PSNH PUBLIC SERVICE
Company of New Hampshire

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February 17, 1983
SBN-471
T.F.B 7.1.2

United States Nuclear Regulatory Commission
Washington, D. C. 20555

Attention: Mr. George W. Knighton, Chief
Licensing Branch 3
Division of Licensing

Reference: (a) Construction Permits CPPR-135 and CPPR-136, Docket Nos. 50-443 and 50-444

Subject: Open Item Responses (SRP 7.3.2, 7.4.2, 7.5.2, 7.7.2; Instrumentation and Control Systems Branch)

Dear Sir:

We have enclosed revised pages of previously submitted ICSB Meeting Notes/Responses to Requests for Additional Information in response to the following ICSB open items.

NRC Branch	SRP Section	Comments
ICSB	7.3.2	Solid-State Protection System Relay Contacts 420.81 (Revised)
ICSB	7.4.2	Systems Required for Safe Shutdown and Remote Shutdown 420.38, 39 (Revised)
ICSB	7.5.2	Radiation Data Management System 420.12 (Revised)
ICSB	7.7.2	Control Systems Failures 420.63 (Revised)
ICSB	7.7.2	IE Notice 79-22 420.62 (Revised)

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Please note that we have also enclosed supplementary information regarding RAI 420.21 and 420.29.

The enclosed responses will be incorporated in OL Application Amendment 49.

Very truly yours

YANKEE ATOMIC ELECTRIC COMPANY

John DeVincentis

John DeVincentis
Project Manager

JDeV/smh

cc: Atomic Safety and Licensing Board Service List

420.12

ADDITIONAL RESPONSE: 11/82 1/83 2/83

The design of the RDMS supplied by the General Atomic Company is consistent with the criteria for physical independence of electrical systems established in "Attachment C" of AEC letter dated December 14, 1973 (see FSAR Appendix 8A) and in Regulatory Guide 1.75, Revision 2. In addition, the independence of Class 1E equipment and circuits follows IEEE Standard 384-1981, Section 7, regarding specific electrical isolation criteria.

All Class 1E equipment is supplied with power from the appropriate Class 1E power source train.

Communications within the RDMS System between the various microcomputer based monitors takes place via redundant semiduplex lines, transmitting and receiving low level digitally coded signals. All of these monitors are provided with semiconductor-based optical isolators that isolate all communication lines from the internal circuitry of the monitors.

Further, all Class 1E monitors are provided with state-of-the-art fault isolation devices. Each communication line is provided with overcurrent and overvoltage protection. Overcurrent protection is provided by incorporating a low current fuse in each line just before it enters the optical isolator circuitry which is part of each monitor. The overvoltage protection is provided by the use of a Transzorb device between the two communication lines and from each communication line to ground (see Figures 1, 2, and 3).

The Transzorbs are semiconductor-based devices incorporating a zener diode and Silicon Controlled Rectifier (SCR) units. When the input voltage exceeds 28 volts, the zener diode will conduct all voltage above 28 volts, charging the capacitor. When the capacitor voltage reaches 2 volts (SCR trigger voltage) the SCR conducts and shorts the fault voltage to ground or between the lines, whichever is the case. If the power in the fault voltage is of a significant nature, it will cause the fuse to blow, which will result in complete circuit isolation.

The qualification plan for the fuse/Transzorb combination used as an isolation device consists of the following two steps:

1) A Maximum Credible Fault Voltage test has been performed (copy of Test Report 0357-9018, dated 6/15/81, is attached) to prove that the components, when exposed to the maximum credible voltage, will protect the RM-80 such that the safety-related functions will not be affected.

   The following is a summary of the test procedure and results which confirm that the isolator performs the required isolation function.

