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River Bend Station  
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August 10, 2018

Thomas Farina, Chief Examiner  
U.S. Nuclear Regulatory Commission, Region IV  
1600 East Lamar Blvd  
Arlington, TX 76011-4511

RBG-47894

SUBJECT: POST NRC EXAMINATION SUBMITTAL

Dear Mr. Farina,

Enclosed is the Post exam comments and analysis for the examination that was administered the week of July 23, 2018. This class consists of 4 RO candidates, 8 SRO Instant candidates, and 2 SRO Upgrade candidates.

The following NUREG 1021 Form is enclosed with the supporting documentation:

ES-403-1, Written Examination Grading Quality Checklist

Also, enclosed is the current Exam Security Agreement (ES-201-3).

Please contact Gabe or John at (225) 378-3522 if you have any questions or need any further materials.

Sincerely,

A handwritten signature in blue ink that reads "Rick Northrup".

Rick Northrup  
Supervisor, Operations Training  
Facility Representative  
River Bend Nuclear Station

### ES-403-1 Written Examination Grading Quality Checklist

6. Performance on missed questions checked for training deficiencies and wording problems; evaluate validity of questions missed by one-half or more of the applicants.

Question 42, 9/14 missed (64%)

RBS has reviewed the question and believes it to be valid and have only one correct answer. This K/A was presented during the training program.

High missed question due to students' attention to detail, which led to a failure to recognize the B-33-C001A Pump A MOT Breaker 4A was open. This was also due to a level of knowledge issue for some to differentiate the indications between the EOC-RPT trip and ATWS RPT Trip.

Question 95, 10/10 missed (100%)

RBS has reviewed the question and believes it to be valid and have only one correct answer. This K/A was presented during the training program.

High missed question do to level of knowledge of refueling procedure modifications. Students confused FHP procedure modification with modification of fuel movement sheets which can be modified by Refuel SRO.

RJPM-NRC18-A6, required applicants to determine whether removal of the LPRM dry tube can be authorized given the initial conditions. An explanation was required to justify the determination.

One of the initial conditions stated that “Containment is open.” This condition does not specifically state what portion of containment is “open.” The key is written such that TS 3.6.1.10 Primary Containment – Shutdown requires Primary Containment to be OPERABLE during operations with a potential for draining the reactor vessel (OPDRVs). Based on this requirement the LPRM dry tube removal cannot be authorized.

Based on the given initial condition that “containment is open,” applicants can also apply TS 3.6.1.2 for Primary Containment Airlocks. TS 3.6.1.2 requires two primary containment air locks to be OPERABLE during operations with a potential for draining the reactor vessel (OPDRVs). If the primary containment airlocks were “open” (often occurs during outages) this tech spec would apply and prevent the LPRM dry tube removal as well.

River Bend recommends adding TS 3.6.1.2 Primary Containment Airlocks as an option for justification for not authorizing the LPRM dry tube removal. Changes to the JPM would include:

Step 2 Standard: Documents on the JPM Answer Sheet that the LPRM dry tube cannot be removed.

Reason: removal of the LPRM dry tube would be an Operation with a Potential for Draining the Reactor Vessel (OPDRV) which is not allowed with the containment open per **TS 3.6.1.2 or 3.6.1.10**.

Step 2 Evaluator Note: OSP-33 Step 5.1 defines an Operation with a Potential for Draining the Reactor Vessel (OPDRV) and lists specific components and systems, if breached, would be considered an OPDRV. LPRM dry tube is listed. TS 3.6.10 requires that primary containment integrity be maintained during OPDRVs. This info is also located in FHP-0001 Step 4.1 and step 6 of Attachment 2, APPLICABLE MODE 5 TECHNICAL SPECIFICATIONS. **TS 3.6.1.2 requires the Primary Containment Airlocks to be OPERABLE during OPDRVs.**

The Task Standard 2) Documents on the JPM Answer Sheet that the LPRM dry tube cannot be removed.

Reason: removal of the LPRM dry tube would be an OPDRV which is not allowed with the containment open per **TS 3.6.1.2 or 3.6.1.10**.

JPM Worksheet Answer Key: Removal LPRM dry tube? Reference: **TS 3.6.1.2 or 3.6.1.10**

## **RBS 2018-07 JPM A6 Post-Exam Comment: Regional Recommendation**

From: Thomas Farina, Chief Examiner

To: Vince Gaddy, Chief, Operations Branch

JPM Title: A6: Determine if Core Alterations Are Allowed

JPM Summary: An SRO applicant is given shutdown plant conditions, which include the following, in part:

- Shutdown with RPV head removed
- Upper Storage Pool level is > 23 ft above vessel flange
- Containment is open
- SRM B and C are failed
- SRM A and D are operable
- Refuel Floor Supervisor requests permission to remove a LPRM dry tube in quadrant B.

The SRO applicant is directed to determine whether removal of the LPRM dry tube can be authorized at this time, and to explain why or why not by identifying the relevant requirement.

