Docket File

FEB 6 1980

REGULATORY DOCKET FILE COPY

MEMORANDUM FOR: Olan Parr, Chief, Light Water Reactors Branch No. 1, DPM

FROM: Rodney M. Satterfield, Chief, Instrumentation and Control Systems Branch, DSS

SUBJECT: ADDITIONAL ICSB QUESTIONS - SUSQUEHANNA UNITS 1 AND 2

Plant Name: Susquehanna Units 1 and 2
Docket Numbers: 50-387, 388
Licensing State: OL
Milestone Number: 8
Responsible Branch: LWR #1
Project Leader: S. Miner
ICSB Reviewer: R. Gregory (Savannah River Plant)
Review Status: Incomplete

Enclosed are additional questions that were generated by the Savannah River Plant ICSB reviewer following his assessment of Section 7.3 of the Susquehanna 1 and 2 Final Safety Analysis Report. We anticipate that additional questions will be forthcoming as the review continues. We suggest that these questions be forwarded to the applicant as soon as possible. The applicant should be informed that there is a need to respond as promptly as possible to ensure that the reviewer completes his review on schedule.

The numbers that appear with the enclosed questions were generated by Savannah River. Please revise the numbers to be consistent with the previous round one questions.

ORIGINAL SIGNED BY
RODNEY M. SATTERFIELD
Rodney M. Satterfield, Chief
Instrumentation and Control Systems Branch
Division of Systems Safety

Enclosure:
As stated

cc; V. Moore
S. Miner
T. Dunning
A. Madden (SRL)

OFFICE	ICSB	ICSB				
SURNAME	TDunning:cc	RSatterfield				
DATE	1/31/80	2/3/80				

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Discussion of the Emergency Core Cooling Systems and the associated tables are incomplete and inconsistent. Correct and clarify the following:

1) The same instruments are used for Reactor Vessel low water level and Primary Containment high pressure for many ESF systems. The specification shown for these instruments in Tables 7.3-1 through 7.3-5 are not consistant. Correct trip settings, ranges, and accuracies shown for these instruments.

2) These tables have allotted columns for instrument response times and margins (of trip setting) to meet requirements of IEEE 279-1971 Section 3, but most data has been omitted. Response times should indicate minimum and/or maximum where applicable.

3) Table 7.3-1 has omitted all specifications for the Turbine overspeed instrument.

4) Figure 7.3-5 has several errors:

   - It does not show two ADS logics as indicated in 7.3.1.1a.1.4.4.
   - Referenced Figure 7.3-16 does not exist.
   - It does not show low pressure interlocks to LPCI and CS required to initiate ADS as indicated in 7.3.1.1a.1.4.4.

5) Table 7.3-2 indicates only one reactor water level setpoint (-149 inches) for the ADS. Section 7.3.1.1a.1.4.4 indicates two level setpoints, a low and a lower water level.

6) Use of level switches with a range of -150"/0/+60" to initiate ADS and CS action with trip settings at -149 does not seem like conservative design. Justify the use of this range for this application. Discuss accuracy of the trip setting and how it is affected by normal and accident environmental conditions and long term drift.

7) Why are two ranges shown for LPCI pump discharge pressure (10-240 psig and 10-260 psig). Range shown for this instrument in Table 7.3-4 is 10-240 psig only.

8) Section 7.3.1.1a.1.4.5 on ADS Bypasses and Interlocks indicates that it is possible for the operator to manually delay the depressurizing action and states "This would reset the timers to zero seconds and prevent depressurization for 105 seconds." Table 7.3-2, Figure 7.3-8 Sht. 3 and Table 6.3-2 all indicate a time delay of 120 seconds. How is a time delay of 105 seconds achieved?

9) Explain why two ranges (50-1000 psig and 50-1200 psig) are listed for the Reactor Vessel Low Pressure instrument in Table 7.3-3.

10) Instrument ranges for pump discharge flow, Table 7.3-3, and pump minimum flow bypass, Table 7.3-4, are specified in inches of water but trip settings are in gpm. Supply ranges for these flow instruments in gpm.

11) Table 7.3-8 HPCI System Minimum Numbers of Trip Channels Required for Functional Performance does not agree with Table 7.3-1 HPCI Instrument Specifications. Table 7.3-8 does not list HPCI pump high suction pressure or Turbine

Overspeed as shown in Table 7.3-1. Table 7.3-8 lists two items, HPCI pump flow and HPCI pump discharge flow, not shown in Table 7.3-1.

12) Table 7.3-4 Low Pressure Coolant Injection - Instrument Specifications does not agree with Table 7.3-10 Low Pressure Coolant Injection System Minimum Number of Trip Channels Required for Functional Performance. Table 7.3-10 does not list Reactor low pressure or Pump discharge pressure as shown in Table 7.3-4. Table 7.3-10 lists several trip channels which are not shown in Table 7.3-4. These include Reactor vessel low water level inside shroud, Reactor vessel low flow, Primary containment high pressure, and Reactor vessel low water level (Recirculation Pumps).

