

HL-19 NRC Post-Exam Comments

Post-Exam Comment #1

In Simulator Scenario #2, while in Mode 1, Loop #4 ARV, 1PV-3030, failed open and was manually closed by the crew. Subsequently, 1AA02 de-energized due to a fault on the bus.

The Scenario Guide states the following Tech Specs are required to be entered when 1AA02 is de-energized and DG1A is emergency tripped:

Tech Spec LCO 3.8.1, AC Electrical Sources – Operating, Cond. A, B, and E
Tech Spec LCO 3.8.9, Distribution Systems – Operating, Cond. A

Based on the given conditions, is Tech Spec LCO 3.7.4, Atmospheric Relief Valves (ARVs), Cond B, required to be entered?

Discussion / Justification

Candidates are expected to address only base LCO entries and not to perform an extensive LOSF evaluation during simulator scenarios. The ability to perform formal LOSF evaluations is tested using Admin JPMs and the candidate would be provided 10008-C, "Recording Limiting Conditions for Operation." Candidates are expected to recognize the existence of a significant LOSF due to multiple failures in the simulator and ensure LCO completion times more conservative than the base LCO are met.

Per Tech Spec LCO 3.0.6, when a supported system LCO is not met solely due to a support system LCO not being met, the Conditions and Required Actions associated with this supported system are not required to be entered. Only the support system LCO ACTIONS are required to be entered. This is an exception to LCO 3.0.2 for the supported system. In this event, additional evaluations and limitations may be required in accordance with Tech Spec 5.5.15, "Safety Function Determination Program (SFDP)." If a loss of safety function is determined to exist by this program, the appropriate Conditions and Required Actions of the LCO in which the loss of safety function exists are required to be entered.

Per Tech Spec LCO 3.7.4, Atmospheric Relief Valves (ARVs), Bases, the analysis assumes three ARVs are OPERABLE at the start of the event. One of the ARVs is on the ruptured SG, another ARV is assumed to fail to open, and the remaining ARV is used to perform the RCS cooldown. However, there is also a scenario where the limiting single failure is the loss of control power for the two remaining ARVs. In this case, the ARVs cannot be controlled from the control room to initiate cooldown. The ARVs are equipped with local hand pumps that can be used to open them manually. Given a tube rupture on one of the steam generators with an operable ARV, and the limiting single failure being a loss of control power to the remaining operable ARVs, only one ARV must be capable of being manually actuated using its hand pump. If the ARV on the ruptured generator also has one of the functional hand pumps, then only one of

HL-19 NRC Post-Exam Comments

the remaining ARVs needs have a functional hand pump in order to meet the safety analysis.

Since the electrical failure is bounded by LCO 3.7.4 Bases and the hand pump operation was unaffected, no LOSF exists as a result of this failure. Therefore, the ARV is declared inoperable, but the actions for LCO 3.7.4 are not taken as stated in LCO 3.0.6. The support system LCO completion times are more conservative and bound the supported system. It is consistent with training and simulator performance on similar failures to not list the supported LCOs as described above. Candidates are not expected to list nor take the actions of these supported system LCOs. If a candidate lists these supported system LCOs, it is not incorrect – it is simply not necessary.

Licensee Recommendation

Based on the discussion above, the licensee does NOT recommend adding Tech Spec LCO 3.7.4, Atmospheric Relief Valves (ARVs), Cond. B, to the Scenario #2 Guide list of Tech Specs required to be entered. Additionally, add a note to the examiner to indicate that supported systems are inoperable, but their associated required action statements are not required to be entered.

HL-19 NRC Post-Exam Comments

Post-Exam Comment #2

In Simulator Scenario #2, while in Mode 1, 1AA02 de-energizes due to a fault on the bus. The Scenario Guide and 18031-C, "Loss of Class 1E Electrical Systems," Step A17 state:

A17. Verify battery charger in service for non-1E batteries:

- ND1
- ND2
- ND3A
- ND3B

The Scenario Guide states ND1 and ND3A will not have battery chargers in service and that the crew will dispatch operators to place the required ND1 and ND3A battery chargers in service.

Based on the given conditions, what are the primary loads supplied by ND1 and ND3A, and what are the potential consequences if the battery chargers are not placed in service? Additionally, would this constitute a critical task per NUREG 1021, Appendix D, which states, "Examples of CTs involving essential safety actions include those for which a crew demonstrates the following abilities: take one or more actions that would prevent a challenge to plant safety?"

