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JTRG-05-018

Mr. Steven Dennis
NRC Chief Examiner
United States Nuclear Regulatory Commission
475 Allendale Road
King of Prussia, PA 19406-1415

SUBJECT: ES-501, INITIAL POST-EXAMINATION ACTIVITIES

Dear Mr. Dennis:

In accordance with NRC NUREG 1021 Revision 9, ES-501 section C, please find the below listed items that are included as our post exam activities submittal:

- The graded written examinations (i.e., each applicant's original answer and examination cover sheets) including a clean copy of each applicant's answer sheet (ES-403)
- The master examination(s) and answer key(s), annotated to indicate any changes made while administering (ES-402) and grading the examination(s) (ES-403)
- Any questions asked by and answers given to the applicants during the written examination (ES-402)
- The written examination seating chart (ES-402)
- A completed Form ES-403-1, "Written Examination Grading Quality Checklist" (ES-403 and Section D.1)
- The results of any written examination performance analysis that was performed, with recommended substantive changes (ES-403).

The original form(s) ES-201-3, "Examination Security Agreement." will follow at a later date.

If you should have any questions, please contact me at 315-349-6240.

Very truly yours,

Patrick J. Berry
Training Manager

PJB/RD/ls

Enclosures

CC: LOI File
JTRG File

The NRC staff reviewed the licensee's comments for the questions below. In addition, the staff reviewed abnormal, emergency, operating, and other pertinent procedures as noted.

SRO Question # 40 (Licensee Comments Highlighted)

An accident has resulted in the following conditions:

Drywell Hydrogen 6%, Steady	Drywell Oxygen 2%, Steady
Torus Hydrogen 6%, Steady	Torus Oxygen 3%, Steady
Drywell Radiation 3100 R/Hr, Steady	Reactor Coolant Activity 250 uci/gm, Steady
RPV Pressure 600 psig, Lowering at 20 psig/min	Torus Pressure 55 psig, Rising at 1 psig/min
Torus Water Temperature 180° F, Rising 0.5° F/min	Torus Water Level 14 Feet, Rising 1"/min

Fifteen minutes from now, the expected Control Room actions will be to:

a. Declare a Site Area Emergency. Vent and Purge the Torus and Drywell.
b. Declare a Site Area Emergency. Emergency Depressurize the Reactor Pressure Vessel.
c. Declare a General Emergency. Evacuate a 5 mile radius and 10 miles downwind.
d. Declare a General Emergency. Evacuate a 2 mile radius and 5 miles downwind.

Answer Key: d.

Post-Exam Evaluation Recommendation:	Accept both "c" and "d" as correct responses
Challenge Issue:	Required reference inadvertently omitted creating an unrealistic "From Memory" expectation - The candidate should have been provided with EAP-4, Attachment 1. Providing this reference is supported by program objective 10.02 in lesson Plan EP-12.5.4.2 which states "Evaluate plant conditions and determine PARs using EAP-4". Failure to provide the required reference was an oversight on the part of the Exam Development Team. Both Training Program and Station Management expectations are that Protective Action Recommendations will not be made without first referencing EAP-4. In the absence of the necessary reference, "c" is also an appropriate and conservative response.
Candidate Performance:	3 of 5 Selected "d" while the remaining two candidates selected "c"

[redacted] D.

CORRECT: The given conditions are 7 psig and 7 minutes from violating the PCPL Curve. IAW EOP-4, venting of primary containment is required prior to exceeding PCPL. General Emergency EAL 3.1.3 is applicable when primary containment venting is required due to PCPL. Whenever a General Emergency is declared, EAP-4 directs a Protective Action Recommendation to evacuate a 2 mile radius and 5 miles downwind.

A. Incorrect: The hydrogen values given warrants a Site Area Declaration on EAL 3.3.1. Using this rational, the hydrogen and oxygen values given only result in vent and purge of the drywell and Torus if the resultant off-site release rate will remain below the off-site release rate LCO. The values of Rx Coolant Activity and Containment Radiation, if vented, will clearly violate the release rate LCO. Additionally, IAP-2 directs EAL entry at the highest level indicated by the conditions.

