SNUPPS
Standardized Nuclear Unit
Power Plant System

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SUBJ: ICSB Positions

Mr. Harold R. Denton, Director
Office of Nuclear Reactor Regulation
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Docket Nos. STN 50-482, STN 50-483, and STN 50-486

Dear Mr. Denton:

During an NRC-SNUPPS meeting on July 27, 1981, the NRC staff (Instrumentation and Control Systems Branch) distributed ten positon statements based on the review of the SNUPPS FSAR and on previous technical meetings. After discussion on these ten positions, it was agreed that no further SNUPPS action was required on items 3, 4, and 5. In addition, it was agreed that no action was required on item 10 until after plant operating procedures had been completed. The enclosure to this letter provides responses to items 1, 2, 6, 7, 8, and 9.

Very truly yours,

Nicholas A. Petrick

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Enclosu.

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1. Concern: The signal which initiates auxiliary feedwater when the main feedwater pumps are tripped is manually blocked on normal shutdown of the main feedwater pumps. The current design is such that the block is not automatically removed when the plant is returned to an operating mode where auxiliary feedwater initiation on loss of main feedwater is needed.

   Posiiton: Even though the signal to initiate auxiliary feedwater when the main feedwater pumps are tripped is considered to be an "anticipatory signal" for which no credit is taken in the analyses of FSAR Chapter 15, the staff position is that the block should be automatically removed when the plant is returned to an operating mode where auxiliary feedwater initiation on loss of main feedwater is needed. This position is taken since the signal provides significant diversity for starting the auxiliary feedwater system following loss of main feedwater.

   Response: A manual block of the signals which initiate auxiliary feedwater on loss of both main feedwater pumps will be indicated by an amber light on the ESF Status Panel. Operating procedures will limit the operating modes where its function can be blocked (blocking just prior to shutdown of the last operating main feedwater pump and removal just after the first main feedwater pump is put into service).
   The provisions described above provide reasonable assurance that the auxiliary feedwater start signal on loss of both main feedwater pumps will not be blocked during operating modes where the diversity of this signal is desirable.

2. Concern: It is not clear from the drawings provided and the description of the turbine trip circuits and mechanisms that the equipment used to trip the turbine following a reactor trip meets the criteria applicable to equipment performing a safety function.

Position: It is the staff position that the circuits and equipment used to trip the turbine following a reactor trip should meet the criteria applicable to a safety function with the execption of the fact that the circuits may be routed through non-seismic qualified structures and the turbine itself is not seismically qualified.

Response: The equipment employed to trip the turbine is the turbine protection system, which is part of the Electro-Hydraulic Control (EHC) system. The EHC system is a highly reliable system as shown by operating experience. In order to provide maximum assurance that the turbine will be tripped, each reactor trip circuit is independently routed to and processed within the turbine protection system to provide two independent means of tripping the turbine. The routing of the two trip circuits from the protection system cabinets (located in the control room) to the EHC cabinet (located in the turbine building) is as follows:

One N. O. slave relay contact circuit, one from each of the Westinghouse SSPS train A and B cabinets, is routed as separation groups 1 and 4 respectively to isolation relays located in the control building. Once isolated, the circuits from the isolation relays are routed as separation groups 5 and 6 to the EHC cabinet. Separation group 1 is isolated to separation group 5 and separation 4 is isolated to separation group 6. The routing of the separation group 5 cable is physically separate from the separation group 6 cable.

Each of the trip circuits described above is directed to one of two trip busses within the turbine protection system Each of these busses energizes a set of cross-trip relays that in turn cross-trip to the other trip bus.

One trip bus energizes the Mechanical Trip Solenoid Valve (MTSV) directly: the other trip bus acts to de-energize the Electrical Trip Solenoid Valve (ETSV). Each of these valves is independently capable of tripping the turbine.

Therefore, each trip circuit activates two independent paths throughout the turbine protection system for tripping the turbine.

These trip circuits within the EHC system are the same circuits that serve to trip the turbine in the event of other abnormal turbine conditions such as over temperature and overspeed. These circuits are fully testable during full power operation.

6. Concern: Information provided by the applicants indicates that the reactor coolant wide range temperature indicators to be provided on the auxiliary shutdown panel will not meet all criteria applicable to safety related displays (such as being provided power from separate Class IE busses).

Position: The staff position is that reactor coolant system temperature is required parameter for maintaining the plant in a safe condition. Indicators meeting criteria applicable to safety related displays should be provided for reactor coolant temperature on the auxiliary shutdown panel.

