LICENSEE POST-EXAM COMMENTS

FARLEY INITIAL EXAM
50-348 & 50-364/2001-301

JULY 23 - 27, 2001

LICENSEE POST-EXAM COMMENTS

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FNP-2001-0129-TRN
August 3, 2001

Mr. Rick Baldwin
United States Nuclear Regulatory Commission
Region II, Atlanta Federal Center
61 Forsyth St., Suite 23T85
Atlanta, GA 30303

Dear Mr. Baldwin:

Please find enclosed the materials required per NUREG 1021 for the written examination administered at Farley Nuclear Plant on July 30, 2001.

The completed examination security agreement should be placed in the mail on Monday, August 6, 2001 when the last individual returns to work and signs the post exam section.

If you have any questions, please contact Joel Deavers at (334) 899-5156 extension 6115 or John Horn at (334) 814-4652.

Sincerely,

L. M. Stinson
Nuclear Plant General Manager

Enclosure

JLD:mgr

cc: M. J. Ajluni
File

MISC DISK #35

Question 2 RO Exam and Question 3 SRO exam

The question states:

The positive reactivity addition during a continuous rod withdrawal is minimized by which of the following:

A. Increasing the Rod Insertion Limit (RIL) as power increases.

B. Maintaining the control bank at the RIL to provide immediate negative reactivity.

C. Increasing the minimum required Shutdown Margi (SDM) as power increases

D. Maintaining rods almost fully withdrawn from the core during power operations.

The answer given on the key is D. Answer A is also correct. The RIL is the limit for "maintaining" rods almost fully withdrawn from the core. The basis of the Rod Insertion Technical Specification 3.1.6 page B3.1.6-2 states "

Operation within the subject LCO limits will prevent fuel cladding failures that would breach the primary fission product barrier and release fission products to the reactor coolant in the event of a loss of coolant accident (LOCA), loss of flow, ejected rod, **or other accident requiring termination by a Reactor Trip System (RTS) trip function.**

It further states:
The control bank sequence, overlap, and physical insertion limits shall be maintained with the reactor in MODES 1 and 2 with $k_{eff} \geq 1.0$. These limits must be maintained, since they preserve the assumed power distribution, ejected rod worth, SDM, and **reactivity rate insertion assumptions.**

The bases of the power range reactor trip specification page 3.3.1-9 states the following:
a. <u>Power Range Neutron Flux—High</u>

The Power Range Neutron Flux — High trip Function ensures that protection is provided, at most power levels, against a fast positive reactivity excursion leading to DNB and fuel overpower during power operations. **These events can be caused by rod withdrawal** or reductions in RCS temperature.

Therefore answer A is correct since the RIL is increased with power and one of the reasons as stated in Tech Specs is maintain the rods at a height to ensure reactivity rate insertion assumptions (positive reactivity addition) are maintained.

BASES

BACKGROUND (continued)

The control banks are used for precise reactivity control of the reactor. The positions of the control banks are normally controlled automatically by the Rod Control System, but can also be manually controlled. They are capable of adding reactivity very quickly (compared to borating or diluting).

The power density at any point in the core must be limited, so that the fuel design criteria are maintained. Together, LCO 3.1.4, "Rod Group Alignment," LCO 3.1.5, "Shutdown Bank Insertion Limits," LCO 3.1.6, "Control Bank Insertion Limits," LCO 3.2.3, "AXIAL FLUX DIFFERENCE (AFD)," and LCO 3.2.4, "QUADRANT POWER TILT RATIO (QPTR)," provide limits on control component operation and on monitored process variables, which ensure that the core operates within the fuel design criteria.

The shutdown and control bank insertion and alignment limits, AFD, and QPTR are process variables that together characterize and control the three dimensional power distribution of the reactor core. Additionally, the control bank insertion limits control the reactivity that could be added in the event of a rod ejection accident, and the shutdown and control bank insertion limits ensure the required SDM is maintained.

Operation within the subject LCO limits will prevent fuel cladding failures that would breach the primary fission product barrier and release fission products to the reactor coolant in the event of a loss of coolant accident (LOCA), loss of flow, ejected rod, or other accident requiring termination by a Reactor Trip System (RTS) trip function.

APPLICABLE SAFETY ANALYSES

The shutdown and control bank insertion limits, AFD, and QPTR LCOs are required to prevent power distributions that could result in fuel cladding failures in the event of a LOCA, loss of flow, ejected rod, or other accident requiring termination by an RTS trip function.

The acceptance criteria for addressing shutdown and control bank insertion limits and inoperability or misalignment are that:

(continued)

BASES

APPLICABILITY

The control bank sequence, overlap, and physical insertion limits shall be maintained with the reactor in MODES 1 and 2 with $k_{eff} \geq 1.0$. These limits must be maintained, since they preserve the assumed power distribution, ejected rod worth, SDM, and reactivity rate insertion assumptions. Applicability in MODES 3, 4, and 5 is not required, since neither the power distribution nor ejected rod worth assumptions would be exceeded in these MODES.

The applicability requirements have been modified by a Note indicating the LCO requirements are suspended during the performance of SR 3.1.4.2. This SR verifies the freedom of the rods to move, and requires the control bank to move below the LCO limits, which would violate the LCO.

ACTIONS

A.1.1, A.1.2, A.2, B.1.1, B.1.2, and B.2

When the control banks are outside the acceptable insertion limits, they must be restored to within those limits. This restoration can occur in two ways:

a. Reducing power to be consistent with rod position; or

b. Moving rods to be consistent with power.

Also, verification of SDM or initiation of boration to regain SDM is required within 1 hour, since the SDM in MODES 1 and 2 normally ensured by adhering to the control and shutdown bank insertion limits (see LCO 3.1.1, "SHUTDOWN MARGIN (SDM)") has been upset. If control banks are not within their insertion limits, then SDM will be verified by performing a reactivity balance calculation, considering the effects listed in the BASES for SR 3.1.1.1.

Similarly, if the control banks are found to be out of sequence or in the wrong overlap configuration, they must be restored to meet the limits.

Operation beyond the LCO limits is allowed for a short time period in order to take conservative action because the simultaneous occurrence of either a LOCA, loss of flow accident, ejected rod accident, or other accident during this short time period, together with an inadequate power distribution or reactivity capability, has an acceptably low probability.

(continued)

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

2. Power Range Neutron Flux

The NIS power range detectors are located external to the reactor vessel and measure neutrons leaking from the core. NIS power range detector NI44 provides input to the Rod Control System. Therefore, the actuation logic must be able to withstand an input failure to the control system, which may then require the protection function actuation, and a single failure in the other channels providing the protection function actuation. Note that this Function also provides a control interlock signal to prevent automatic and manual rod withdrawal prior to initiating a reactor trip. Limiting further rod withdrawal may terminate the transient and eliminate the need to trip the reactor.

a. Power Range Neutron Flux—High

The Power Range Neutron Flux—High trip Function ensures that protection is provided, at most power levels, against a fast positive reactivity excursion leading to DNB and fuel overpower during power operations. These events can be caused by rod withdrawal or reductions in RCS temperature.