B. Incorrect: A Site Area Emergency 3.2.1 is declared if conditions cannot be maintained below HCTL. Although the values of RPV Pressure and Torus Temperature are in the GREY area of the HCTL curve, they are below that of 14 feet and trending parallel to the curve. An emergency depressurization is also required for the violation of PSP. Additionally, IAP-2 directs EAL entry at the highest level indicated by the conditions.

C. [redacted]

CORRECT: The given conditions are 7 psig and 7 minutes from violating the PCPL Curve. IAW EOP-4, venting of primary containment is required prior to exceeding PCPL. General Emergency EAL 3.1.3 is applicable when primary containment venting is required due to PCPL. Without an available reference (EAP-4 Att. 1) to make a specific PAR, this would be a conservative decision on the operator's part; with answer "d" being a subset of "c".

Technical Reference(s):	IAP-2, EAP-4 (and Bases) EOP-4, EOP-4A, EOP-11
Proposed references to be provided to applicants during examination:	IAP-2 Attachment IAP-2.1, EOP-4, 4A, and 11

NRC Resolution - Q. #40

In regard to answer "D" (the original correct answer):

The staff recognized that the applicants were not provided with the necessary reference, EAP-4, Att.1, to determine the correct answer. The staff also recognized that per station management expectations and the license operator training program, PARs will not be made without first referencing EAP-4.

The NRC staff reviewed the original licensee justification, references noted above, the licensee's post exam comments, and found that answer "D", "Declare a GE. Evacuate a 2 mile radius and 5 miles downwind," was correct. The staff determined that answer "D" remains the correct answer.

In regard to answer "C" (the proposed additionally correct answer):

The staff recognized that the applicants were not provided with the necessary reference, EAP-4, Att.1, to determine the correct answer. The staff also recognized that per station management expectations and the license operator training program, PARs will not be made without first referencing EAP-4.

The NRC staff reviewed the original licensee justification for "C" being an incorrect response, the references noted above in support of that determination, and found that answer "C", "Declare a GE. Evacuate a 5 mile radius and 10 miles downwind," was NOT supported by the references. The licensee's post-exam statement that the answer was also appropriate because it was a conservative response does not make the response correct in accordance with station

procedures. No procedural justification was provided by the licensee in regard to a conservative response being acceptable for a PAR. Therefore, the staff determined that answer "C" was NOT correct.

In regard to answers "A" and "B":

Based upon the original staff review and post-exam review of the question, it was determined that these answers remain INCORRECT. (No change from original submittal.)

Conclusion

The NRC staff determined that the ONLY correct answer, based on procedural references, was Answer "D." The fact that "C" may be a more conservative decision did not make it a correct answer. The staff recognizes that the licensee inadvertently failed to provide the applicant's the reference required to determine the correct answer and that prior to making a PAR determination a referral to the reference was required by training and station management expectations. No procedural justification was provided by the licensee in regard to a conservative response being acceptable for a PAR.

Based on the fact that the procedure reference to determine the correct answer was not provided to the applicants, the NRC staff has determined that the question should be deleted from the exam. The licensee comment to accept both "C" and "D" as correct is denied.

SRO Question # 62 (Licensee Comments Highlighted)

An Equalizing Charge is in progress on "Alpha" Station Battery. MCC-253 is lost midway through the charging cycle, resulting in the loss of:

- "Alpha" Air Handling Unit 72 AHU-30A
- "Alpha" Exhaust Fan 72FAN-46C
- "Alpha" Recirculation Fan 72FAN-31A

The correct course of action, relative to "Alpha" Station Battery / Ventilation, is to:

a. Initiate actions to begin lining up emergency ventilation to "Alpha" Battery Room in accordance with AOP-58 "Station Battery Room Emergency Ventilation"
b. Open Fire Dampers 72FD-3 and 72FD-6 to cross-connect "Alpha" and "Bravo" Supply and Exhaust Fans in accordance with OP-33 "Fire Protection"
c. **Dispatch an operator to secure the Equalizing Charge on "Alpha" Station Battery in accordance with OP-43A "125 VDC Power System"**
d. **Ensure standby Exhaust Fan (72FAN-46A) for "Alpha" Battery Room starts in accordance with OP-59A "Battery Room Ventilation"**