Response: As indicated in Section 7.4.3 of the SNUPPS FSAR, the reactor coolant wide range temperature indicators are not essential for maintaining safe hot shutdown (hot standby). Safe hot shutdown can be maintained from the auxiliary shutdown panel through the use of the essential short-term monitoring indicators and controls listed in FSAR Section 7.4.3.1.1. These indicators and controls meet the criteria applicable to safety grade equipment (see FSAR Section 7.4.3.1.4).

The reactor coolant wide range temperature indicators (one per RCS loop) located on the auxiliary shutdown panel provide a highly reliable indication of reactor coolant temperature. These instrument loops are powered from protection set II, isolated at the protection set cabinet, and routed to the auxiliary shutdown panel via separation group six. The indicators are the same model number as the PAMS indicators provided for the same function on the main control board.

7. Concern: The original design for actuation of the accumulator valve component level window on the bypassed and inoperable status panel was such that the bypass indication was not actuated until the valve reached the fully closed position rather than when the valve left the fully open position. After discussions with the staff, the applicants changed the design such that the bypass is indicated when the valve is not fully open. There may, however, be other valves where the bypass indication is not actuated when the valve leaves the position required for it to accomplish its safety function.

Position: The staff position is that bypass indication on the bypassed and inoperable status panel should be actuated when a valve leaves the position required for it to accomplish its safety function.

Response: Where valve misalignment (position switch input) is indicative of a bypass/inoperable status, the staff position as stated above is met.

Such cases are the auxiliary feedwater discharge valves (air operated and motor operated) and the accumulator isolation valves.

8. Concern: Instrumentation for process measurements used for safety functions such as reactor trip or emergency core cooling typically are provided with the following:

a) An indicator in the control room to provide the operator information on process variable being monitored which can also be used for periodic surveillance checks of the instrument transmitter.

b) An alarm to indicate to the operator that a specific safety function has been actuated.

c) Indicator lights or other means to inform the operator which specific instrument channel has actuated the safety function.

d) Rod positions, pump flows, or valve positions to verify that the actuated safety equipment has taken the action required for the safeiy function.

e) Design features to allow test of the instrument c nel and actuated equipment without interfering with normal plant operations.

During review of the applicant's design, it was found that one or more of the features above was not provided for certain instrumentation used to initiate safety functions. Examples include instrumentation used to isolate essential service water to the air compressors, insturmentation used to isolate the non-safety-related protion of the component cooling water system, and instrumentation used to isolate the spary additive tank on low low level.

Position: The staff position is that instrumentation provided to perform safety functions such as isolating non-seismic portions of systems, closing valves when tank levels reach low level setpoints, and similar functions should be provided with alarms and indicators commensurate with the importance of the safety function and should be testable without interfering with normal plant operations. The applicants should provide the staff with a list of all instrument channels which perform a safety function where one or more of the features listed in a) through e) of the concern above are not currently provided. For each of these insturment channels, the applicants should indicate which of the features a) through e)are not currently provided. The staff position on these instrument channels is further that the applicants should:

a) Provide an alarm to indicate that the safety function has been actuated if such an alarm is not in the current design.

b) If not in the design, provide means to inform the operator which specific channel has actuated the safety function.

c) If not in the current design, provide indication that the actuated safety equipment has taken the action required for the safety function.

d) If not in the current design, provide the capability for testing each safety function without interfering with normal plant operations and without lifting instrument leads or using jury rigs. The capability for testing should include the transmitter where indicators are not provided to perform operability checks of the transmitters.

The staff will provide requirements in the plant technical specifications for testing these safety fucntions.

Response: We have investigated all of the process instrumentation provided to perform safety functions, and we have tabulated all of those process measurements which do not, at present, comply with all of the concerns "a" through "e". Since compliance with concern "a" is not required and since appropriate changes will be made (as noted with an asterick) to presently non-conforming measurements, all of the tabulated loops will be in conformance to the NRC positions "a" through "d". Note that measurements which fully comply at present with each concern "a" through "e", such as containment spray additive tank level, are not included in the tabulation.

Note the following general considerations in regard to the NRC concerns and positions:

1) The plant computer system is both accurate and highly reliable, and as such is used to provide certain of the indications and alarms.

2) Indication of which safety channel caused a particular actuation is provided by means of indicating lights in the Engineered Safety Features Actuation System. Since actuations not generated by the ESFAS are all based only upon a single channel, this indication is not applicable to them.

3) Many safety functions are simply normal operational functions of safety-related equipment (e.g., UHS cooling tower fan control). Alarming of each actuation of such functions would simply distract the operator from other functions, without providing any useful information. For such functions, the alarms provided indicate not that the actuation has occured but rather that the process variable has exceeded the limit where the actuation should have occurred and plant conditions indicate that additional operator action is warranted.