The LCO requires all four of the Power Range Neutron Flux—High channels to be OPERABLE. The channels are combined in a 2-out-of-4 trip Logic.

In MODE 1 or 2, when a positive reactivity excursion could occur, the Power Range Neutron Flux—High trip must be OPERABLE. This Function will terminate the reactivity excursion and shut down the reactor prior to reaching a power level that could damage the fuel. In MODE 3, 4, 5, or 6, the Power Range Neutron Flux—High does not have to be OPERABLE because the reactor is shut down and reactivity excursions into the power range are extremely unlikely. Other RTS Functions and administrative controls provide protection against reactivity additions when in MODE 3, 4, 5, or 6.

(continued)

Question 23 on RO exam and 21 SRO Exam

The question states:

Unit 1 has experienced a Large Break Loss of Coolant Accident (LOCA) inside containment. The crew is currently in EEP-1, "LOSS OF REACTOR OR SECONDARY COOLANT," at step 16, "Check when to transfer to cold leg recirculation."

Step 16 of EEP-1 states:

Action /Expected Response	Response NOT Obtained
16.1 Check RWST level - LESS THAN 12.5 ft. RWST LVL [] LI 4075A [] LI 4075B	16.1 Return to step 14.

NOTE: Step 16.1 must be complete before continuing with this procedure.

16.2 Go to FNP-1-ESP-1.3, TRANSFER TO COLD LEG RECIRCULATION

Which ONE of the following describes the basis for the above note?

A. To ensure the maximum amount RWST water is used and still allow adequate suction transfer time.

B. To ensure most of the boric acid available in the RWST has been flushed through the core.

C. To ensure the operators have taken sufficient time to evaluate plant status per step 14.

D. To ensure level in the containment sump is high enough to provide adequate suction head for the LHSI pumps.

The answer on the key is A but answer D is also correct. The basis of this step in the background document is to ensure the operator immediately goes to ESP-1.3 to maintain coolant flow to the core. This note was added by FNP and the justification states:
To alert the operator to wait until RWST level has reached 12.5' prior to going to ESP-1.3. Therefore the basis of the note is the same as the basis of the 12.5 ft.

STEP: Check If Transfer To Cold Leg Recirculation Is Required

PURPOSE: To guarantee coolant flow to the core by switching to cold leg recirculation if the RWST level is below the switchover setpoint

BASIS:

Since the low-head SI pumps are injecting at this time (verified in step 12), this indicates the presence of a large break LOCA and, hence, the eventual transfer to cold leg recirculation. When the switchover level in the RWST is reached, the operator should immediately go to ES-1.3, TRANSFER TO COLD LEG RECIRCULATION, to maintain coolant flow to the core. If, however, the switchover setpoint has not been reached when the operator encounters this step, he is instructed to return to step 11. Here he would continue his evaluation of plant status while waiting for the RWST level to reach the switchover setpoint.

ACTIONS:

- o Determine if RWST level is less than (U.02)
- o Transition to ES-1.3, TRANSFER TO COLD LEG RECIRCULATION, step 1

INSTRUMENTATION:

RWST level indication

CONTROL/EQUIPMENT:

N/A

KNOWLEDGE:

For a large break LOCA, where the RWST level is decreasing rapidly, it is important for the operator to be aware of the requirement to switch over to sump recirculation. A rapid decrease in RWST water level corresponds to a situation where most or all of the high capacity safeguards pumps (i.e., containment spray and low-head safety injection pumps) are operating and the RWST empties in a short time (i.e., 10 minutes to 30 minutes). If the RWST low level alarm is not imminent, then the operator should perform further evaluation of the plant status and return to Step 11.

PLANT-SPECIFIC INFORMATION:

(U.02) RWST switchover setpoint in plant specific units.

STEP CHANGE DOCUMENTATION

STEP 18 NOTE : Step 18.1 must be complete before continuing with this procedure.

ERG NOTE : N/A Step Addition

JUSTIFICATION OF DIFFERENCES:

1. Added note to alert the operator to wait until RWST level has reached 12.5 ft prior to going to ESP-1.3.

ERP WRITER [signature] DATE 1/12/95

The tech spec basis for RWST level states :
This LCO ensures that:

a. The RWST contains sufficient borated water to support the ECCS during the injection phase;

b. **Sufficient water volume exists in the containment sump** to support continued operation of the ECCS and Containment Spray System pumps at the time of transfer to the recirculation mode of cooling; and

The functional system description for RHR (FSD) for the RWST and the level alarms are as follows:

3.3.2 Functional Requirements
3.3.2.1 A single tank with a nominal volume of 500,000 gallons (46 ft.I.D. and 41 ft. height) is provided. (Reference 6.4.46) This tank volume is sufficient for the following functions while considering measurement uncertainties, operating ranges, operator action times, undeliverable volumes, and minimum pump NPSH limits:

a. Volume required to fill the refueling cavity in preparation for refueling the reactor. (Reference 6.3.14)

b. **Adequate volume to supply all the ECCS and containment spray pumps following a large break LOCA, allowing sufficient time for operators to take manual actions.** (References 6.3.12, 6.3.17,6.3.25, and 6.3.26)

c. **Adequate volume to supply enough water to the emergency sumps to provide a suction supply to the ECCS pumps during long term SI recirculation.**(References 6.3.15, 6.3.16, 6.3.17, and 6.3.24)

The RWST Low and Low-Low Level must assure sufficient volume is available to:

1) **Provide adequate time to complete ECCS and CSS switchover to sump recirculation.**

2) **Provide adequate NPSH for the ECCS and CSS pumps.**

3) Prevent vortexing of the CS pumps.

Operator action is taken when the main control board indicators reach the following indicated levels:
Low Level 12' - 6"
Low-Low Level 4' - 6"
To ensure adequate volume is available, analyses has been performed applying the total indicator inaccuracy to the switchover setpoints.

Based on the above answer D is also correct

BASES

BACKGROUND (continued)

contents to the RWST, which could result in a release of contaminants to the atmosphere and the eventual loss of suction head for the ECCS pumps.

This LCO ensures that:

a. The RWST contains sufficient borated water to support the ECCS during the injection phase;

b. Sufficient water volume exists in the containment sump to support continued operation of the ECCS and Containment Spray System pumps at the time of transfer to the recirculation mode of cooling; and

c. The reactor remains subcritical following a LOCA.

Insufficient water in the RWST could result in insufficient cooling capacity when the transfer to the recirculation mode occurs. Improper boron concentrations could result in a reduction of SDM or excessive boric acid precipitation in the core following the LOCA, as well as excessive caustic stress corrosion of mechanical components and systems inside the containment.

APPLICABLE SAFETY ANALYSES

During accident conditions, the RWST provides a source of borated water to the ECCS and Containment Spray System pumps. As such, it provides containment cooling and depressurization, core cooling, and replacement inventory and is a source of negative reactivity for reactor shutdown (Ref. 1). The design basis transients and applicable safety analyses concerning each of these systems are discussed in the Applicable Safety Analyses section of B 3.5.2, "ECCS—Operating"; B 3.5.3, "ECCS—Shutdown"; and B 3.6.6, "Containment Spray and Cooling Systems." These analyses are used to assess changes to the RWST in order to evaluate their effects in relation to the acceptance limits in the analyses.

