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Docket Nos. 50-387
and 50-388

APR 17 1980

BCC: NSIC
TIC
ACRS (16)

Mr. Norman W. Curtis
Vice President - Engineering
and Construction
Pennsylvania Power and Light Company
2 North Ninth Street
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Dear Mr. Curtis:

SUBJECT: SUSQUEHANNA STEAM ELECTRIC STATION, UNITS NOS. 1 AND 2 - REQUEST FOR ADDITIONAL INFORMATION

As a result of our review of your application for operating licenses for the Susquehanna Steam Electric Plant, we find that we need additional information in the area of Instrumentation and Control Systems. The specific information required is listed in the Enclosure.

Some of this review has been performed by the Savannah River Plant (SRP). The questions in the Enclosure were originated by SRP.

Please contact us if you desire any discussion or clarification of the information requested.

Sincerely,

Original signed by

Olan D. Parr, Chief
Light Water Reactors Branch No. 3
Division of Project Management

Enclosure:
As Stated

cc w/enclosure:
See next page

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ENCLOSURE

REQUEST FOR ADDITIONAL INFORMATION

Q032.62 It is the staff's position that the Rod Block Monitor (RBM) is a system
7.2 important to safety and should be designed, fabricated, installed, tested
SSES and subjected to all the design criteria applicable to safety related systems.
13 Design of the RBM is being reviewed on a generic basis on the Zimmer docket.
Identify any differences between the Susquehanna plant and the Zimmer plant in this regard.

Q032.63 The response to Q032.39 states "The RCIC is initially aligned to the CST for
7.4 reactor vessel make-up water but automatically switches to the suppression
SSES pool at low CST level." This does not agree with the FSAR, Section 7.4.1.1.3.6,
14 or the drawings (791E421AE) submitted for review. Correct this discrepancy.

Q032.64 Correct and clarify the following items associated with the Core Spray System:
7.3.1.1a.1.5 1) Figure 7.3-8 Sh. 3 indicates a permissive when core spray pump "B" is
SSES running. Pump B is not in Division I. The pressure switch shown (E211-N008A)
15 actually monitors pump C which is in Division I.

2) Section 7.3.1.1a.1.4.4 states in part that one of the RHR pumps or any pair of the Core Spray pumps is sufficient to give the permissive signal. It appears from Figure 7.3-8 that only two specific pairs of Core Spray pumps can give the permissive. These are the pair in each RHR loop (A & C or B & D). No other pairs can give the permissive.

Q032.65 Correct and clarify the following items associated with the Main
7.3.1.1a.3 Steamline Isolation Valve Leakage Control System (MSIV-LCS):
SSES 1) Provide instrument specifications and setpoint data. Section
16 7.3.1.1a.3.12.3 indicates there are no setpoints, but several permissive setpoints on steamline pressure, reactor pressure and leakage flow are indicated in the Functional Control Diagram, Figure 6.7-3.

2) Sections 7.3.2a.3.2.1.4 states in part that the MSIV-LCS does not comply with RG-1.96 with regard to reduction of stem packing leakage or direct leakage to the steam tunnel from MSIV. Section 6.7.1.2 states the system does conform to RG-1.96 and Section 6.7.3.5 indicates the outboard MSIV leakage is piped to the rad waste system.

3) Section 7.3.2a.3.2.1.4 references Section 5.5.5.4 which does not exist.

Q030.66 | The response to Q032.25 is incomplete. Provide a complete
7.2 | description of the design of, and the qualification plan for,
F7.2-1 | the RPS motor generator monitoring and protection equipment to
Dwg 115D6002AE | protect the connected loads from unacceptable values of
Q030.25 | voltage and frequency. Include a functional control diagram
SSES | and an elementary diagram. Also, revise elementary diagram
17 | 115D6002AE and Figure 7.2-1 to show how the protection equipment connects to the RPS and MG sets.