Discussion / Justification

An extensive review of all loads associated with 1ND1 and 1ND3A was made on one-line drawings 1X3D-AA-H03A, H03C, H07A, H07B, F28A, G02B, and G05B, and utilizing Switchgear Notes. No supplied equipment was found that would place the plant in a significant transient or significantly challenge power operation.

- 1ND1 provides power to the Turbine Generator backup seal oil pump.
- 1ND3A loads all have redundant power supplies from regulating transformers that auctioneer with the exception on 1ND31 and 1ND33.
- 1ND31 loads:
 - Control power to non-1E switchgear.
 - Various non-1E air operated valves that fail closed.
 - Some non-1E alarms functions.
- 1ND33 loads:
 - Control power to non-1E switchgear.

Licensee Recommendation

Based on review of the associated load, the licensee does NOT recommend revising the Scenario #2 Guide to indicate placing the ND1 and ND3A battery chargers in service is a critical task.

HL-19 NRC Post-Exam Comments

Post-Exam Comment #3

In Simulator Scenario #2, while in Mode 1, 1AA02 de-energizes due to a fault on the bus. DG1A starts, but its output breaker does not close due to the 1AA02 bus fault.

The Scenario Guide states the crew will emergency trip DG1A at Step 4 of 18031-C, "Loss of Class 1E Electrical Systems."

Based on the given conditions, what are the potential consequences of allowing DG1A to run with its output breaker open until ALB35-C04, DG1A HI TEMP JACKET WATER OUT, is received? Additionally, would this constitute a critical task per NUREG 1021, Appendix D, which states, "Examples of CTs involving essential safety actions include those for which operation or correct performance prevents the following: degraded emergency core cooling system (ECCS) or emergency power?"

Discussion / Justification

Per the System Engineer, the EDGs are designed to operate for 3 minutes, fully loaded, with no NSCW flow through the jacket water heat exchanger without exceeding any temperature limitations. Per ARP 17035-1, ALB35-C04 alarms at 195F, and a NOTE for the annunciator indicates the EDG will trip at 200F if in normal mode. If an emergency start signal is present, ALB35-C05, DG1A TRIP HI TEMP JACKET WATER, will annunciate, but the EDG will not trip.

Since the EDG output breaker was open, the EDG was running unloaded. The minimal heat input would greatly extend the allowable run time, although no calculations exist to determine the exact time/temperature relationship. Since the EDG was stopped prior to ALB35-C05 alarming, the automatic trip setpoint had not been reached.

Furthermore, since 1AA02 was faulted, it would not have constituted a possible recovery path. If the EDG were allowed to run until damage had occurred, the loss of the EDG would not increase the degradation of the ECCS or Electrical system because that portion of the Electrical system was already lost. Therefore, stopping the EDG does not constitute a critical task per NUREG 1021, Appendix D.

Licensee Recommendation

Based on the discussion above, the licensee does NOT recommend revising the Scenario #2 Guide to designate tripping DG1A by the crew to be a critical task.

HL-19 NRC Post-Exam Comments

Post-Exam Comment #4

In Simulator Scenario #4, while in Mode 1, 1PT-525, Steam Generator Pressure, fails low. This is the only steam generator pressure instrument failed.

The Scenario Guide states the following Tech Specs are required to be entered for this instrument failure:

3.3.2, ESFAS Instrumentation, Fu 1.e, Cond. D.

3.3.3, Post Accident Monitoring Instrumentation, Fu 8, Cond. B, G, H, I. (INFO only)

3.3.4, Remote Shutdown System, Fu 13, Cond A.

Based on the given conditions, is Tech Spec LCO 3.3.2, ESFAS Instrumentation, Fu 4.d.(1), Cond. D, and Fu 4.d.(2), Cond. D, required to be entered?

Discussion / Justification

A review of the scenario indicates that all the correct Tech Specs were listed for the specific event on Form ES-D-2, but not all were included in the Scenario Outline, Form ES-D-1.

On Page 2 of 2 of Form ES-D-2 for Event #5 (Step # F8):

- Reference Tech Specs for ESFAS Instrumentation, PAMS Instrumentation, and Remote Shutdown Instrumentation.
 - LCO 3.3.2, Fu 1e, Condition D
 - LCO 3.3.2, Fu 4d(1), Condition D
 - LCO 3.3.2, Fu 4d(2), Condition D
 - LCO 3.3.3, Fu 8, Condition B
 - LCO 3.3.4 Fu 13, Condition A

Licensee Recommendation

The licensee recommends adding Tech Spec LCO 3.3.2, ESFAS Instrumentation, Fu 4.d.(1), Cond. D, and Fu 4.d.(2), Cond. D, to the Scenario #4 Outline, Form ES-D-1, list of Tech Specs required to be entered for Event 5.