The RWST must also meet volume, boron concentration, and temperature requirements for non-LOCA events. The volume is not an explicit assumption in non-LOCA events since the required volume is a small fraction of the available volume. The deliverable volume limit is set by the LOCA and containment analyses. For the RWST, the deliverable volume is different from the total volume contained

(continued)

3.3.1.3 The RWST provides the borated water required for makeup to the RCS in the event that RHR cooling is lost during reduced inventory operations.

3.3.1.4 The RWST shall provide a backup source of borated water for the charging pumps. If the CVCS makeup control system fails to maintain volume control tank level, the RWST is automatically aligned to the suction of the charging pump.

3.3.1.5 Two redundant level channels are used to monitor the RWST water inventory through post-accident conditions. Eight level switches connected to these transmitters provide means for initiation of alarms in the main control room to ensure proper tank level during normal plant operation and to indicate the time for terminating the injection phase. Four more level switches generate signals to automatically open each of the four sump isolation valves. (References 6.1.18 and 6.2.14)

3.3.1.6 Two redundant temperature elements are installed in the RWST discharge piping to provide a low temperature alarm and indication in the main control room to facilitate technical specification surveillance of RWST temperature. The plant Technical Specifications require that RWST temperature remain above 35°F. (Reference 6.1.2)

3.3.2 Functional Requirements

3.3.2.1 A single tank with a nominal volume of 500,000 gallons (46 ft.I.D. and 41 ft. height) is provided. (Reference 6.4.46) This tank volume is sufficient for the following functions while considering measurement uncertainties, operating ranges, operator action times, undeliverable volumes, and minimum pump NPSH limits:

a. Volume required to fill the refueling cavity in preparation for refueling the reactor. (Reference 6.3.14)

b. Adequate volume to supply all the ECCS and containment spray pumps following a large break LOCA, allowing sufficient time for operators to take manual actions. (References 6.3.12, 6.3.17, 6.3.25, and 6.3.26)

c. Adequate volume to supply enough water to the emergency sumps to provide a suction supply to the ECCS pumps during long term SI recirculation. (References 6.3.15, 6.3.16, 6.3.17, and 6.3.24)

3.3.2.2 The RWST boron concentration shall be between 2300 and 2500 ppm to ensure adequate shutdown capability and acceptable sump pH limitations. (References 6.1.2, 6.3.10, and 6.3.11)

3.3.2.3 RWST temperature must be maintained above 35°F to prevent boron stratification and freezing which could block the tank vent. (References 6.2.48 and 6.7.11)

3.3.2.4 The supply line from the RWST to the RHR pump suctions must be able to withstand a single active failure in the injection phase and a single active or passive failure in the recirculation phase without disabling both trains of the RHR. (Reference 6.1.19)

3.3.2.5 The RWST shall contain a Technical Specification minimum volume of 471, 000 gallons. This minimum volume is based on the total number of gallons from the bottom of the tank. (Reference 6.7.54) This minimum volume does include the 4 inches of unusable volume below the bottom of the suction line invert which has been accounted for in the supporting analysis. Deliverable volumes are based on the Technical Specification minimum and indicated low and low-low level setpoints with the indicator uncertainty applied in a conservative manner. (References 6.4.43, 6.4.44, 6.7.64, 6.7.65 and 6.7.66)

3.3.3 Code Requirements

3.3.3.1 The tank is classified as Safety Class 2. (Reference 6.1.29)

3.3.3.2 The tank is designed according to the requirements of the ASME Boiler and Pressure Vessel Code Section III, Class 2. (Reference 6.1.29)

3.3.3.3 Level Indication complies with the requirements of IEEE-279-1971, Criteria for Protection Systems for Nuclear Power Generating Stations. (Reference 6.1.33)

3.3.4.5 The level channel total indicated accuracy shall be within ±3.9 percent of span. Alarm uncertainty shall be no greater than indicator uncertainty to ensure the alarms provide adequate back-up protection. (Reference 6.3.27)

3.3.4.6 The RWST Low and Low-Low Level must assure sufficient volume is available to:

1) Provide adequate time to complete ECCS and CSS switchover to sump recirculation.

2) Provide adequate NPSH for the ECCS and CSS pumps.

3) Prevent vortexing of the CS pumps.

Operator action is taken when the main control board indicators reach the following indicated levels:

Low Level	12' - 6"
Low-Low Level	4' - 6"

To ensure adequate volume is available, analyses has been performed applying the total indicator inaccuracy to the switchover setpoints.

Alarm setpoints are set near these indicated levels as a back-up to alert operators to decreasing RWST levels. (References 6.3.24, 6.5.27, 6.5.28, 6.5.29)

3.3.4.7 Level indication must be provided in the main control room. (Reference 6.4.2)

3.3.5 Equipment Protection Features

3.3.5.1 A vent connection capable of admitting air at a rate required to counteract the water outflow/inflow and with a low enough pressure drop such that there exists no potential for having vacuum/overpressure conditions in the RWST must be provided. (References 6.4.2, 6.7.38, and 6.4.46)

3.3.5.2 A concrete shield wall must be provided around the RWST to ensure that the tank is protected from missiles. (References 6.1.29 and 6.1.25)

Question 46 RO exam and 39 on the SRO exam

The question states:

Unit 1 is shutdown for refueling with fuel movement in progress. The audio count rate selector switch is selected to Source Range channel N-31 and the speaker is in NORMAL (amplifier 1 supplying the control room speaker and amplifier 2 supplying the containment speaker.) An instrument power fuse blows on NI-31.

Which ONE of the following describes the sequence of actions to be taken?

A. Continue the fuel movement in progress, monitor the remaining NI channels, select Source Range channel N-32 on the audio count rate selector.

B. Suspend all fuel movement, monitor the remaining NI channels, select Source Range channel N-32 on the audio count rate selector, repair N-31, and then continue fuel movement.

C. Continue the fuel movement in progress, monitor the remaining NI channels, select Source Range channel N-32 on the audio count rate selector, then initiate repairs on N-31.

D. Suspend all fuel movement, monitor the remaining NI channels, select Source Range channel N-32 on the audio count rate selector, continue fuel movement, and then repair N-31.

The key has answer C as correct. This is correct based solely on the following tech spec bases statement allowing use of gamma-metrics as a third channel of Source range indication. The answer should be B or D.

The following is from the bases of Tech Spec 3.9.2:
Two installed Westinghouse source range neutron flux monitors are BF3 detectors operating in the proportional region of the gas filled detector characteristic curve. The detectors monitor the neutron flux in counts per second. The instrument range covers six decades of neutron flux with a 5% instrument accuracy. The detectors also provide continuous visual indication in the control room and an audible count rate to alert operators to a possible dilution accident. The operator may select either installed Westinghouse source range neutron flux monitor as the signal source for the audio indication. The NIS is designed consistent with the intent of the criteria presented in Reference 1.

The installed source range Gamma-Metrics post accident neutron flux monitor is an enriched U-235 fission chamber operating in the ion chamber region of the gas filled detector characteristic curve. The detector monitors the neutron flux in counts per second. The instrument range covers six decades of neutron flux with a 2% instrument accuracy. The detector also provides continuous visual indication in the control room.