Q030.67
7.2.1.1.3
7.2.1.1.4.1
Dwg 791E414AE
SSES
18

The description of the backup scram DC power supplies in the FSAR and the elementary diagram (791E414AE) is inadequate. Amend the FSAR to answer the following questions:

1) Does the DC power to the trip system A and B backup scram circuits come from Class 1E sources and, if so, what are the power sources?
2) Assuming the DC power does come from separate Class 1E sources, what methods are used to separate and isolate the two DC sources in the two trip system cabinets since DC sources pass through both the trip system A and trip system B cabinets? Also, what methods are used to separate and isolate the DC power from non-Class 1E power circuits in the cabinets?

Q030.68
7.2.1.2.1.5
7.3.2a.1.2.1.7

The various analyses for Regulatory Guide 1.47, Position C.4, are incomplete since they do not indicate that the individual system level indicators can be actuated manually from the

7.3.2a.2.2.1.5 control room by the operators. Describe the provisions
SSES incorporated into the Susquehanna design to satisfy Position
19 C.4 of Regulatory Guide 1.47. (Note: This position is not intended to address the testing of annunciators, but is intended to provide manual initiation of system level indication of inoperable and bypassed status.)

Q030.69 7.3.1.1a.1.3 7.3.2a.1 F5.1-3b F7.3-6 F7.3-7 Dwg791E420AE SSES 20	The description, analyses, figures, and elementary diagram of the HPCI sensors and logic are inconsistent. The text (7.3.1.1a.1.3) begins by describing a system with only two level sensors and then continues describing a system with four level sensors and four pressure sensors. The IEEE 279 analyses appear to be for a system with four each level and pressure sensors arranged in two separate one-out-of-two-taken-twice logics. The information in Table 7.3-8 implies two separate logics. The figures (F5.1-3b, F7.3-6, and F7.3-7) and the elementary diagram (791E420AE) show only two each level and pressure sensors and a single logic.

Amend the appropriate document(s) to describe the HPCI initiation and control system actually installed at Susquehanna. Also, review the RPS, ECCS, and other ESF system descriptions in the FSAR, the FSAR figures, and the elementary diagrams and verify that these documents describe the systems actually installed.

Q030.70 Describe the actions required to restart HPCI upon again

7.3.1.1a.1.3.7 reaching reactor low water level after HPCI has been tripped
SSES due to reactor high water level.
21

Q030.71 The analysis for compliance with Regulatory Guide 1.47,
7.3.2a.1.2.1.7 Positions C.1, C.2, and C.3 appears to address the RPS and
SSES PCRVICS and not the ECCS (HPCI, ADS, CS, and LPCI) which
22 is the subject of this section. Provide an analysis showing how the ECCS meets Regulatory Guide 1.47, Positions C.1, C.2, and C.3.

Q030.72 The description of LPCI manual initiation is incomplete and is
7.3.1.1a.1.6.3 inconsistent with Figure 7.3-10 and elementary diagram
7.3.2a.1.2.1.9 791E418AE. The description of LPCI manual initiation
F7.3-10 references the HPCI system description which mentions manual
Dwg 791E418AE initiation but does not describe it. The Regulatory Guide
SSES 1.62 analysis (7.3.2a.1.2.1.9) indicates a single manual
23 initiation switch for each of the RHR A/RHR C and RHR B/RHR D LPCI systems. Figure 7.3-10 and elementary diagram 791E418AE indicate the LPCI manual initiation switch does not start the RHR pumps. Regulatory Guide 1.62, Position C.2, states that manual initiation of a protective action should perform all actions performed by automatic initiation.

Amend the FSAR and/or the figure and elementary diagram to fully describe the LPCI manual initiation system actually installed at Susquehanna. Amend the Regulatory Guide 1.62

analysis to justify having a manual initiation that does not perform all actions performed by automatic initiation, i.e., the manual initiation switch initiates the LPCI valve lineup but does not start the RHR pumps.

Q030.73
7.3.1.1a.1.6
3.1.2.1.5
F7.3-10
Dwg 791E418AE
SSES
24

Figure 7.3-10 and elementary diagram 791E418AE show an interlock between the RHR systems in Units 1 and 2 such that when a LOCA signal (Low Reactor Water Level or High Drywell Pressure in coincidence with Low Reactor Pressure) is present in one unit, the RHR pumps in the other unit are prevented from operating either automatically, manually, or remote-manually from the individual pump start/stop switches. This interlock is not mentioned or described in the FSAR text and appears to be a violation of GDC 5.