Answer Key:	c.
Post-Exam Evaluation Recommendation:	Accept both "c" and "d" as correct responses.
Challenge Issue:	Stem Clarity - As worded, both "c" and "d" are correct responses. The initial operator action, as detailed in the attached copy of ARP-HV-7A-05, is to ensure that the standby exhaust fan is operating **properly.** Guidance to determine "proper" operation, including power supplies and damper positions, would be found in OP-59A. The action to utilize the ARP and associated OP is appropriate, supported by station management expectations, and is in accordance with training program objectives concerning procedure usage. Discovery of the failure of the standby Exhaust Fan to start would be made as a result of the reference to OP-59A. Upon recognition of this failure, the subsequent, or ultimate operator action for the presented conditions would be to secure the equalizing charge in accordance with the stated Precaution in OP-43A. The following correction to the last stem statement will make "c" the only correct response: The ~~correct~~ ultimate course of action, relative to the "Alpha" Station Battery / Ventilation, is to:

Candidate Performance:	4 of 5 Selected “d” while the remaining candidate selected “a”
C. [redacted]	**CORRECT:** OP-43A Precaution states “Equalizing charges shall only be applied to batteries while battery room ventilation is operating to prevent hydrogen buildup.” Therefore, the charge must be secured.
A.	Incorrect: AOP-58 actions are only warranted when a fire in one of several possible locations causes the loss of Battery Room Ventilation.
B.	Incorrect: Both Fire Dampers are, in fact, located in the supply and exhaust lines. 72FD-6 does cross-connect the supply line, but is normally open. 72FD-3 is located in the Alpha-side exhaust, but does not cross-connect and is normally open. Additionally, OP-33 does not address Fire Damper positioning for the aforementioned dampers.
D. [redacted]	**CORRECT:** Alarm response in ARP-HV-7A-05 directs the operator’s first (priority) action to be to “Ensure the standby Exhaust Fan (72FN-46A) is operating **properly**.” This action is independent of the cause-effect relationship and/or condition. Guidance to determine “proper” operation, including power supplies and damper positions, would be found in OP-59A.
Technical Reference(s):	OP-43A, OP-59A, AOP-58
Proposed references to be provided to applicants during examination:	NONE

NRC Resolution - **Q. #62**

<u>In regard to answer “C” (the original correct answer):</u>

Answer “C” states “Initiate actions to begin lining up emergency ventilation to “Alpha” Battery Room in accordance with AOP-58 “Station Battery Room Emergency Ventilation.”

The staff reviewed the supporting references and found:

1. The loss of MCC-253, which was a given condition in the question stem, results in a loss of power to both exhaust fans 72FAN-46A and 72FAN-46C. These are the only fans available to provide exhaust ventilation from the battery room.

2. In accordance with Lesson Plan SDLP-72B, Objective 1.04, the power supply to the battery room exhaust fans shall be known “from memory and without error.”

3. Procedure OP-43A, “125 VDC Power System,” Rev.22, Precaution C.2.1. states, “Equalizing charges shall only be applied to batteries while battery room ventilation is operating to prevent hydrogen buildup.”

The staff also noted that the question asked the applicants to determine "The correct course of action, relative to "Alpha" Station Battery / Ventilation." In this situation, the applicants must first recognize that power is unavailable to both exhaust fans. With that determination, the applicants must then recognize that the action stated in Answer "D", "Ensure the standby exhaust fan starts . . . ," is a moot point. Therefore, with no exhaust fans available, the applicants must abide by the procedure precaution and, as stated in Answer "C," secure the equalizing charge as the 'correct course of action."

Therefore, the staff determined that Answer "C" was correct.

In regard to answer "D" (the proposed additionally correct answer):

Answer "D" states, "Ensure standby Exhaust Fan (72FAN-46A) for "Alpha" Battery Room starts in accordance with OP-59A "Battery Room Ventilation."

The staff reviewed the supporting references and found:

1. The loss of MCC-253, which was a given condition in the question stem, results in a loss of power to both exhaust fans 72FAN-46A and 72FAN-46C. These are the only fans available to provide exhaust ventilation from the battery room.

2. In accordance with Lesson Plan SDLP-72B, Objective 1.04, the power supply to the battery room exhaust fans shall be known "from memory and without error."