Three installed source range neutron flux monitors are available, only two are required to be operable. **Two of the three installed source range neutron flux monitors OPERABLE** will satisfy L.C.O. 3.9.2 as long as one channel of audible count rate is OPERABLE and continuous visual indication in the control room is available from at least two monitors.

However based on the following procedural requirements in UOP-4.1 there are certain actions that must be taken to take credit for use of the gamma-metrics during fuel movement. This means that procedurally fuel movement must stop until these actions either justify using gamma-metrics or determine gamma-metrics is not a valid indication based on the current state of the core. **Depending on whether gamma-metrics is determined to be a valid indication** or not answer B or D is correct. This is further supported by the attached training advisory notice regarding use of gamma-metrics.

CAUTION:	**The Gamma-Metrics source range channel may only be used as a back-up to N-31 or N-32 during certain core configurations. The Refueling Coordinator or Westinghouse should be consulted if N-31 or N-32 becomes inoperable when the core is not fully loaded.**

__ 2.8 At least two of the required source range neutron flux monitors are operable with
_/_ a Channel Check performed within 12 hours prior to any core alterations.

3.2 **The Gamma-Metrics source range channel may only be used as a back-up to N-31 or N-32 during certain core configurations**. The Refueling Coordinator or Westinghouse should be consulted if N-31 or N-32 becomes inoperable when the core is not fully loaded.

TRAINING ADVISORY NOTICE

Use of the Gamma-Metrics Detector as a Back-up to Source Range Channel N-31 or N-32

Technical Specification 3.9.2, *Refueling Operations - Nuclear Instrumentation*, requires that two source range neutron flux monitors and one channel of audible count rate shall be operable. This Tech. Spec. has not changed. However, the basis for this spec.
(B 3.9.2) has been revised to allow the Gamma-Metrics source range channel to be substituted for one of the Westinghouse source range detectors, N-31 or N-32. If the Gamma-Metrics is being used as a back-up, the audible count rate will be selected to the operable Westinghouse detector, and the requirements of spec. 3.9.2 are satisfied.

Some caution must be used before taking advantage of this new capability. Since the Gamma-Metrics detector is located 90° around the core from the source range detectors, **the neutronic coupling of the Gamma-Metrics detector to the core could be different than either source range detector, depending on the core configuration.** Refer to the attached figure. Consider the case where initially there is no fuel in the reactor vessel. A typical core reload will install fuel assemblies and neutron sources in front of source range detectors N-31 and N-32. Fuel assemblies are then installed across the core to form a "bridge" so that the source range detectors are both close enough to the fuel to be able to respond to neutrons from the core. This is known as being neutronically coupled to the core. Once the bridge across the core is complete, both detectors are coupled to the core, so they are providing redundant indication. Early in a core reload sequence, the Gamma-Metrics detector is too far away from the core to be able to respond to its neutrons. **In order to use the Gamma-Metrics as a back-up, the core loading must be such that there are fuel assemblies forming a neutronic bridge** to that detector so that the detector is able to respond to the core's neutron output. Precautions have been included in the latest revisions to FNP-1/2-UOP-4.1, *Controlling Procedure for Refueling*, to ensure that core configuration is considered when using Gamma-Metrics as a back-up.

B 3.9 REFUELING OPERATIONS

B 3.9.2 Nuclear Instrumentation

BASES

BACKGROUND

The source range neutron flux monitors are used during refueling operations to monitor the core reactivity condition. The installed source range neutron flux monitors are part of the Nuclear Instrumentation System (NIS). These detectors are located external to the reactor vessel and detect neutrons leaking from the core. Temporary neutron flux detectors which provide equivalent indication may be utilized in place of installed instrumentation.

Two installed Westinghouse source range neutron flux monitors are BF3 detectors operating in the proportional region of the gas filled detector characteristic curve. The detectors monitor the neutron flux in counts per second. The instrument range covers six decades of neutron flux with a 5% instrument accuracy. The detectors also provide continuous visual indication in the control room and an audible count rate to alert operators to a possible dilution accident. The operator may select either installed Westinghouse source range neutron flux monitor as the signal source for the audio indication. The NIS is designed consistent with the intent of the criteria presented in Reference 1.

The installed source range Gamma-Metrics post accident neutron flux monitor is an enriched U-235 fission chamber operating in the ion chamber region of the gas filled detector characteristic curve. The detector monitors the neutron flux in counts per second. The instrument range covers six decades of neutron flux with a 2% instrument accuracy. The detector also provides continuous visual indication in the control room.

Three installed source range neutron flux monitors are available, only two are required to be operable. Two of the three installed source range neutron flux monitors OPERABLE will satisfy L.C.O. 3.9.2 as long as one channel of audible count rate is OPERABLE and continuous visual indication in the control room is available from at least two monitors.

BASES

APPLICABLE SAFETY ANALYSES

Two OPERABLE source range neutron flux monitors are required to provide a signal to alert the operator to unexpected changes in core reactivity. The audible count rate from the source range neutron flux monitors provides prompt and definite indication of any boron dilution. The count rate increase is proportional to the subcritical multiplication factor and allows operators to promptly recognize the initiation of a boron dilution event. Prompt recognition of the initiation of a boron dilution event is consistent with the assumptions of the safety analysis and is necessary to assure sufficient time is available for isolation of the primary water makeup source before SHUTDOWN MARGIN is lost (Ref. 2). The High-Flux at Shutdown Alarm, because of the delay for the neutron flux to reach the alarm setpoint, does not provide prompt indication of the initiation of a boron dilution event and the delay introduced by the alarm setpoint is not consistent with the assumptions of the safety analysis.

The source range neutron flux monitors satisfy Criterion 3 of 10 CFR 50.36(c)(2)(ii).

LCO

This LCO requires that two source range neutron flux monitors be OPERABLE to ensure that redundant monitoring capability is available to detect changes in core reactivity. To be OPERABLE each channel of source range instrumentation must provide visual indication in the control room. In addition, one channel of audible count rate must be available to alert the operators to the initiation of a boron dilution event. The preferred location of the required audible count rate is in the control room. In the case where the required audible count rate is only available in containment, it is acceptable to station a licensed operator in containment to communicate with the control room and alert the operators to a possible dilution accident. In the event that the required channel of audible count rate is lost, all unborated water sources must be isolated. The isolation of unborated water sources precludes a boron dilution accident. Once actions are initiated to isolate the unborated water sources, they must be continued until all the necessary flow paths are isolated. Movement of fuel may continue provided two channels of source range visual indication are available in the control room.

BASES

APPLICABILITY

In MODE 6, two source range neutron flux monitors must be OPERABLE to determine changes in core reactivity. There are no other direct means available to check core reactivity levels. In other MODES, the OPERABILITY requirements for the Westinghouse installed source range detectors and circuitry are addressed by LCO 3.3.1, "Reactor Trip System (RTS) Instrumentation."

The source range neutron flux monitors have no control function in MODE 6 and are assured to alarm (visual indication and audio) only during an FSAR design basis accident or transient. The source range neutron flux monitors provide the only on-scale monitoring of the neutron flux during refueling. Therefore, they are being retained in the Technical Specifications.