FSAR FIGURE/INST. LOOP NUMBER(S)	PARAMETER AND SAFETY ACTUATION/ CONTROL FUNCTION	ICSB POSITION 8 CONCERNS	CLARIFICATIONS/RESPONSE
A.			
9.2-3/ EGLT-1,-2	Component cooling water surge tank level: Isolate the non-seismic CCW piping on low-low level to protect water inventory from possible seismically-induced slow leakage.	(a) provided (b) not provided (c) not applicable (d) provided (e) provided	A low level alarm is provided at a level higher than the automatic isolation setpoint, but no alarm is provided at the isolation setpoint. If the alarm occurs and the make-up valve is open and the surge tank level continues to decrease (analog indications provided), the operator should ensure that the non-seismic piping has been isolated. Thus the need for isolation is indicated by the low level alarm with the make-up valve open and decreasing level, and there is no need for an alarm on initation of the isolation signal.
B.			
9.2-3/ EGFT-62	Component cooling water return flow from reactor coolant pump thermal barrier cooling coil discharge header: Isolate the RCP TBCC's from the low-pressure piping in the CCW system to protect the CCW system from TBCC rupture and the consequent instrusion of high-pressure reactor coolant.	(a) not provided (b) provided (c) not applicable (d) provided (e) provided	No analog indication of flow is provided. All other applicable staff positions are satisfied.

FSAR FIGURE/INST. LOOP NUMBER(S)	PARAMETER AND SAFETY ACTUATION/ CONTROL FUNCTION	ICSB POSITION 8 CONCERNS	CLARIFICATIONS/RESPONSE
C.			
10.4-6 Shts 7&8/ FCPSL 25,26,125, & 126	Main feedwater pump trip oil pressure /starts the motor driven auxiliary feedwater pumps on loss of both main feedwater pumps.	(a) not provided (b) provided (c) provided (d) provided (e) provided	No analog indication of oil pressure is provided. All other applicable positions are satisfied.
D.			
9.2-3 EGFT-107,-108	Component cooling water flow to non-seismic piping: Isolate the non-seismic CCW piping on high flow to protect the CCW water inventory from possible seismically-induced gross leakage.	(a) not provided* (b) not provided (c) not applicable (d) provided (e) provided	Leakage would be indicated by decreasing surge tank level and the attendent alarms (see discussion of loops EGLT-1 and -2). Instrument loops EGFT-107 and -108 are provided to initiate immediate isolation, and thus to minimize the effects of gross leakage on the CCW water inventory. Considering the time required for operator response, and considering the time required for gross CCW leakage to impact the CCW surge tank level and cause the attendent alarms and actuations, the provision of gross leakage alarms and indications would serve no purpose. Positive indication of isolation valve position is provided on the main control board and alarms are provided via the computer when the isolation valves close. Note that the isolation valves would be colsed by a safety-injection signal.

* Flow indication (via the plant computer) will be added for each flow loop.

FSAR FIGURE/INST. LOOP NUMBER(S)	PARAMETER AND SAFETY ACTUATION/ CONTROL FUNCTION	ICSB POSITION 8 CONCERNS	CLARIFICATIONS/RESPONSE
E.			
9.2-2/ EFPDT-43,-44	Essential service water flow to air compressors: Isolate the non-seismic piping to the air compressor from the ESWS to prevent excessive leakage of ESW into the turbine-or auxiliary building in the event of seismically-induced leakage.	(a) not provided (b) not provided (c) not applicable (d) provided (e) provided	Loss of cooling water to the air compressors would be alarmed in the control room via an air compressor common trouble alarm. The ESWS inventory is adequate to withstand leakage from full rupture of the non-seismic piping in both trains for at least seven days without inpacting the ESWS operation. Thus automatic isolation is not required to protect the ESWS, although it would be advantageous from an operational standpoint. Positive indication of valve position is provided on the main control board and alarms are provided via the computer when the isolation valves close.
F.			
M-K2EF01(WC) 9.2-2(CAL) 1-EF-PDT-19,-20 2-EF-PDT-19,-20 5-EF-PDT-19,-20	Essential service water self-cleaning strainer differential pressure: This parameter is used for normal control of the ESWS self-cleaning strainers, and not to mitigate the consequences of some event. Strainer cleaning is initiated on high differential pressure.	(a) provided (b) provided (c) not applicable (d) provided (e) provided	Indication of high differential pressure is provided via the plant computer system. The proper operation of the strainer would be indicated by the computer system display of differential pressure, since the differential pressure would decrease upon proper operation.