3. Procedure OP-43A, "125 VDC Power System," Rev.22, Precaution C.2.1. states, "Equalizing charges shall only be applied to batteries while battery room ventilation is operating to prevent hydrogen buildup."

The staff also noted that the question asked the applicants to determine "The correct course of action, relative to "Alpha" Station Battery / Ventilation." In this situation, the applicants must first recognize that power is unavailable to both exhaust fans. With that determination, the applicants must then recognize that the action stated in Answer "D", "Ensure the standby exhaust fan starts . . . ," is a moot point and would serve no purpose as a "correct course of action" to address the situation given in the question stem. Additionally, because the equalizing charge is not secured, the safety consequences of a hydrogen buildup in the battery room due to the ventilation loss, would not be addressed and this answer would not constitute a "correct course of action."

Therefore, the staff determined that Answer "D" was NOT correct.

In regard to answers "A" and "B":

Based upon the original staff review and post-exam review of the question, it was determined that these answers remain INCORRECT. (No change from original submittal.)

Conclusion

The NRC staff conducted detailed reviews of all references provided as well as the information stated in the question stem. It was also noted that no inquiries were made by the applicants in regard to this question during exam administration. The staff concluded Answer "C" was the ONLY correct answer. The licensee comment to accept both answers "C' and "D" as correct is denied.

RO Question # 9 (Licensee Comments Highlighted)

A common-cause failure has resulted in all 137 CRD Hydraulic Control Unit (HCU) Accumulators becoming inoperable. Per the Technical Specification Bases, which of the following reactor pressures is designated as the transition point between acceptable and unacceptable Control Rod Scram Times?

e. 750 psig

f. ~~800 psig~~

g. 850 psig

h. 900 psig

Answer Key:	b.
Post-Exam Evaluation Recommendation:	Change Answer Key from "b" to "d"
Challenge Issue:	Answer Key Incorrect / Stem Clarity - The stem requests the candidate to demonstrate knowledge between acceptable and unacceptable Control Rod Scram Times and not necessarily control rod operability. The original intent of the question was control rod operability as described in the lesson material and TS 3.1.4 Bases in relation to preventing fuel damage. However, with the introduction of the inoperable accumulators to the stem of the question the candidates interpreted the question based on TS 3.1.5. The Bases of TS 3.1.4 does not deal with inoperable accumulators, but the Bases of TS 3.1.5 does discuss how reactor pressure and accumulator pressure work to perform the scram function. *See attached Tech Spec excerpt.* The stem requests the candidate to demonstrate knowledge between acceptable and unacceptable Control Rod Scram Times as they relate to the scram function. This demonstration is based on the knowledge of the Tech Spec Bases and how the accumulators and RPV pressure are used to perform the scram function. *(continued on next)*
Challenge Issue: (cont.)	The stem of the question states that all accumulators are inoperable, therefore the scram function is relying on reactor pressure only. Tech Spec Bases states that above 900# the scram function will be performed using reactor pressure alone assuming the accumulators are inoperable. However, less than 900# the function of accumulators, in providing the scram force, becomes much more important and at even lower pressures the scram function "could become severely degraded". Therefore, with the accumulators inoperable 900# is the transition point between acceptable and unacceptable scram times.

Candidate Performance:	3 of 5 selected “d,” 1 selected B and 1 selected “c”

B.

[redacted]

Incorrect: Reference Tech Spec Bases 3.1.4 and SDLP-03a, Figure 8 “Accumulator to Reactor Pressure Scram Times. Although 800 psig is the pressure below which reactor pressure alone will result in insufficient scram times to prevent exceeding fuel thermal limits during Design Basis Accidents and transients, it is bound by the Technical Specification reactor pressure of 900 psig below which scram times may not meet requirements.

A.

Incorrect: Incorrect pressure. Although bounded by the specified 900 psig reactor steam dome pressure, no reference in Technical Specifications, or Bases, to a reactor pressure of 750 psig being a “transition” point for control rod operability.

C.

Incorrect: Incorrect pressure. Although bounded by the specified 900 psig reactor steam dome pressure, no reference in Technical Specifications, or Bases, to a reactor pressure of 750 psig being a “transition” point for control rod operability.

D.