In MODES 1-3, the operability requirements for the installed source range Gamma-Metrics post accident neutron flux monitor are addressed by LCO 3.3.4, "Remote Shutdown System."

ACTIONS

A.1 and A.2

With only one source range neutron flux monitor OPERABLE (providing visual indication in the control room), redundancy has been lost. Since these instruments are the only direct means of monitoring core reactivity conditions, CORE ALTERATIONS and positive reactivity additions must be suspended immediately. Performance of Required Action A.1 shall not preclude completion of movement of a component to a safe position or normal cooling of the coolant volume for the purpose of maintaining system temperature.

B.1

With no required source range neutron flux monitor OPERABLE (providing visual indication in the control room), action to restore a monitor to OPERABLE status shall be initiated immediately. Once initiated, action shall be continued until a source range neutron flux monitor is restored to OPERABLE status.

(continued)

BASES

ACTIONS (continued)

B.2

With no required source range neutron flux monitor OPERABLE (providing visual indication in the control room), there are no direct means of detecting changes in core reactivity. However, since CORE ALTERATIONS and positive reactivity additions are not to be made, the core reactivity condition is stabilized until the source range neutron flux monitors are OPERABLE. This stabilized condition is determined by performing SR 3.9.1.1 to ensure that the required boron concentration exists.

The Completion Time of 12 hours is sufficient to obtain and analyze a reactor coolant sample for boron concentration and ensures that unplanned changes in boron concentration would be identified. The 12 hour Completion Time is reasonable, considering the low probability of a change in core reactivity during this time period.

C.1

With no audible count rate available, prompt and definite indication of a boron dilution event, consistent with the assumptions of the safety analysis, is lost. In this situation, the boron dilution event may not be detected quickly enough to assure sufficient time is available for operations to manually isolate the unborated water sources and stop the dilution prior to the loss of SHUTDOWN MARGIN. Therefore, action must be taken to prevent an inadvertent boron dilution event from occurring. This is accomplished by isolating all the unborated water flow paths to the reactor coolant system from the Reactor Makeup Water System and the Demineralized Water System. Isolating these flow paths ensures that an inadvertent dilution of the reactor coolant boron concentration is prevented. The Completion Time of "immediately" assures a prompt response by operations and requires an operator to initiate actions to isolate an affected flow path immediately. Once actions are initiated, they must be continued until all the necessary flow paths are isolated. Movement of fuel may continue provided two channels of visual indication are available in the control room.

BASES

SURVEILLANCE REQUIREMENTS

SR 3.9.2.1

SR 3.9.2.1 is the performance of a CHANNEL CHECK, which is a comparison of the parameter indicated on one channel to a similar parameter on other channels. It is based on the assumption that the two indication channels should be consistent with core conditions. Changes in fuel loading and core geometry can result in significant differences between source range channels, but each channel should be consistent with its local conditions.

The Frequency of 12 hours is consistent with the CHANNEL CHECK Frequency specified similarly for the same instruments in LCO 3.3.1.

SR 3.9.2.2

SR 3.9.2.2 is the performance of a CHANNEL CALIBRATION every 18 months. This SR is modified by a Note stating that neutron detectors are excluded from the CHANNEL CALIBRATION. The CHANNEL CALIBRATION for the source range neutron flux monitors consists of obtaining the detector plateau or preamp discriminator curves and evaluating those curves. The CHANNEL CALIBRATION for the Westinghouse monitors also includes verification of the audible count rate function. The 18 month Frequency is based on the need to perform this Surveillance under the conditions that apply during a plant outage. Operating experience has shown these components usually pass the Surveillance when performed at the 18 month Frequency.

REFERENCES

1. 10 CFR 50, Appendix A, GDC 13, GDC 26, GDC 28, and GDC 29.

2. FSAR, Section 15.2.4.2.2.

2.5.3 When completing rows (i.e., loading the last assembly in a row, adjacent to the baffle), complete the third row out from the baffle first, the second row out from the baffle next, and the baffle row last.

2.5.4 Inspect for non-uniformity or substantial misalignment after each fuel assembly is seated, and for assemblies locked out of alignment by the mechanical interaction of crossing rows of assemblies.

2.5.5 Inspect all assembly-to-assembly gaps, assembly-to-baffle gaps, and all top nozzle corner-to-corner junctions during core verification.

2.5.6 If misalignments exist, determine the source of the misalignment. Using normal fuel handling procedures, remove designated assemblies and reseat them in the core as appropriate. Reinspect all gaps and misalignments that may have been changed by reseating assemblies.

_____ / _____ 2.6 Perform FNP-1-STP-13.0, REACTOR DECAY TIME, to verify reactor has been subcritical for at least 150 hours.

_____ / _____ 2.7 The reactor coolant system boron concentration is greater than the limits specified in the COLR and referenced by Tech. Spec 3.9.1 and has been verified in the last 72 hours per SR 3.9.1.1 prior to the start of head stud detensioning.

CAUTION: The Gamma-Metrics source range channel may only be used as a back-up to N-31 or N-32 during certain core configurations. The Refueling Coordinator or Westinghouse should be consulted if N-31 or N-32 becomes inoperable when the core is not fully loaded.

_____ / _____ 2.8 At least two of the required source range neutron flux monitors are operable with a Channel Check performed within 12 hours prior to any core alterations. Trip functions and associated TSLB's are not required for Mode 6 or core alterations.

_____ / _____ 2.9 The containment building penetrations are in the following status within 100 hours prior to the start of core alterations.

_____ / _____ 2.9.1 The equipment door closed and held in place by a minimum four bolts.

_____ / _____ 2.9.2 A minimum of one door in each air lock is closed.

____ /__ 2.29.4 A briefing has been performed by the Senior Line Manager of all involved personnel. This briefing requires completion of the AP-92, BRIEFING CHECKLIST FOR THE CONDUCT OF INFREQUENTLY PERFORMED TESTS OR EVOLUTIONS. The completed briefing form should be attached to this procedure for document tracking purposes. Draining to the vessel flange (129'7") or mid plane (123'3" to 123'5") will be designated an IPTE and require Senior Line Manager Oversight. (IN-97-83)

____ /__ 2.30 RCS temperature < 140°F.

____ /__ 2.31 Training has been completed on recent refueling equipment design changes for the appropriate personnel. (Commitment 94-13-01)

RF coordinator

3.0 Precautions and Limitations

3.1 At least two source range neutron flux monitors shall be operating, each with continuous visual indication in the control room AND one channel of audible count rate in the control room or in containment using a stationed licensed operator that will communicate with control room if required to alert them of a possible dilution accident.

3.2 The Gamma-Metrics source range channel may only be used as a back-up to N-31 or N-32 during certain core configurations. The Refueling Coordinator or Westinghouse should be consulted if N-31 or N-32 becomes inoperable when the core is not fully loaded.

3.3 The High Flux at Shutdown alarm serves as an additional monitor of neutron flux during stable flux conditions. During core reload, continually changing neutron flux is being closely monitored by performance of a 1/M plot. The High Flux at Shutdown alarm may be placed in the BLOCK position to prevent spurious alarms in containment.