   The testing was accomplished by applying fault voltages at communication of a radiation monitor port A (and subsequently port B) of +140 volts dc, -140VDC and 140 volts ac. These fault voltages envelope the maximum credible fault voltages, surge or continuous, at Seabrook. Fault voltages are limited | 2/83

420.12

by routing low level signal cables in raceways separate from all other cables (FSAR 8.3.1.4.c) and due to the low fault potential of the power sources that feed instrumentation that is connected to low level cables (inverters are limited to 120 ±1.2 V ac, transformers to 120 ±12 V ac, battery chargers on equalize charge to 137 ±0.5 V dc). Fault voltages were applied between each conductor and ground as well as between conductors. In each case, port B continued to function properly thereby proving proper operation of radiation monitor and that the isolator protects the 1E functions from faults on the non-1E circuits. 2/83

Port B was similarly tested. Port A continued to function properly indicating proper operation of the monitor before and after the test and isolation from the faulted input. Proper operation during application of the fault voltages will be addressed with 420.16. 2/83

2) A study to prove that the Transzorb and fuse have no age-related failures over the 40-year life of the plant.

The results of the study are:

a. The Transzorb is a solid-state device with an activation energy of 1 ev. The manufacturer on a periodic basis samples test units to 150-200°C for 50 hours. By extrapolation on an Arrhenius curve using the activation energy and the test temperature and test time, the life of the device is several orders of magnitude greater than 40 years at normal operating conditions (40°C). Therefore, the Transzorb has no significant age-related failures.

b. A fuse is nothing more than a piece of wire which has no age-related failures which would cause it not to blow upon high current through it. There are no insulation materials in the device which would degrade with age.

ADDITIONAL RESPONSE: 1/83

Qualified isolation devices that meet the requirements of IEEE-279 are provided at the interface between protection and control systems. Faults in the control systems will not prevent the protection system from performing its safety function.

Non-1E cables and circuits in seismic and non-seismic areas are associated with one Class 1E train, are never routed in raceways containing Class 1E or associated cables of another train or channel and are physically separated the same as the Class 1E circuit with which they are associated. (See RAI 430.149.) The Seabrook design complies with requirements of FSAR Appendix 8A, IEEE 384-1974 and Regulatory Guide 1.75, Rev. 2.

Electrical interaction (crosstalk) between the Class 1E and non-1E calbles in the same routing group is minimized by the use of shielded cables, grounding, separation by voltage level and dedicated raceways for circuits that are noise sensitive (nuclear instrumentation) or are noise sources (control rod drives). (See FSAR 8.3.1.4 and RAI 430.149.)

There are no other safety-grade sensors routed through non-seismic areas. The only safety-related outputs in non-seismic areas are signals to close the feedwater control valves, close the condenser dump valves and trip the turbine generator. These circuits are designed as described above.

ADDITIONAL RESPONSE: 5/12 — The handout was discussed and revised.

Each turbine stop valve is monitored by two independent switches.

STATUS: 7/15 — Closed. ICSB will follow PSB review of separation per Regulatory Guide 1.75.

HANDOUT: 3/23 — Revised SNUPPS Submittal

9/14
2/83

Evaluations indicate that the functional performance of the protection system would not be degraded by credible electrical faults such as opens and shorts in the circuits associated with reactor trip or the generation of the P-7 interlock. The contacts of redundant sensors on the steam stop valves and the trip fluid pressure system are connected through the grounded side of the ac supply circuits in the solid state protection system. A ground fault would therefore produce no fault current. Loss of signal caused by open circuits would produce either a partial or a full reactor trip. Faults on the first stage turbine pressure circuits would result in upscale, conservative, output for open circuits and a sustained current, limited by circuit resistance, for short circuits. Multiple failures imposed on these redundant circuits could potentially disable the P-13 interlock. In this event, the nuclear instrumentation power range signals would provide the P-7 safety interlock. Refer to Functional Diagram, Sheet 4 of Figure 7.2-1.

SSPS input circuits and sensors in non-seismic structures are Class 1E and are routed in conduit to maintain train separation and to prevent the application fault voltages greater than the maximum credible fault voltages (see 420.29). The electrical and physical independence of the connecting cabling conforms to Regulatory Guide 1.75. 2/83

STATUS: 9/14 — Closed.

420.22 (7.2.1.1) — FSAR Section 7.2.1.1.b.8 states that, "The manual trip consists of two switches with two outputs on each switch. One output is used to actuate the train A reactor trip breaker, the other output actuates the train B reactor trip breaker." Please describe how this design satisfies the single failure criterion and separation requirements for redundant trains.