[redacted]

CORRECT: Reference TS 3.1.5 Bases. With one control rod scram accumulator inoperable and reactor steam dome pressure $\geq$ 900 psig, the control rod may be declared “slow,” since the control rod will still scram at the required operating pressure but may not meet required scram times. Thus, at reactor pressures less than 900 psig with an inoperable accumulator, further degradation in scram performance and excessive scram times would result.

Technical Reference(s):	SDLP-03A, Figure 8 T.S. 3.1.4 / 5 and Bases
Proposed references to be provided to applicants during examination:	None

NRC Resolution - RO Question # 9

In regard to answer “B” (the original correct answer):

Answer “B” stated “800 PSIG.” The staff pre-exam review of the references supported this as the correct answer.

The additional reference provided by the licensee and reviewed by the staff, Technical Specification Bases 3.1.5, supports 900 PSIG as the correct value to be designated as the

transition point between acceptable and unacceptable control rod scram times. The staff also noted that the question stem stated that all control rod accumulators were inoperable. This would support the statement in TS bases 3.5.1 in regard to the reactor pressure limit at which control rod scram times would be unacceptable in the event of one inoperable control rod. Additionally, the stem was more focused on control rod scram times and not control rod operability (the bases for the 800 PSIG).

The staff has determined that TS references do not support answer “B” as correct.

In regard to answer “D” (the proposed correct answer)

Answer ”D” stated “900 PSIG.” The staff pre-exam review of the references did not support this as the correct answer.

The additional reference provided by the licensee and reviewed by the staff, Technical Specification Bases 3.1.5, supports 900 PSIG as the correct value to be designated as the transition point between acceptable and unacceptable control rod scram times. The staff also noted that the question stem stated that all control rod accumulators were inoperable. This would support the statement in TS bases 3.5.1 in regard to the reactor pressure limit at which control rod scram times would be unacceptable in the event of one inoperable control rod. Additionally, the stem was more focused on control rod scram times and not control rod operability (the bases for the 800 PSIG as stated in TS Bases 3.1.4).

The staff has determined that TS references support answer “D” as correct.

In regard to answers “A” and “C”:

Based upon the original staff review and post-exam review of the question, it was determined that these answers remain INCORRECT. (No change from original submittal.)

Conclusion

The NRC staff conducted detailed reviews of all references provided as well as the information stated in the question stem. It was also noted that no inquiries were made by the applicants in regard to this question during exam administration. The staff concluded that Answer “B” (the original correct answer) was INCORRECT and that Answer “D” should be accepted as the ONLY correct answer. The licensee comment to accept only answer “D” as correct is accepted.

RO Question # 75 (Licensee Comments Highlighted)

A reactor startup is in progress, following a refuel outage, with the following plant conditions:

- IRMs on mid-scale on Range 7
- Average Reactor Coolant Temperature is currently 200° F and rising slowly

A Zone RB-1W (Reactor Building West Crescent) Fire Alarm is received. An NPO is quickly dispatched to the location and reports significant heat, smoke, and flames. All AOP-28, "Operation During Plant Fires" prompt operator actions are completed satisfactorily. Which of the following accurately reflects the plant's current "Mode of Operation"?

a. Mode 2: Startup / Hot Standby
b. Mode 3: Hot Shutdown
c. Mode 4: Cold Shutdown
d. Mode 5: Refueling

Answer Key:	c.
Post-Exam Evaluation Recommendation:	Accept both "b" and "c" responses
Challenge Issue:	Stem Clarity - The stem conditions indicate power in the heating range with coolant temperature slowly rising from 200 degrees. It was unintentional that the Exam Development Team exposed the candidate to a heatup in progress. Assuming a nominal heatup rate of 20 degrees per 15 minutes (procedural target), 9 minutes of elapsed time will result in exceeding 212 degrees; resulting in a Mode change and making the "b" response correct. Without a specified timeframe for completing actions, and with some candidates taking a safety analyses (UFSAR) approach to operator actions, it is reasonable to expect that at least 10 minutes could elapse between the receipt of a fire alarm, dispatching operators to verify conditions, AOP-28 procedure entry and step execution. Likewise, completing these actions in less than 9 minutes is also reasonable; making the "c" response correct.
Candidate Performance:	3 candidates selected "b", the remainder selected "c"
[redacted]	**CORRECT:** Initial conditions place the plant in Mode 2. With a confirmed fire in Zone RB-1W, a Reactor Scram would be inserted and AOP-1 will direct taking the Mode Switch to "Shutdown"; resulting in either Mode 3 or 4 operation. With resulting Average Reactor Coolant Temperature below 212° F, Mode 4 operation would result.

a. Incorrect: Plant in Mode 2 currently. If candidate fails to recognize AOP-28 Prompt Action Reactor Scram, this would be the resulting mode.