HL-19 NRC Post-Exam Comments

Post-Exam Comment #5

In Simulator Scenario #4, while in Mode 1, the Loop #4 BFRV fails to control in automatic. The BFRV can be controlled successfully when taken to manual.

The Scenario Guide states no Tech Specs apply for this condition.

Based on the given conditions, is Tech Spec LCO 3.7.3, MFIVs and MFRVs and Associated Bypass Valves, Cond. C, required to be entered?

Discussion / Justification

The solenoid valve that vents air and allows the BFRV valves to close automatically on a FWI signal is upstream of the control air functions. Therefore, the isolation function will still occur. However, the specific knowledge of the failure mechanism is not known to the candidate at the time of failure. As such, the Operability Determination process is entered per NMP-AD-012, "Operability Determinations and Functionality Assessments." A component remains operable as long as a reasonable expectation of operability remains.

NMP-AD-012 states a subsequent determination of operability should be based on the licensee's "reasonable expectation," from the evidence collected, that the Systems, Structures, or Components (SSCs) are operable and that the Operability Determination will support that expectation. Reasonable expectation does not mean absolute assurance that the SSCs are operable. The SSCs may be considered operable when there is evidence that the possibility of failure of an SSC has increased, but not to the point of eroding confidence in the reasonable expectation that the SSC remains operable. The supporting basis for the reasonable expectation of SSC operability should provide a high degree of confidence that the SSCs remain operable. It should be noted that the standard of "reasonable expectation" is a high standard, and that there is no such thing as an indeterminate state of operability; an SSC is either operable or inoperable.

Without the specific information needed for the operability call and the BFRV control failure, it is understandable that a candidate would conclude that reasonable expectation of operability no longer existed, and concurrent with NMP-AD-012 guidance, immediately declare the BFRV inoperable.

Licensee Recommendation

The licensee recommends adding Tech Spec LCO 3.7.3, MFIVs and MFRVs and Associated Bypass Valves, Cond. C, to the Scenario #4 Guide list of Tech Specs with a note to the examiner indicating the candidate may enter LCO 3.7.3 if the operability of the BFRV is in question (awaiting an operability determination).

HL-19 NRC Post-Exam Comments

Post-Exam Comment #6

In Simulator JPM 'a', "Perform a Manual Makeup to the VCT," the candidate is directed to raise VCT level from 32% to 50%. JPM 'a', Step 2, is a critical step that reads:

NOTE
Volumetric change in VCT is equal to 19.2 gallons per percent change in level.

4.6.1.1 Set TOTAL MAKEUP Integrator 1-FQI-0111 to the desired amount of Total Makeup Water.

Standard: Candidate reviews CAUTIONS and NOTE and calculates the total makeup required to raise VCT level from 32% to 50% (18%) using: (19.2 gallons / % x 18% = 345.6 gallons) and sets 1-FQI-0111 to 345 – 346 gallons by depressing the gray pushbutton under the digit to be changed (red pushbutton will reset reading to all zeros).

Based on the given conditions, does rounding the calculated value to 350 gallons meet the expectation for completion of this step?

Discussion / Justification

Rounding the total required makeup up to 350 gallons is an acceptable practice. The additional 4.4 gallons would have resulted in a VCT level change from 50% to 50.2%, which is neither significant nor detectable using QMCB indication.

Licensee Recommendation

To more closely represent the initiating cue of raising VCT level from 32% to 50%, the licensee recommends revising Simulator JPM 'a', Step 2, Standard to a new range of 326.4 – 364.8 gallons of makeup to be added, which is equivalent to 50±1% VCT level change.