RESPONSE: 3/23 — Manual trip design is identical to SNUPPS, Watts Bar, Byron-Braidwood. Drawing was reviewed and found acceptable.

420.29

ADDITIONAL RESPONSE: 5/12 — See 420.29.

STATUS: 7/15 — Closed.

420.29 (7.3.2.1) — Confirm that the FMEA referenced in FSAR Section 7.3.2.1: (1) is applicable to all engineered safety features equipment within the BOP and NSSS scope of supply, and (2) is applicable to design changes subsequent to the design analyzed in the referenced WCAP.

RESPONSE: 3/23 — Discussion of this item was deferred to the next meeting.

ADDITIONAL RESPONSE: (28&29) 5/12 2/83 — The Seabrook design complies with the interface criteria in Appendix B of WCAP 8584, Revision 1. The FMEA in WCAP 8584 is applicable to all BOP and NSSS safety features equipment at Seabrook including design changes made to the systems analyzed in WCAP 8584.

Separation by potential, Item 3, is met by routing low level or control cables in raceways that are separate from each other and from all other cables (FSAR 8.3.1.4.c). Fault voltages are limited by the low fault potential of the power sources that feed the cables that are routed in the raceways (inverters are 120 ± 1.2 V ac, transformers 120 + 12 V ac, battery chargers on equalize charge 137 ± 0.5 V dc). This ensures that the maximum credible fault voltages that could be applied to the SSPS are within the fault voltage envelope for which the SSPS is qualified to withstand without loss of function. 2/83

STATUS: 7/15 — Closed.

420.30 (7.3) — Section 7.3.2.2 of the FSAR indicates that conformance to Regulatory Guide 1.22 is discussed in Section 7.1.2.8. However, Section 7.1.2.8 addresses Regulatory Guide 1.63. Correct this discrepancy.

RESPONSE: 3/23 — The reference to Section 7.1.2.8 will be changed in Amendment 45 to Section 7.1.2.5 where Regulatory Guide 1.22 is addressed.

STATUS: 9/14 — Closed.

420.31 (7.3.2.2) — Using detailed drawings, discuss the automatic and manual operation of the containment spray system including control of the chemical additive system. Discuss how testing of the containment spray system conforms to the recommendations of Regulatory Guide 1.22 and the requirements of BTB ICSB 22. Include in your discussion the tests to be performed for the final actuation devices.

The design for the safety grade wide-range nuclear instrumentation has the electronics mounted such that they would not be affected by a fire in the control room cable spreading room. The indication that will be provided at the remote shutdown location will be safety grade. We are reviewing a conflict between our Appendix R response (de-energization of the SSPS) and the ICSB guidance to meet Appendix K (do not disable ESF actuation prior to cooldown). We will provide our position on this item.

The draft revision to FSAR 7.4 submitted with the March 23, 1982, meeting minutes is being revised to reflect the latest design of the remote shutdown equipment and will address the positions in your April 21, 1982 letter, item-by-item.

ADDITIONAL RESPONSE: 1/83 — A revised FSAR Section 7.4 is attached.

ADDITIONAL RESPONSE: 2/83 — Our compliance with the ICSB positions on remote shutdown capability is documented as indicated below:

Letter dated April 21, 1982

Position	Compliance Documentation
1) hot shutdown	7.4.2, 7.4.6, 7.4.7
manual actions	7.4.2, 7.4.6
no temporary modifications	7.4.6 (revised)
2) cold shutdown	7.4.6, 7.4.7
3) disable ESFAS	modified by later position

ICBS Guidance for the Interpretation of GDC-19 Concerning Requirements for Remote Shutdown Stations

1) hot shutdown	7.4.2, 7.4.6, 7.4.7
service conditions	7.4.1, 7.4.5, 7.4.7
seismic qualification	7.4.6
2) redundant instrumentation	7.4.6, 7.4.6, 7.4.7
3) manual actions	7.4.2, 7.4.6
no temporary modifications	7.4.6 (revised)
4) cold shutdown capability	7.4.2, 7.4.5, 7.4.6
5) loss of off-site power	7.4.5d

actions would be necessary to assure that hign energy line breaks will not cause control system failures to complicate the event beyond the FSAR analysis. Provide the results of your review including all identified problems and the manner in which you have resolved them.