FSAR FIGURE/INST. LOOP NUMBER(S)	PARAMETER AND SAFETY ACTUATION/ CONTROL FUNCTION	ICSB POSITION 8 CONCERNS	CLARIFICATIONS/RESPONSE
G.			
9.2-2(CAL Addendum) 2-EF-TT-67A,-68A 5-EF-TT-67A,-68A	Essential service water temperature at Power Block Discharge: This parameter is used for normal control of the Callaway Site UHS cooling towers, and not to mitigate the consequences of some event. It is not a safety actuation parameter.	(a) provided (b) provided (c) not applicable (d) provided (e) provided	Indication and alarms concerning proper tower operation are provided via the plant computer system (EGTE 69 & 70) and by indicating lights on the main control board. The computer monitors the tower discharge temperature and provides a high temperature alarm. Snce the only function of the tower is to provide adequate ESW cooling, the discharge temperature--rather than the inlet temperature--is the information required by the operator. Actuation of the tower fans and valves is an operational control function, and so no alarms of actuation are provided.
H.			
5.1-1/ BB-FT-17,-18, -19,-20	Reactor coolant pump thermal barrier cooling coil discharge flow: Isolate the TBCC from the low-pressure CCW system, to protect the CCW system from intrusion of high-pressure reactor coolant resultant of possible TBCC rupture.	(a) not provided (b) provided (c) not applicable (d) provided (e) provided	No indication of flow is provided. All other applicale staff positions are satisfied.

FSAR FIGURE/INST. LOOP NUMBER(S)	PARAMETER AND SAFETY ACTUATION/ CONTROL FUNCTION	ICSB POSITION 8 CONCERNS	CLARIFICATIONS/RESPONSE
I.			
9.4-7/ GM-TT-1,11	Diesel generator room ventilation control: These loops control the temperature of the Diesel Generator rooms by starting and stopping the supply fans and modulation of control dampers.	(a) provided (b) not provided* (c) not applicable (d) provided (e) provided	Temperature indication is available via the plant computer. Iinitiation of this system is a normal control function required to maintain room temperature within required limits. Therefore, alarms upon initiation are not provided. * Alarms initiated from the analog inputs will be added to the plant computer to alert the operator when temperatures in the rooms fall above or below the required control ranges.
J.			
FSAR Figures (later)/ (1,2,5)-GD-TT-1,11 (1,2,5)-GD-TT-51,61 PEID's-M-K2G001 & M-U2G001	Essential service water pump house ventilation and ESW cooling tower electrical room ventilation function: Control room temperature by modulation of dampers. Also starts and stops fans on low temperature when ESW pumps or cooling tower fans are operating.	(a) provided (b) not provided* (c) not applicable (d) provided (e) provided	Temperature indication is available via the plant computer. Actuation of this system is a normal occurance required to maintain room temperature within required limits, Therefore, alarms upon initiation are not provided and are not necessary. * Where not already provided, alarms actuated from the analog inputs will be addded to the plant computer to alert the operator when temperatures in the rooms fall above or below the required control ranges.

FSAR FIGURE/INST. LOOP NUMBER(S)	PARAMETER AND SAFETY ACTUATION/ CONTROL FUNCTION	ICSB POSITION 8 CONCERNS	CLARIFICATIONS/RESPONSE
K.			
9.5.4-1/ JE-LT-1,21	Emergency fuel oil day tank level control/starts and stops the fuel oil transfer pumps to keep an adequate supply of fuel oil in the tank.	(a) provided (b) not provided (c) not applicable (d) provided (e) provided	The following design features are provided for each emergency fuel oil day tank: Low level alarm below the transfer pump start set point, high level alarm above the transfer pump stop set point, and a minimum level alarm. Alarms are not provided at the start and stop set points for the transfer pumps since these are normal control functions.
L.			
10.2-1, sht.-1/ AC-PT-231, 232, & 233	Turbine trip oil pressure/ reactor trip on a trubine trip.	(a) not provided (b) provided (c) provided (d) provided (e) provided	No analog indication of oil pressure is provided. All staff positions are satisfied.

9. Concern: On November 7, 1979, Westinghouse notified the Commission of a potential undetectable failure which could exist in the engineered safeguards P-4 interlocks. Test procedures were developed to detect failures which might occur. The procedures require the use of voltage measurements at the terminal blocks of the reactor trip breacker cabinets.

Position: In order to minimize the possibility of accidental shorting or grounding of safety system circuits during testing, suitable test jacks should be provided to facilitate testing of the P-4 interlocks.

Response: The SNUPPS design will include test jacks to facilitate testing of the P-4 interlocks.