HL-19 NRC Post-Exam Comments

Post-Exam Comment #7

In Simulator JPM 'a', "Perform a Manual Makeup to the VCT," the candidate is directed to raise VCT level from 32% to 50%. JPM 'a', Step 3, is a critical step that reads:

4.6.1.2 Set BORIC ACID TO BLENDER Integrator 1-FQI-0110 to the amount of boric acid as follows:

- a. Calculate estimated volume of boric acid using the following calculation.

$$\text{Gallons of Boric Acid} = \frac{\text{Total M/U} \times \text{RCS Cb}}{\text{BAST Cb}}$$

Standard: Candidate reviews CAUTION and correctly calculates amount of boric acid to add using the total makeup number calculated in Step 4.6.1.1 (345 – 346 gallons) and the equation:

$$\frac{345.6 \text{ gallons} \times 907 \text{ ppm}}{7000 \text{ ppm}} = 44.8 \text{ gallons (44.7 – 44.9 gallons)}$$

Based on the given conditions and using 350 gallons from the previous step in the equation, is a value of 43.3 gallons of boric acid acceptable if the calculated value should be 45.35 gallons?

Discussion / Justification

Based on the discussion and recommendation of Post-Exam Comment #6, a value of 326.4 – 364.8 gallons of makeup is acceptable for satisfactory completion of Step 4.6.1.1. Therefore, the acceptable range for the completion of the calculation in Step 4.6.1.2 is ± 0.1 gallon based on the value determined in Step 4.6.1.1. As described in Post-Exam Comment #6, the acceptable range for Step 4.6.1.2 would be 45.35 ± 0.1 gallons using 350 gallons of boric acid in the calculation.

Licensee Recommendation

The licensee recommends revising Simulator JPM 'a', Step 3 Standard to indicate a range of ± 0.1 gallons based on the total makeup value determined by the candidate in Step 4.6.1.1.

HL-19 NRC Post-Exam Comments

Post-Exam Comment #8

In Simulator JPM 'f, "Synchronize Main Generator to the Grid," the candidate is directed in Step 10 to:

4.1.3.8 Adjust Turbine speed using the INCREASE LOAD and DECREASE LOAD Pushbuttons until 1SI-40125 Pointer is rotating very slowly in FAST (clockwise) direction.

Simulator JPM 'f, Step 14, is a critical step that reads:

4.1.3.10 If automatic synchronizing is required:

c. Verify the Synchroscope Pointer is rotating very slowly (approximately 10 to 15 second rotation) in the FAST (clockwise) direction.

CUE: *"CV request is noted."*

NOTE TO EXAMINER: Candidate may use INCREASE LOAD and/or DECREASE LOAD pushbuttons to adjust 1SI-40125 rotation speed.

Standard: Candidate verifies 1SI-40125 is rotating very slowly (~ 10 to 15 second rotation) in the FAST (clockwise) direction by adjusting turbine speed using the INCREASE and/or DECREASE LOAD pushbuttons as necessary.

Based on the given conditions, what rotation speed in the FAST (clockwise) direction is acceptable to meet the intent of this step?

Discussion / Justification

Per NMP-AP-002, "SNC Fleet Procedures Writers' Guide," critical steps are procedure steps, series of steps, or actions that, if performed incorrectly, will cause irreversible, intolerable harm to plant equipment, people, or significantly impact plant operation. The critical aspect of the task is the direction of rotation and the general speed of rotation. The generator auto-sync circuit is equipped with a sync check relay. When the sync scope rotation is correct and the rotation speed is within an allowable range, the AUTO SYNC PERMISSIVE LIGHT immediately below the sync scope illuminates when the sync scope reaches the 12 o'clock position. If any of the required parameters is not correct, this light will not illuminate and consequentially, the generator output breakers will not automatically close when the AUTO SYNC PERMISSIVE pushbutton is depressed. Since incorrect performance cannot close the generator output breakers, this cannot be a critical step.

Licensee Recommendation

A procedure revision suggestion for 13830-1/2, Step 4.1.3.10.c., has been submitted to remove the "critical" step designator (CR #822337).

HL-19 NRC Post-Exam Comments

The licensee recommends revising Simulator JPM 'f', Step 14 to remove the Critical Step designation. The licensee also recommends revising Simulator JPM 'f', Step 14, Standard to require rotation in the fast (clockwise) direction. Subsequent steps of the JPM will require checking the auto-sync relay scheme as indicated by the red indicating light lit and the output breaker closure.

HL-19 NRC Post-Exam Comments

Post-Exam Comment #9

In Simulator JPM 'g', "Manually Align Control Room Isolation on High Radiation," high radioactivity levels are detected in the incoming duct for the Unit 1 Control Room (1RE-12116 and 1RE-12117 are in high alarm). Normal Control Room HVAC is in service, and an automatic Control Room Isolation does not occur.