The specific "scenarios" discussed in the above referenced Information Notice are to be considered as examples of the kinds of interactions which might occur. Your review should include those scenarios, where applicable, but should not necessarily be limited to them.

RESPONSE: 3/23 — We will identity key control systems that effect plant safety and analyze for effects of high energy line break. Review will be completed and formal response to I&E Information Notice 79-22 submitted.

STATUS: (420.62 & .63) 9/14 — We have received the memo from Check to Tedesco that provides additional guidance. Our review is in progress and the required reports will be submitted later.

RESPONSE: 1/83 2/83 — Since questions 420.62 and 63 deal with the same control systems and require similar analysis, we have combined the answers.

The evaluation required to answer Question 420.62 and 63 consists of postulating failures which affect the major control systems and determining what the resulting event will be. The following are events which were considered:

a. Loss of any/or combination of instruments (due to a high energy line break), | 2/83

b. Loss of power to all systems powered by a single power supply,

c. Break of an instrument sensing line providing input to multiple sensors or failure of a common sensor providing input to multiple control systems. | 2/83

The analysis was conducted for the following five major control systems:

1. Rod control

2. Steam dump

3. Pressurizer pressure

4. Pressurizer level

5. Feedwater

For this analysis, all operational modes were considered.

420.62/63

Loss of Any Single Instrument

Table 1, Sensor Failure Analysis, is a sensor by sensor evaluation of all sensors, which provide input to a control loop of the above system and could be affected by a High Energy Line Break (HELB). This table does not include equipment which is located in areas that are not affected by a HELB, nor does it include Class 1E equipment which is qualified to operate in its harsh environment. The table provides the particular sensor by Tag number, sensor function, failure both high and low, effect of the failure, and bounding event. In addition, the failure of multiple sensors due to a HELB was analyzed.

Our analysis of the effects of each single and multiple sensor failure associated with each postulated HELB indicates that the resulting events are bounded by the FSAR analysis.

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Loss of Common Power Supplies

The five major control systems are powered either from a protection set, control group, or Balance of Plant (BOP) Process Control System. The four (4) protection cabinets and the Control Groups 1 and 3 are powered from redundant 120 volt vital instrument buses. Control Groups 2 and 4 are powered from a common 120 volt vital instrument bus. The two BOP Process Control Systems are powered from a common 120 volt bus.

The following table provides the control cabinet and inverter power supply by tag number:

Tag #	UPS #
CP1	UPS 1-1-1A
CP2	UPS 1-1-1B
CP3	UPS 1-1-1C
CP4	UPS 1-1-1D
CP5	UPS 1-1-1A
CP6	UPS 1-1-1E
CP7	UPS 1-1-1C
CP8	UPS 1-1-1E
CP153	UPS 1-4
CP175	UPS 1-4

Table 2 considers loss of power to protection sets and control groups. The table indicates the system, signal affected, itemized effect, and bounding event for each protective set and control group. It should be noted that Control Groups 2 and 4 are analyzed separately in this table. This was done to account for the fact that they are powered from separate feeders. It can be seen from reviewing the table that the effect would be the same if Control Groups 2 and 4 were lost at the same time.

Table 3 considers loss of power to BOP process control equipment feed from a common power supply. This table also indicates the system, signal affected, itemized effects, and bounding event.

420.62/63

Loss of Common Sensors

There are no common impulse lines or hydraulic headers that provide signals to two or more control systems at Seabrook Station. The following sensors provide input to multiple control systems:

Tag #	Signal	Input To
MS PT507	Steam Header Pressure	Steam Dump, Feedpump Speed Control
MS PT505	Turbine Impulse Pressure	Steam Dump, Feedwater Control
Power Range Neutron Detectors	Power Range Flux	Rod Control, Tavg

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We have considered the failure both high and low of these sensors and determined that the results are bounded by the FSAR Analysis.