3.4 IF the High Flux at Shutdown alarm is actuated, THEN all personnel will evacuate the containment in an orderly manner. IF the alarm is actuated during movement of fuel, THEN return the fuel to the position it occupied prior to the alarm before evacuating the containment.

3.5 Core Alterations will be suspended if any of the following events occur during any core alteration evolution.

3.5.1 An unexpected increase in the count rate by a factor of 2 on both required channels (N31, N32, N48) or by a factor of 5 on one required channel.

THERE IS NO WRITTEN RESPONSE REQUIRED!!!!

***RTYPE: K2.13**

TRAINING ADVISORY NOTICE

*DATE 20010213B

TITLE: **Use of the Gamma-Metrics Detector as a Back-up to Source Range Channel N-31 or N-32**

(*XREF)

Special instructions (if any): READ THE ATTACHED INFORMATION. THERE IS NO WRITTEN RESPONSE REQUIRED.

*INDEXING INFORMATION

- All Licensed Personnel
- cc: David McCoy, Doug McKinney, Dave Morey, Randy May, Bob Monk, John Garlington

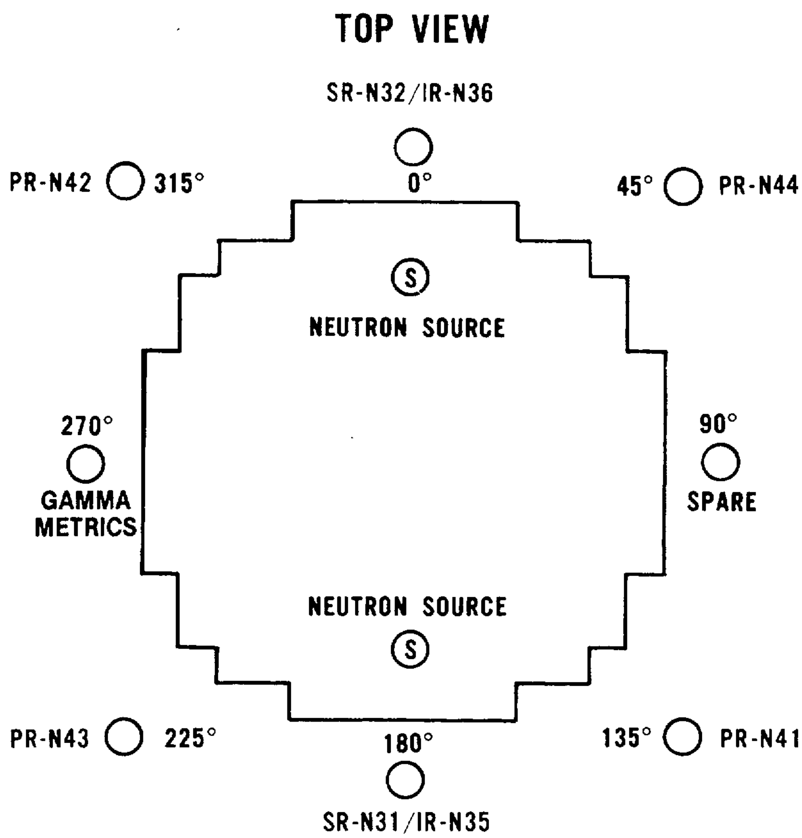
TRAINING ADVISORY NOTICE

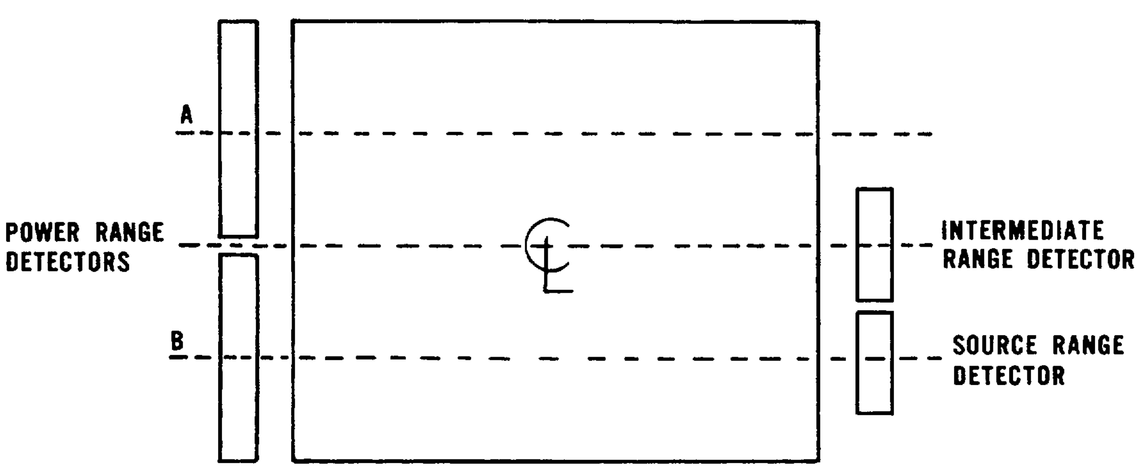
Use of the Gamma-Metrics Detector as a Back-up to Source Range Channel N-31 or N-32

Technical Specification 3.9.2, *Refueling Operations - Nuclear Instrumentation*, requires that two source range neutron flux monitors and one channel of audible count rate shall be operable. This Tech. Spec. has not changed. However, the basis for this spec. (B 3.9.2) has been revised to allow the Gamma-Metrics source range channel to be substituted for one of the Westinghouse source range detectors, N-31 or N-32. If the Gamma-Metrics is being used as a back-up, the audible count rate will be selected to the operable Westinghouse detector, and the requirements of spec. 3.9.2 are satisfied.

Some caution must be used before taking advantage of this new capability. Since the Gamma-Metrics detector is located 90° around the core from the source range detectors, the neutronic coupling of the Gamma-Metrics detector to the core could be different than either source range detector, depending on the core configuration. Refer to the attached figure. Consider the case where initially there is no fuel in the reactor vessel. A typical core reload will install fuel assemblies and neutron sources in front of source range detectors N-31 and N-32. Fuel assemblies are then installed across the core to form a "bridge" so that the source range detectors are both close enough to the fuel to be able to respond to neutrons from the core. This is known as being neutronically coupled to the core. Once the bridge across the core is complete, both detectors are coupled to the core, so they are providing redundant indication. Early in a core reload sequence, the Gamma-Metrics detector is too far away from the core to be able to respond to its neutrons. In order to use the Gamma-Metrics as a back-up, the core loading must be such that there are fuel assemblies forming a neutronic bridge to that detector so that the detector is able to respond to the core's neutron output. Precautions have been included in the latest revisions to FNP-1/2-UOP-4.1, *Controlling Procedure for Refueling*, to ensure that core configuration is considered when using Gamma-Metrics as a back-up.