13) Table 7.3-11 Core Spray System Minimum Numbers of Trip Channels Required for Functional Performance is incomplete. It does not list Pump Discharge Flow as shown in Table 7.3-1.

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Discussion of the Primary Containment and Reactor Vessel Isolation Control System in Section 7.3.1.1a.2 and associated Tables 7.3-5, 7.3-7 and 7.3-12 are confused, incomplete and inconsistent. Correct or clarify the following:

1) Several instruments listed in 7.3.1.1a.2.1 are not discussed in the text and/or do not appear in the tables. These include RWCS High Flow, RHRS High Flow, RICI High Flow, HPCI High Flow.

2) Several items only appear in Table 7.3-5 with no discussion. These include RCIC Turbine Steamline High Temperature and Low Pressure, HPCI Turbine Steamline High Temperature and Low Pressure, Reactor Building and Drywell Ventilation Exhaust High Radiation.

3) In Table 7.3-5, instrument ranges, setpoints, accuracies, and time responses have been omitted for many sensors. Several sensors discussed in the text are not listed at all. These include Condenser Vacuum, RHR High Temperature and Differential Temperature, RWCS Differential Temperature, Main Steamline Differential Temperature. It is understood that some setpoints will be selected based on operating conditions, but these sensors must be identified.

4) Table 7.3-12 is redundant. It has only one entry, serves no purpose and could be eliminated.

5) Section 7.3.1.1a.4.12, Main Steamline-Leak Detection, appears to serve no purpose since all items are discussed in other parts of this section on the PCRVICS.

6) Table 7.3-7, Trip Channel Required for PCRVICS, is incomplete. Many functions discussed in the text and/or listed in Table 7.3-5 are missing.

7) Section 7.3.1.1a.2.4.2 references Table 7.3-7 for instrument characteristics. These are actually shown in Tables 7.3-5.

032. It is the current staff position that Mark II suppression

7.3.1.1a.4 SUSQ 7	chamber sprays be actuated automatically instead of manually. Similar plants such as Zimmer and Shoreham are making this change. Identify any significant differences between these plants and Susquehanna in this reguard and justify the proposed manual system.
032. Table 6.2-12 7.3.1.1a.2.9 7.3.1.1a.2.11 SUSQ 8	Describe test method to be used to verify closing times for main steamline isolation valves are within limits of technical specifications. Identify any special design features to facilitate this test. Table 6.2-12 is referenced for closure times of main steamline isolation valves, but time has been omitted from that table. What is the range of acceptable closure times?
032. 7.3.1.1a.3 SUSQ 9	Review of the Main Steamline Valve Isolation Control System logic at Hatch 2 and similar plants determined that failure of a single relay could cause two redundant isolation valves to open. Has this problem been corrected in the Susquehanna design?
032. SUSQ 10	General Electric and other NSSS suppliers have reported that post-accident temperature conditions can affect reactor vessel water level instrumentation. 1) Describe the liquid level measuring systems within containment that are used to initiate safety actions or are used to provide post-accident monitoring information. Provide a description of the type of reference leg used

i.e., open column or sealed reference leg.

2) Provide an evaluation of the effect of post-accident ambient temperatures on the indicated water level to determine the change in indicated level relative to actual water level. This evaluation must include other sources of error including the effects of varying fluid pressure and flashing of reference leg to steam on the water level measurements.

3) Provide an analysis of the impact that the level measurement errors in control and protection systems (2 above) have on the assumptions used in the plant transient and accident analysis. This should include a review of all safety and control setpoints derived from level signals to verify that the setpoints will initiate the action required by the plant safety analyses throughout the range of ambient temperatures encountered by the instrumentation, including accident temperatures. If this analysis demonstrates that level measurement errors are greater than assumed in the safety analysis, address the corrective action to be taken. The corrective actions considered should include design changes that could be made to ensure that containment temperature effects are atuomatically accounted for. These measures may include setpoint changes as an acceptable corrective action for the short term. However, some form of temperature compensation or modification to eliminate or reduce temperature errors should be investigated as a long term

solution.

4) Review and indicate the required revisions, as necessary, of emergency procedures to include specific information obtained from the review and evaluation of Items 1, 2, and 3 to ensure that the operators are instructed on the potential for and magnitude of erroneous level signals. Provide a copy of tables, curves, or correction factors that would be applied to post-accident monitoring systems that will be used by plant operators.

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Pressure switches 1N022 A through S are used to actuate the 16 safety relief valves in the overpressure mode of operation as described in section 5.2.2.4.

1) Describe the logic associated with these instruments including those associated with ADS relief valves (Figure 7.3-8 Sht. 3) and non-ADS relief valves.
2) Identify design criteria and requirements met by this system.
3) Justify the use of a single instrument to operate each relief valve and analyze the effects of single failures.

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The purpose of the Recirculation Pump Trip (RPT) is to aid the Reactor Protection System (RPS) in protecting the integrity of the fuel barrier.

1) Is the RPT designed in accordance with all requirements for the RPS? If not, identify and justify any exceptions.
2) Plants such as Hatch 2 and Zimmer have provided

recirculation pump trips for reactor vessel low water level or high reactor pressure. Why have these not been provided for Susquehanna?