A table will be provided to document the effects.

Summary

Our review of the five major control systems clearly shows that the loss of any single sensor or power supply will result in events that are bounded by the FSAR analyses. In addition, we have considered multiple failures of sensor or power supplies and have determined that in all cases the resulting event will be bounded by the FSAR analysis.

TABLE 2

LOSS OF POWER TO CONTROL GROUP 1 (CP-5)

CONTROL SYSTEM AFFECTED	SIGNAL AFFECTED	ITEMIZED EFFECT	BOUNDING EVENT
Steam Dump to Cond	Trip Open Cond Dump, Auto Modulation of Cond Dump Valves MS-PV 3009,10, 11,12,13,14,15, 16,17,18,19 and 20	No control action. Steam dump to condenser Blocked. Atmospheric dump valves and steam generator safety valves still available.	No event.
Rod Control	Neutron Flux	No control action.	No event.
FW Control	Auto control of FW-FCV 510, Steam Flow Reference from Loop 1 to Pump Speed Control	FW-FCV 510 closes causing. Loss of FW TO SG 1 Feedpump speed may decrease. During power operation this would cause a plant trip on low SG level.	Loss of normal feedwater. See FSAR 15.2.7.
Pressurizer Level	Low-Level Cutoff for Pressurizer Heaters and Letdown Isolation	No control action, auto functions blocked.	No event.
Pressurizer Pressure	Heater Control, Pressurizer Spray Valves RC-PCV 455 A&B and PORV RC-PCV-456A	Variable heater and spray off. RCS cold over pressurization loss of auto control for RC-PCV-456A. During power operation plant will trip on low SG level. During all other modes of operation, plant will trip on high or low pressurizer pressure.	For loss of power to CP-5 during power operation, the bounding event is loss of normal feedwater, FSAR Section 15.2.7. During all other modes of operation, the bounding event will be either inadvertent opening of pressurizer safety or relief valve, see FSAR Section 15.6.1, or RCS overpressure, see FSAR Section 15.2.2.

TABLE 2

LOSS OF POWER TO PROTECTION SET II (CP-2)

CONTROL SYSTEM AFFECTED	SIGNAL AFFECTED	ITEMIZED EFFECT	BOUNDING EVENT
Steam Dump	Turbine Impulse Pressure (PT 506)	Steam dump demanded but blocked.	No event.
Rod Control	Power range Flux, TAVG	No control action.	No event.
FW Control	S. G. Level (FW-LT-552 & 553)	If signal used for control. FW Control Valve FW-FCV520 will go full open. During power operation, plant will trip on high SG level.	Excessive feedwater flow, see FSAR Section 15.1.2.
Pressurizer Level	Prz. Level (RC-LT-460)	If affected signal used for control, letdown is isolated, heaters blocked. During power operation, plant will trip on high SG level. During all other modes of operation, plant will trip on high pressurizer level.	During power operation, bounding event will be excessive feedwater flow, see FSAR Section 15.1.2. 2/8 During all other modes of operation, the bounding event will increase in reactor coolant inventory, see FSAR Section 15.5.2. 2/8
Pressurizer Pressure	Prz. Pressure (RC-PT-456)	No control action PORV, RC-PCV-456B, blocked.	No event.

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TABLE 2

LOSS OF POWER TO PROTECTION SET III (CP-3)

CONTROL SYSTEM AFFECTED	SIGNAL AFFECTED	ITEMIZED EFFECT	BOUNDING EVENT
Steam Dump	None	No effect.	No event.
Rod Control	Power Range	No control action	No event.
FW Control	None	No effect	No event.
Pressurizer Level	Prz. Level (RC-LT-461)	If affected signal used for control, charging pump speed increases, charging flow control valve CS-FCV-121 goes full open, letdown isolated and heaters blocked.	Bounding event will either increase in reactor coolant inventory, see FSAR Section 15.5.2, or RCS overpressure, see FSAR Section 5.2.2.
Pressurizer Pressure	Prz. Pressure (RC-PT-457)	If channel is selected for control the backup heaters will come on and spray will be blocked. The plant will trip in either high pressurizer level or pressure.	