Amend the FSAR and/or the figure and elementary diagram to fully describe the interlocks between the RHR systems in Unit 1 and Unit 2. Provide a detailed analysis to justify having such an interlock that will prevent the safe and orderly shutdown and cooldown of one unit (by preventing RHR operation) while a LOCA signal is present in the second unit. Include this interlock in your discussion and analysis of compliance with GDC 5 (3.1.2.1.5).

Also, identify and describe any other interlocks between Units 1 and 2 in any other instrumentation or control system.

Q030.74
7.3.1.1a.2
7.3.2a.2
F5.1-3b
F7.3-8
Dwgs 791E401AE
791E414AE
791E425AE
Q032.33
SSES
25

For the PCRVICS, a large number of inconsistencies, errors, omissions, and conflicts were noted between the descriptions (7.3.1.1a.2), the analyses (7.3.2a.2), the functional control diagram (Figure 7.3-8), and the elementary diagrams (791E401AE, 791E414AE, and 791E425AE). Some examples follow:

1) The FSAR (7.3.1.1a.2.4.1.1.1) indicates four level switches with two sets of contacts each - one set of contacts for low level and one set for low low (lower) level. Also, a single pair of reactor vessel pressure taps for each pair of switches was indicated. Figures 5.1-3b and 7.3-8 and elementary diagrams 791E401AE and 791E414AE show two sets of four each level switches - one for low level and one for low low level. Figure 5.1-3b also shows the low level and low low level switches connected to different pressure taps.

2) The FSAR (7.3.1.1a.2.4.1.1.1) indicates that the low low water level signal isolates the MSIVs, the steam line drain valves, the sample lines, and "all other NSSS isolation valves." Further review of the FSAR text, figures, and elementary diagrams shows low low water level only isolates the MSIVs, steam line drain valves, and the sample lines. No "other NSSS isolation valves" could be found that were actuated by the low low water level signal.

3) The FSAR indicates the PCRVICS instrumentation and control subsystems include: (10) main steamline - leak detection, (12) reactor water cleanup system - high flow, (14)

reactor core isolation cooling system - high flow, and (15) high pressure coolant injection system - high flow. The remaining text does not discuss these items nor were they found in the elementary diagrams or figures.

4) The FSAR (7.3.1.1a.2.4.1.9) indicates that RWCU system high differential flow is sensed with "two differential flow sensing circuits" and the analyses section indicates the PCRVICS complies fully with the single failure criteria. The RWCU P&ID and the elementary diagrams show only one high differential flow instrument consisting of three flow transmitters driving a single summer which, in turn, drives two alarm units (one for each of the two trip channels). This arrangement does not meet the single failure criteria.

5) Elementary diagram 791E401AE shows a device (dPIS G33-N044A) labeled "High Diff Flow" in addition to the device in 4) above. N044A appears as a differential pressure switch in the RWCU P&ID. No other reference to this device could be found in the text or elementary diagrams.

6) The text states "RWCU system high differential flow trip is bypassed automatically during RWCU system startup." No information on this bypass could be found on the elementary diagrams (791E401AE or 791E423AE) or in the various analyses in Section 7.3.2a.2.

7) The text indicates "main condenser low vacuum trip can be bypassed manually when the turbine stop valve is less

than 90% open." Elementary diagram 791E401AE and the response to Q032.33 shows that "reactor low pressure" is also required to allow this bypass. No other information on this "reactor low pressure" permissive, including the setpoint, could be found in the FSAR.

8) The FSAR (7.3.1.1a.2.5 and 7.3.1.1a.2.11) mentions a "high differential pressure" signal used for RWCU isolation. No other information could be found on this signal either in the text or the elementary diagrams.

9) The FSAR (7.3.1.1a.2.11) mentions "high temperature downstream of the non-regenerative heat exchanger" as a RWCU isolation signal. Elementary diagram 791E401AE also shows this signal, but only shows a single instrument, which does not meet the single failure criteria. This isolation signal is not discussed, described, or justified in the text or the analyses.

