be depleted. Although not credited in the analysis, inventory margin in the column of pipe from the surge tank to the ECC pump suction piping would allow additional inventory prior to system damage. If total inventory was depleted, cavitation of the pumps could occur eventually leading to potential loop loss.

**Commitments**

There are no regulatory commitments made in this letter. Any actions discussed in this document represent intended or planned actions, are described for the NRC's information, and are not regulatory commitments. Please notify the Manager - Regulatory Affairs at Perry Nuclear Power Plant of any questions regarding this document or any associated regulatory commitments.