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420.62/63

420.81

AUDITIONAL RESPONSE: 1/83 2/83

An independent test was performed to verify the contact current carrying capabilities of the SSPS slave relay. Three relays were removed from the Seabrook SSPS cabinet for use in the test. They will be replaced with new relays. The test was performed using a single set of contacts controlling the close coil and lockout coil from the Gould Model 5HK 350 5 kV breaker used in the Seabrook design. This load is the maximum load that any of the SSPS slave relay contacts energize; approximately 5.5 amps at the test voltage. Test voltage was 137.5 $\pm$ 0.5 volts dc based on the maximum voltage expected on the plant's 125 V dc distribution system including instrument error. Each relay was cycled 1000 times; twice the number of operations expected during the lifetime of the plant. A cycle consisted of energizing the load by closing the SSPS slave relay contact. After the 70 to 80 milliseconds (average closing time for Model 5HK 350 breaker), an auxiliary relay interrupted the current flow. The auxiliary relay simulated the function of the breaker auxiliary "b" contact which interrupts the closing circuit once the breaker has closed. Two sketches, showing the test setup, are attached. 2/83 2/83

Each of the three relays tested passed the 1000 operation test, successfully energizing the closing and lockout coils. Furthermore, measurements of contact resistance made before, during and after the test showed that there was less than a 5% increase from the pre-test contact resistance values. This small change in resistance represents only 0.0006% of the total test circuit resistance. 2/83

Inspection of the relay contacts upon completion of the test revealed no visible contact wear.

The small increase in contact resistance, the lack of any visible contact wear, and the test results which show that the relay performs its safety function before, during and after the test verified the ability of the SSPS slave relay to perform its design function using a single set of contacts.

Based on the results of the SSPS slave relay test, the Seabrook design will be modified to a single contact scheme as was used for the test.

A test report will be available by 2/1/83.

7.4.6 Analysis

Hot standby is a stable plant condition, automatically reached following a plant trip. The hot standby and hot shutdown conditions can be maintained safely for an extended period of time. In the unlikely event that access to the Main Control Room is restricted, the plant can be safely kept at hot standby, hot shutdown or brought to cold shutdown, by the use of the equipment listed in Subsection 7.4.7. The required indicators and controls are provided in the Main Control Room and the RSS locations. This equipment, with the exception of the pressurizer heaters and the indication at the RSS locations, is redundant and safety grade and meets the applicable requirements of IEEE 279-1971, 323-1974 and 344-1975. Failure of a single component will not prevent safe shutdown from the Control Room or the RSS locations.

The pressurizer heaters meet the requirements of NUREG-0737, Item II.E.3.1 and are provided with manual controls in the Main Control Room that override all interlocks.

All control provisions at the RSS locations consist of selector switches that | 2/83
isolate the Main Control Room and transfer control to the RSS locations, and control switches to perform the manual control functions (the MSIVs only have selector switches that also close the MSIVs when local control is selected). Selecting local control initiates an alarm in the Main Control Room, turns off the MCB indicating lights and isolates all automatic functions, interlocks and Main Control Room controls that rely on Main Control Room equipment or cables. Jumpers, lifted leads or temporary circuits are not required. | 2/83

The Main Control Room instrumentation is Class 1E.

Instrumentation at the RSS locations is independent of the Main Control Room instrumentation. It is activated continuously so that its availability can be monitored. The RSS instrumentation will be available following all natural phenomena.

High Pressure Injection	SI-V-138	CP-108A
High Pressure Injection	SI-V-139	CP-108B
VCT Disch. Isol. Valve	CS-LCV-112B	CP-108A
VCT Disch. Isol. Valve	CS-LCV-112C	CP-108B
SI Accum. TK-9A Isol.#	SI-V-3	CP-108A
SI Accum. TK-9B Isol.#	SI-V-17	CP-108B
SI Accum. TK-9C Isol.#	SI-V-32	CP-108A
SI Accum. TK-9D Isol.#	SI-V-47	CP-108B
SI Accum. TK-9A Vent Vlvs.#	SI-V-2475,2476	CP-108B
SI Accum. TK-9B Vent Vlvs.#	SI-V-2482,2483	CP-108A
SI Accum. TK-9C Vent Vlvs.#	SI-V-2477,2486	CP-108B
SI Accum. TK-9D Vent Vlvs.#	SI-V-2495,2496	CP-108A
Bus E52 Feeder Breaker to MCC-E-522	AW9	CP-108A
Bus E62 Feeder Breaker to MCC-E-622	AW0	CP-108B