OpsNis010


TOP VIEW
SR-N32/IR-N36
0°
PR-N42
315°
45°
PR-N44
NEUTRON SOURCE
270°
GAMMA METRICS
90°
SPARE
NEUTRON SOURCE
PR-N43
225°
180°
135°
PR-N41
SR-N31/IR-N35


A
POWER RANGE DETECTORS
B
INTERMEDIATE RANGE DETECTOR
SOURCE RANGE DETECTOR

Question 59 on the RO exam and 55 on the SRO exam

The questions states:

The crew has performed ECP-0.0, :LOSS OF ALL AC POWER," and transitioned to ECP-0.1 "LOSS OF ALL AC POWER RECOVERY WITHOUT SI REQUIRED." While performing ECP-0.1, step 3, "Reset PHASE A CTMT ISO," there was a simultaneous loss of a Vital Instrument bus and SI actuation.

Which ONE of the following describes the crews required action(s)?

A. Return to ECP-0.0, restore the instrument bus; then transition to ECP-0.2 "LOSS OF ALL AC POWER RECOVERY WITH SI REQUIRED" when directed.

B. Reset the SI signal; then transition to ECP-0.2 "LOSS OF ALL AC POWER RECOVERY WITH SI REQUIRED" when directed.

C. Transition to EEP-0.0, "REACTOR TRIP OR SAFETY INJECTION,"; then transition to ECP-0.0, restore the instrument bus; then return to ECP-0.1.

D. Immediately transition to ECP-0.2 "LOSS OF ALL AC POWER RECOVERY WITH SI REQUIRED".

The key correct answer is B. Answer D is also correct, because

One of the entry conditions of ECP-0.2 states:

b. FNP-1-ECP-0.1, LOSS OF ALL AC POWER RECOVERY WITHOUT SI REQUIRED, step 9, 20, **or any time an SI is required or actuated during performance of FNP-1-ECP-0.1**.

FNP-0-SOP-0.8, EMERGENCY RESPONSE PROCEDURE USER'S GUIDE, states: "Each ERP has its "Purpose" and "Symptoms or Entry Conditions" listed on the first page. This information is presented to help the user ensure that he has transitioned to the correct procedure."

In addition to the above the stem of the question states " there was a simultaneous loss of a Vital Instrument bus and SI actuation." **The loss of a single vital instrument bus should not cause a safety injection, which implies that the SI could possibly be due to degrading RCS conditions**. If this is the case and the only action that has been initiated in ECP-0.1 is the continuation of action started in ECP-0.0, the operator based on the entry condition of ECP-0.2 could decide that he should be in ECP-0.2.

Based on the above either answer B or D is correct.

A. **Purpose**

This procedure provides actions to use engineered safeguards systems to recover plant conditions following restoration of AC emergency power.

B. **Symptoms or Entry Conditions**

I. This procedure is entered when AC power has been restored and SI is required; from the following:

a. FNP-1-ECP-0.0, LOSS OF ALL AC POWER, step 29

b. FNP-1-ECP-0.1, LOSS OF ALL AC POWER RECOVERY WITHOUT SI REQUIRED, step 9, 20, or any time an SI is required or actuated during performance of FNP-1-ECP-0.1.

Teamwork, like communication, is essential to effective plant operation at all times but especially during emergency operations. No individual can observe everything that is happening during a casualty. It is vital that the operating crew function as a team and maintain open communication between all team members. Each team member has a responsibility to ask questions when he does not understand something and to point out any situation in which he believes the team may be proceeding in the wrong direction. This helps to ensure that the team fully considers all aspects of the situation before reaching a decision.

During an emergency event, a large number of priority tasks must be correctly performed in a limited time. In this situation, the potential for error is increased. The team can minimize this potential if each member follows procedural guidance and strictly performs each task accordingly, while communicating the status of his efforts to the other members. Team members should back each other up when possible to provide additional assurance that tasks are properly completed.

3.0 Procedure Usage

3.1 Entry Conditions

There are two entry points to the ERP network. The first is upon a reactor trip or safety injection occurs or is required. When this occurs the network is entered at step 1 of EEP-0, REACTOR TRIP OR SAFETY INJECTION. The second is if a complete loss of AC power to the safeguards busses occurs. For this condition the network is entered at step 1 of ECP-0.0, LOSS OF ALL AC POWER.

Once the ERP network has been entered, the user is directed to other ERPs by transition steps. ESP-0.0, REDIAGNOSIS, may be entered at any time after exiting EEP-0, REACTOR TRIP OR SAFETY INJECTION, when a safety injection is in progress or is required and no red or orange path FRP is being implemented. This procedure is entered based on the user's judgment and is designed to help him determine which ERP should be implemented if any confusion develops.

Each ERP has it's "Purpose" and "Symptoms or Entry Conditions" listed on the first page. This information is presented to help the user ensure that he has transitioned to the correct procedure.

3.2 Notes and Caution Statements

The ERPs have been written to provide concise directed action steps for the user. For this reason, there are many cases where information in addition to action steps is provided to assist the user in proper performance of a step. If the information is needed to prevent personnel injury, mitigate the accident, prevent loss of life or prevent damage to equipment, it is placed in a caution statement. Other information is placed in a note.

Step	Action/Expected Response	Response NOT Obtained

****

CAUTION: IF an SI signal is actuated prior to performing step 9 of this procedure, THEN it should be reset to permit manual loading of SI equipment.

****

****

CAUTION: Critical safety function status trees should be monitored for information only. No Function Restoration Procedure should be implemented until completion of step 12.

****

Step	Action/Expected Response	Response NOT Obtained
1	**Check RCP Seal Isolation Status:**	
1.1	Check RCP seal injection isolation valves - CLOSED (139 ft. AUX BLDG rad side filter room) SEAL WATER INJ FILTER A INLET [] Q1E21V127A closed [] Q1E21V127C closed SEAL WATER INJ FILTER B INLET [] Q1E21V127B closed [] Q1E21V127D closed	1.1 IF valves open or position not known, THEN check charging pump status: 1.1.1 IF CHG PUMP running, THEN go to Step 2. 1.1.2 IF CHG PUMP NOT running, THEN manually close valves before starting CHG PUMP.

Step 1 continued on next page.

___Page Completed

Step	Action/Expected Response	Response NOT Obtained
1.2	Check CCW return from RCP thermal barrier valves - CLOSED. CCW FROM RCP THRM BARR [] Q1P17HV3045 [] Q1P17HV3184	1.2 IF both valves open or position not known, THEN check on service CCW PUMP status: 1.2.1 IF on service CCW PUMP running, THEN go to Step 2. 1.2.2 IF on service CCW PUMP NOT running, THEN manually close valves. 1.2.3 IF neither valve can be closed, THEN locally isolate CCW return from thermal barrier. (121 ft, AUX BLDG rad side PPR) CCW FROM RCP THRM BARR [] Q1P17V107 closed
___ 2	**Reset SI signals.**	
2.1	Verify SI - RESET. [] MLB-1 1-1 not lit (A TRN) [] MLB-1 11-1 not lit (B TRN)	2.1 IF any train will NOT reset using the MCB SI RESET pushbuttons, THEN place the affected train S821 RESET switch to RESET. (SSPS TEST CAB.)
2.2	Reset B1F sequencer. (139 ft, AUX BLDG A train SWGR room)	
2.3	Reset B1G sequencer. (121 ft, AUX BLDG B train SWGR room)	
___ 3	**Reset PHASE A CTMT ISO.** [] MLB-2 1-1 not lit [] MLB-2 11-1 not lit	

___Page Completed

Step	Action/Expected Response	Response NOT Obtained
___ 4	**Check PHASE B CTMT ISO - RESET.** [] MLB-3 1-1 not lit [] MLB-3 6-1 not lit	4 Perform the following. 4.1 Reset PHASE B CTMT ISO. 4.2 Establish instrument air to containment. 4.2.1 Verify at least one air compressor started. AIR COMPRESSOR [] 1A [] 1B [] 1C 4.2.2 Verify INST AIR PRESS PI 4004B greater than 85 psig. 4.2.3 Align instrument air to containment. (BOP) IA TO PENE RM [] N1P19HV3825 open [] N1P19HV3885 open IA TO CTMT [] Q1P19HV3611 open 4.3 Verify proper PRF system operation using FNP-1-SOP-60.0, PENETRATION ROOM FILTRATION SYSTEM. 4.4 Proceed to step 6.