1HV-12130, Control Room Return Fan Inlet Air Damper (CREFS 'A'), and 1HV-12131, Control Room Return Fan Inlet Air Damper (CREFS 'B'), are simultaneously opened (manually). The dampers then re-close when the handswitch is released.

Based on the given conditions and with no previous action taken, what are the potential consequences of partially opening 1HV-12130, Control Room Return Fan Inlet Air Damper (CREFS 'A'), and 1HV-12131, Control Room Return Fan Inlet Air Damper (CREFS 'B'), simultaneously? Would this action increase the radioactivity levels in the Control Room?

Discussion / Justification

A review of P&IDs AX4DB206-1, 2, and 3 determined that a backdraft damper exists immediately downstream of both 1HV-12130 and 1HV-12131. These backdraft dampers would prevent any reverse flow through the associated ductwork. Furthermore, both suction paths originate from a common supply header. Having both dampers open simultaneously would not result in a change in the airflow into or out of the control room envelope. Additionally, the flow path created by having both paths open does not create a "short circuit" flow path. Worst case, a parallel flow path could be established that would decrease the Control Room envelope positive pressure slightly due to increasing the amount of recirculation air flow and reducing the amount of makeup air. However, Control Room dose rate calculations take into account the air intakes being completely isolated and therefore this condition is bounded.

Licensee Recommendation

The licensee has determined there were NO negative consequences due to partially opening 1HV-12130, Control Room Return Fan Inlet Air Damper (CREFS 'A'), and 1HV-12131, Control Room Return Fan Inlet Air Damper (CREFS 'B'), simultaneously.

HL-19 NRC Post-Exam Comments

Post-Exam Comment #10

In Admin RO JPM 'e', "Perform ERO Recall and ENN Notification," the candidate is directed to notify and confirm receipt of the Emergency Notification Form using the manual method. Admin RO JPM 'e', Step 17, is a critical step that reads:

- 5.0. (Vogle Only) IF any agency requires message authentication, THEN authenticate the message as follows:**
- a. Enter the code provided by the requesting agency.
 - b. Select GET AUTHENTICATION CODE from the ENN Communicator's packet.
 - c. Provide the authentication code supplied by the system to the agency requiring authentication verbally over the ENN.

CUE: *Simulator Operator will respond on the ENN phone, "South Carolina requests authentication for code word #27."*

Standard: Candidate provides code word from the ENN Communicator's packet (drawer to the left of the phone). NOTE: The code word will be provided to the examiner prior to the JPM administration.

Based on the given conditions, is it acceptable for the candidate to wait for an agency to request an authentication code (i.e. ENN communicator does not query the agencies concerning message authentication)?

Discussion / Justification

During Emergency Notification Form (ENF) transmission, the State of South Carolina typically requires an authentication code early in the communication. ENN Communicators are trained to respond to the authentication code request. The ENN Communicator is permitted to wait for the code to be requested by the state agency to avoid jeopardizing the 15-minute notification time. The authentication code is not a Federal requirement for ENN transmission; it is a requirement of the State of South Carolina EMA. Therefore, it is acceptable for the ENN Communicator to wait for an authentication code to be requested from the state agency. As such, a cue from the Simulator Operator would be necessary.

Licensee Recommendation

The licensee recommends revising Admin RO JPM 'e', Step 17, Standard to provide a note to the examiner indicating that it is acceptable for the candidate to wait for an agency to request authentication. When this occurs, a cue from the Simulator Operator will request an authentication code as the State of South Carolina.

HL-19 NRC Post-Exam Comments

Post-Exam Comment #11

In Admin SRO JPM 'e', "Classify an Emergency Event and Complete the Emergency Notification Form," the candidate is directed to classify an emergency event and complete the Emergency Notification Form. Admin SRO JPM 'e', Step 10, is a critical step and its Standard reads:

Standard: Candidate marks Block 'A' (DRILL) and enters MESSAGE #1.

Based on the given conditions, is it acceptable for the candidate to mark Block 'B' (ACTUAL EVENT) on Line 1 of the Emergency Notification Form?

Discussion / Justification

Per NMP-TR-416, "Licensed Operator Continuing Training Program Administration," Step 4.11.11, satisfactory completion of the Emergency Notification Form (ENF) requires correctly declaring the event as either drill or actual event. Unless an actual event is in progress, drill should be selected. This is consistent with the training and evaluation of emergency declarations in both the Initial and Requal training programs.

Licensee Recommendation

The licensee does NOT recommend revising Admin SRO JPM 'e', Step 10, Standard.