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(3) Reactivity Monitoring and Control

Description	Device	Remote Control Location	Instrumentation Location MCB	CP108A	CP108B
Boric Acid Trans. Pump	CS-P-3A	Swgr. Rm. A			
Boric Acid Trans. Pump	CS-P-3B	Swgr. Rm. B			
BA to Chg. PP Isol. Valve	CS-V-426	Swgr. Rm. B			
BA to Chg. PP Isol. Valve*	CS-V-452	N/A			
Wide-Range (Excore)	NI-NI-6690	Swgr. Rm. A	X	X	
Neutron Monitors	NI-NI-6691	Swgr. Rm. B	X		X

*CS-V-452 is a manual valve which would be required to operate only in the event that CS-V-426 failed.

(4) Servi Water (SW)

Description	Device	Remote Control Location	Instrumentation Location MCB	CP108A	CP108B
Service Water Pump	SW-P-41A	Bus E5			
Service Water Pump	SW-P-41B	Bus E6			
Service Water Pump	SW-P-41C	Bus E5			
Service Water Pump	SW-P-41D	Bus E6			

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(7) Residual Heat Removal (RHR)

Description	Device	Remote Control Location	Instrumentation Location MCB	CP108A	CP108B
RHR Pump#	RH-P-8A	Bus E5			
RHR Pump#	RH-P-8B	Bus E6			
RHR System Valves#	RC-V-88	CP-108A			
	RC-V-23	CP-108A			
RHR System Valves#	RC-V-22	CP-108B			
	RC-V-87	CP-108B			

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(8) Sampling

Description	Device	Remote Control Location	Instrumentation Location MCB	CP108A	CP108B
RCS Sampling (Loop #1)	RC-FV-2832	CP-108A			
	RC-FV-2894	CP-108A			
RCS Sampling (Loop #3)	RC-FV-2833	CP-108B			
	RC-FV-2896	CP-108B			
RHR Local Samples Valves#	RH-V-8	N/A			
	RH-V-44	N/A			

2/83

# Denotes equipment required only to attain/maintain cold shutdown. 2/83

Description		Device	Safety Classification Mechanical	Electrical	Train Assignment	Control Location
Service Water Pump House Supply Fan		SWA-FN-40A	3	1E	A	CP-108A
		SWA-FN-40B	3	1E	B	CP-108B
Residual Heat Removal Pumps		RH-P-8A	2	1E	A	4 kV Bus E5 Cubicle 10
		RH-P-8B	2	1E	B	4 kV Bus E6 Cubicle 11
RHR Suction Isolation Valve		RC-V-87	1	1E	B	CP-108B
		RC-V-88	1	1E	A	CP-108A
		RC-V-22	1	1E	B	CP-108B
		RC-V-23	1	1E	A	CP-108A
Diesel Generator A				1E	A	DG-CP-75A
B				1E	B	DG-CP-76A
RCS Sample	Loop 1	RC-FV-2832	2	1E	A	CP-108A
		RC-FV-2894	2	1E	A	CP-108A | 2/83
	Loop 3	RC-FV-2833	2	1E	B	CP-108B
		RC-FV-2896	2	1E	B	CP-108B | 2/83

MANUAL CONTROL

RHR Local Sample Valve	RH-V-8	2	Manual Hand-Operated Valves
	RH-V-44	2	

Note 1: Non 1E Instrumentation is designed to operate following a seismic event.

Note 2: Instrumentation is separate from and independent of the Control Room instrumentation.

Note 3: Selection of the local (remote shutdown) position isolates all automatic functions, interlocks and remote (other than the remote shutdown location) controls that are dependent on Main Control Room equipment or cables.

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(LAST)