___Page Completed

Step	Action/Expected Response	Response NOT Obtained

___ 5 **Verify instrument air available.**

5.1 Verify at least one air compressor - STARTED.

AIR COMPRESSOR
[] 1A
[] 1B
[] 1C

5.2 Verify INST AIR PRESS PI 4004B - GREATER THAN 85 psig.

5.3 Align instrument air to containment. (BOP)

IA TO PENE RM
[] N1P19HV3825 open
[] N1P19HV3885 open

IA TO CTMT
[] Q1P19HV3611 open

___ 6 **Restore remote control capability of safeguards equipment using ATTACHMENT 1.**

___Page Completed

Step	Action/Expected Response	Response NOT Obtained

****

CAUTION: Bus failure could result from starting loads in excess of the capacity of the power source.

****

7 Manually start safeguards equipment.

7.1 Start only one CCW PUMP.

HX 1A(1B,1C)
CCW FLOW
[] FI 3043AA
[] FI 3043BA
[] FI 3043CA

7.2 Start available containment fan coolers in slow speed.

CTMT CLR FAN SLOW SPEED
[] 1A
[] 1B
[] 1C
[] 1D

7.3 Align reactor makeup system.

7.3.1 Adjust BORIC ACID MKUP FLOW FK 113 to deliver greater than existing RCS boron concentration.

7.3.2 Verify reactor makeup system - IN AUTOMATIC MODE.

MKUP MODE SEL SWITCH
[] N1E21HS2100Q in AUTO

MKUP MODE CONT SWITCH
[] N1E21HS2100P red light lit

Step 7 continued on next page.

___Page Completed

***

CAUTION: The charging pump to be started must be in the same train as the running CCW pump.

***

7.4 Restore charging capability.

7.4.1 IF VCT available, THEN align charging pump suction to VCT.

CHG PUMP
SUCTION HDR ISO
[] Q1E21MOV8130A open
[] Q1E21MOV8130B open
[] Q1E21MOV8131A open
[] Q1E21MOV8131B open

VCT
OUTLET ISO
[] Q1E21LCV115C open
[] Q1E21LCV115E open

RWST
TO CHG PUMP
[] Q1E21LCV115B closed
[] Q1E21LCV115D closed

Response NOT Obtained:

7.4.1 Verify charging pump suction aligned to RWST.

RWST
TO CHG PUMP
[] Q1E21LCV115B open
[] Q1E21LCV115D open

VCT
OUTLET ISO
[] Q1E21LCV115C closed
[] Q1E21LCV115E closed

7.4.2 Verify charging pump miniflow valves - OPEN.

1A(1B,1C) CHG PUMP
MINIFLOW ISO
[] Q1E21MOV8109A open
[] Q1E21MOV8109B open
[] Q1E21MOV8109C open

CHG PUMP
MINIFLOW ISO
[] Q1E21MOV8106 open

Step 7 continued on next page.

Step	Action/Expected Response	Response NOT Obtained

7.4.3 Verify charging line - ISOLATED.

CHG PUMPS TO REGENERATIVE HX

[] Q1E21MOV8107 closed

[] Q1E21MOV8108 closed

7.4.4 Start only one CHG PUMP.

****

CAUTION: To prevent diesel generator overloading, at least 0.1 MW of diesel generator capacity must be available prior to aligning a SFP Cooling Pump to a diesel.

****

7.5 Verify Spent Fuel Pool Cooling in service per FNP-1-SOP-54.0, SPENT FUEL PIT COOLING AND PURIFICATION SYSTEM.

8 Establish normal charging.

8.1 Manually close charging flow control valve.

CHG FLOW

[] FK 122

Step 8 continued on next page.

FNP-1-ECP-0.1	LOSS OF ALL AC POWER RECOVERY WITHOUT SI REQUIRED	Revision 16

Step	Action/Expected Response	Response NOT Obtained

8.2 Verify charging flow path aligned.

8.2.1 Verify charging pump discharge flow path - ALIGNED.

CHG PUMP
DISCH HDR ISO
[] Q1E21MOV8132A open
[] Q1E21MOV8132B open
[] Q1E21MOV8133A open
[] Q1E21MOV8133B open

CHG PUMPS TO
REGENERATIVE HX
[] Q1E21MOV8107 open
[] Q1E21MOV8108 open

8.2.2 Verify only one charging line valve - OPEN.

RCS NORMAL
CHG LINE
[] Q1E21HV8146

RCS ALT
CHG LINE
[] Q1E21HV8147

8.3 Maintain pressurizer level 15%-50%{48%-52%}.

8.3.1 Control charging flow.

CHG FLOW
[] FK 122 adjusted

___Page Completed

Step	Action/Expected Response	Response NOT Obtained

****

CAUTION: To ensure proper plant response, FNP-1-ECP-0.2, LOSS OF ALL AC POWER RECOVERY WITH SI REQUIRED, should be entered for any SI required, or actuated, during the performance of this procedure.

****

Step	Action/Expected Response	Response NOT Obtained
___ 9	**Check SI flow not required.**	
	9.1 Check SUB COOLED MARGIN MONITOR indication - GREATER THAN 16°F{45°F} SUBCOOLED IN CETC MODE.	9.1 Go to FNP-1-ECP-0.2, LOSS OF ALL AC POWER RECOVERY WITH SI REQUIRED.
	9.2 Check pressurizer level - GREATER THAN 7%{50%}.	9.2 Perform the following. 9.2.1 Raise charging flow. CHG FLOW [] FK 122 adjusted 9.2.2 IF pressurizer level can NOT be maintained, THEN go to FNP-1-ECP-0.2, LOSS OF ALL AC POWER RECOVERY WITH SI REQUIRED.
___ 10	**Monitor CST level.**	
	10.1 Check CST level greater than 5.3 ft. CST LVL [] LI 4132A [] LI 4132B	10.1 Align AFW pumps suction to SW using FNP-1-SOP-22.0, AUXILIARY FEEDWATER SYSTEM.
	10.2 Align makeup to the CST from water treatment plant OR demin water system using FNP-1-SOP-5.0, DEMINERALIZED MAKEUP WATER SYSTEM, as necessary.	

___Page Completed