[redacted]

CORRECT: With IRMs on Range 7 and resulting Average Reactor Coolant Temperature at 200° F and ***rising slowly***, it is inferred that a heatup is in progress; and Mode 3 operation would result in as little as 9 minutes. If procedural actions take 9 minutes, or more, then a Mode change would occur based solely on Reactor Coolant Temperature.

d. Incorrect: See above. Mode switch can be in "Shutdown" for Mode 5 if vessel head not fully tensioned. If candidate fails to recognize dependency on tensioning, this could be the resulting mode.

Technical Reference(s): AOP-28
ITS (Mode Definitions)

Proposed references to be provided to applicants during examination: None

Learning Objective: JLP-OPS-ITS02, EO 1.03 (As available)
LPAOP, EO 1.03

NRC Resolution - RO Question # 75

In regard to answer "C" (the original correct answer):

Answer "C" stated "Mode 4: Cold Shutdown." The staff pre-exam review of the references supported this as the correct answer.

The original justification for this answer was based on the alarm condition, entry into AOP-28, "Operation During Plant Fires," and the first "prompt action" stated at step 1.2.1, "Manually scram the reactor and execute AOP-1 concurrently." The staff took into account that a heatup was in progress but noted that with the first prompt action step of AOP-28, the reactor was scrammed. This action would mitigate the heatup. Therefore, being in "Cold Shutdown accurately reflected the plant's mode of operation" and was supported by plant references.

The staff determined that Answer "C" was correct.

In regard to answer "B" (the proposed additional correct answer):

Answer "B" stated "Mode 3: Hot Shutdown." The staff pre-exam review of the references supported this as an incorrect answer.

The original justification for this answer being incorrect was based on the question stem statement that the prompt actions of AOP-28 were completed satisfactorily, the first of which was to manually scram the reactor. The staff determined that the reactor scram would mitigate

the heatup and that Mode 3: Hot Shutdown would not have been achieved. Therefore, answer "B" was incorrect.

The licensee's comment makes the following assumptions in regard to achieving "Mode 3: Hot Shutdown," and therefore accepting answer "B" as correct

1. A nominal heatup rate of 20 degrees per 15 minutes.

2. A time frame of greater than nine minutes elapsing before AOP-28 actions are executed.

The staff reviewed the licensee's comment and assumptions in support of answer "B" and also noted that no questions were asked by the applicants during exam administration in regard to the conditions stated in the question stem. As stated in NUREG 1021, Rev. 9, Appendix E, Step 7, "when answering questions do not make assumptions regarding conditions that are not specified in the question unless they occur as consequence of other conditions." Because no time frame was stated in the stem other than the word "quickly" and the fact that the initial prompt actions (including a manual reactor scram) were stated as complete, an assumption that 9 minutes have elapsed goes beyond what is given in question stem. There were no indications in the stem that the actions required to be completed were delayed and there was no indication in the question stem that a "nominal" heatup rate of 20 degrees per 15 minutes had been achieved. Finally, with the prompt actions of AOP-28 complete, a manual scram would have occurred mitigating any heatup and the plant would be in cold shutdown.

Therefore, the staff determined that Answer "B" was incorrect.

In regard to answers "A" and "D":

Based upon the original staff review and post-exam review of the question, it was determined that these answers remain INCORRECT. (No change from original submittal.)

Conclusion

The NRC staff conducted detailed reviews of all references provided as well as the information stated in the question stem. It was also noted that no inquiries were made by the applicants in regard to this question during exam administration. The staff concluded that only Answer "C" (the original correct answer) was CORRECT. The licensee comment to also accept answer "B" as correct is denied.