10) Elementary diagram 791E401AE also shows a single SBLC system isolation signal that does not meet single failure criteria. This signal is also not discussed in the text or the analyses.

11) Elementary diagram 791E401AE shows an RHR isolation for "Excess Flow" and "High Reactor Pressure." No information could be found on these signals in the text or analyses.

12) The text indicates that RWCU and RHR systems high area and differential temperature subsystems have "no automatic bypasses." Elementary diagram 791E401AE shows a manual bypass switch for this subsystem. The text also says that

the main steamline low pressure and the condenser low vacuum bypasses are the only bypasses in the PCRVICS.

13) The text indicates that the main steamline high radiation system has bypasses on the individual instruments that are not described in the FSAR or included in the analyses (7.3.2a.2).

Amend the appropriate document(s) to fully and accurately describe the PCRVICS instrumentation and control systems actually installed at Susquehanna. Amend the PCRVICS analyses presented in Section 7.3.2a.2 to agree with the systems discussed in the text and shown in the figures and elementary diagrams.

For the bypasses, fully describe and justify all manual or automatic bypasses associated with any PCRVICS subsystem and include all bypasses in the various Section 7.3.2a.2 analyses. Include a description of how all bypasses are annunciated. Also, review the complete PCRVICS descriptions and analyses given in the FSAR and the figures and elementary diagrams. Verify that these documents accurately describe the systems actually installed at Susquehanna.

Q030.75 Justify your claim that high drywell pressure provides
7.3.1.1a.2.4.1.1.5 "diversity of trip initiation for pipe breaks inside primary
SSES containment" when high drywell pressure will not close MSIVs,
26 isolate RWCU, or reactor water sample lines. Also, discuss

diversity for breaks outside primary containment.

Q030.76
7.3.1.1a.3
SSES
27

Justify locating the MSIV-LCS controls, instrumentation, and indicators needed for effective operation on back row panels in the control room. Describe the panels and their location with respect to other safety-related instrumentation and controls required for accidents.

Q030.77
7.3.1.1a.4
7.3.2a.4
F7.3-10
Dwg 791E418AE
SSES
28

For the containment spray cooling system, the following inconsistencies and errors were noted between the FSAR description (7.3.1.1a.4), the analyses (7.3.2a.4), the function control diagram (FCD) (Figure 7.3-10), and the elementary diagram (791E418AE):

1) The description indicates high drywell pressure is the only permissive required for containment spray cooling manual initiation. The analyses, FCD, and elementary diagram show high drywell pressure <u>or</u> reactor low level as the permissive. The FCD and elementary diagram also show LPCI injection valve (F015A) closed as another permissive.
2) The description indicates "containment spray is interlocked with reactor water level." This interlock was not addressed in the analyses and could not be found in the FCD or elementary diagram.
3) The description indicates the "two drywell pressure switches are electrically connected so that no single sensor failure can prevent initiation of containment spray A." This could not be verified in the analyses, FCD, or

elementary diagram.

Amend the appropriate document(s) to fully and accurately describe the containment spray cooling instrumentation and control system actually installed at Susquehanna. Amend the analyses presented in Section 7.3.2a.4 to agree with the description. Also review the complete containment spray descriptions, analyses, figures, and elementary diagrams and verify that these documents accurately describe the systems actually installed.

Q030.78
7.3.1.1b.4
7.3.1.1b.5
7.3.1.1b.8.5.4
7.3.1.1b.8.5.5
SSES
29

Discussion of the SGTS, RBRC, HPCI, and RCIC pump rooms unit coolers, and SWGR cooling system indicates the two trains for each system are normally set up in a "lead-lag" fashion and that when the manual control switches for the fans are in the STOP position, this is annunciated on the BIS. What controls are used to ensure the switch for one train is in the LEAD position and the switch for the other train is in the STANDBY position? What are the consequences of having the switches for both trains in either the LEAD or the STANDBY positions when an emergency initiation signal is received and what effect on the safety of the public or the release of radioactivity to the environment would this have?