OSP-0033, OPERATIONS WITH A POTENTIAL TO DRAIN THE REACTOR VESSEL, Step 5.1 specifies that LPRM Dry Tube removal is an operation with a potential to drain the reactor vessel (OPDRV).

Technical Specification 3.6.1.10, Primary Containment-Shutdown, requires that Primary Containment shall be OPERABLE during OPDRVs.

The SRO applicant was expected to identify that with Containment open, as given in the initial conditions, LPRM dry tube removal is not permitted per TS 3.6.10, because it is defined as an OPDRV by OSP-0033.

RBS Post-Exam Comment: River Bend Station commented that the initial conditions state that "Containment is open," but does not specify what portion of containment is "open." The task standard requires that the applicant identifies TS 3.6.1.10, Primary Containment – Shutdown, as the requirement which prohibits LPRM dry tube removal with Containment open. RBS commented that TS 3.6.1.2, Primary Containment Airlocks, could also be used as a justification for prohibiting LPRM dry tube removal. TS 3.6.1.2 requires two primary containment air locks to be OPERABLE during OPDRVs. RBS stated that primary containment airlocks are often open during refueling outages, which would make TS 3.6.1.2 applicable to this JPM in addition to TS 3.6.1.10.

Based on the above, River Bend Station has requested via post-exam comment to add TS 3.6.1.2 Primary Containment Airlocks as an acceptable alternate to TS 3.6.1.10 for satisfying the task standard.

Recommendation: If the given initial conditions specified that primary containment air locks were open, then TS 3.6.1.10 would explicitly apply as a justification for prohibiting LPRM dry

tube removal. JPM A6 does not specify this however, it merely states that Containment is open. For an applicant to choose TS 3.6.1.2 as a justification, an assumption would need to be made that is not explicitly supported by the initial conditions. TS 3.6.1.10 does explicitly apply however, based on the given initial conditions alone.

NUREG 1021, Appendix E instructs applicants that, "When answering a question, do not make assumptions regarding conditions that are not specified in the question unless they occur as a consequence of other conditions that are stated in the question." Although included in the section specific to the Written Exam, this guidance can reasonably be applied to the performance of an Administrative JPM as well.

Based on the above, no change to JPM A6 is justified or recommended. However, a comment will be added to the Final JPM A6 stored in ADAMS, "Per RBS post-exam comment, future revisions of this JPM should specify the condition of primary containment air locks, for increased clarity."

Final Resolution:

Branch Chief approved recommendation. [8/16/2018]

During the administration of RB-2018-07 JPM A7, there was a procedure deficiency noted with OSP-37, Shutdown Operations Protection Plan (SOPP). Attachment 1, Shutdown Cooling Function Color States, has several columns to be used to determine the color states.

There is a note 5 which states, "Flooded-up Condition requires that the cavity gate be open. This may be Yellow if calculations show that SFC alone is capable of removing all decay heat. Otherwise SFC must be used in conjunction with ADHR."

The JPM was written to test the condition of this note. The initial conditions state the cavity gate is CLOSED. Based on the initial conditions, the "Med DH/Not FL" should have been selected and the color code corresponding to RHR A & B availability was YELLOW.

There is a typo in the procedure that should apply note 5 to columns 5-7 only differing by decay heat level, however only column 5 states "Flooded Up." Columns 6-7 state "flooded." Based on this typographical error the applicant could select column 6 "Med DH/Flooded" and select GREEN as the corresponding color for RHR A & B. Without the definition of "Flooded" or "Flooded Up" the applicant could assume less inventory than "Hi DH / Flooded Up" Green condition due to gate being closed, but potentially offset by less DH (Ded DH), maintaining Green condition.

Based on this typographical error, the station believes the following changes should be made to the grading standard:

Step 1 Standard: Documents on the SOPP Status Sheet the Shutdown Cooling Function Color State is YELLOW (**or GREEN**).

Step 1 Evaluator Note: From Attachment 1 YELLOW Color State is derived from Med Decay Heat/ Not Flooded Up With only RHR A&B available and ADHR is not available. ***From Attachment 1 GREEN Color State is derived from Med DH/Flooded with only RHR A&B available and ADHR is not available.***

Step 4 Standard: Documents on the SOPP Status Sheet the Overall Risk Color State is YELLOW (**or GREEN**).

Step 4 Evaluator Note: Step 3.13 states, "Overall Risk – The most conservative color-code assignment found in the Shutdown Safety Level and Shutdown EOOS Safety Index. This approach insures that both defense-in-depth and core damage risk are evaluated and the most conservative value is chosen." Since the Shutdown Cooling Safety Level is YELLOW (and all others are GREEN), Overall Risk is Yellow. ***Also, based on the Shutdown Cooling Safety Level is GREEN (and all others are GREEN), Overall Risk is GREEN.***

Task Standard: Correctly document Shutdown Cooling is Yellow (**or Green**), Inventory Control is Green, Fuel Building is Green, and Overall Risk Color States is Yellow (**or Green**) on the attached SOPP Status Sheet in accordance with SOPP Status Sheet Answer Key.

## ANSWER KEY

1. Shutdown Cooling Yellow (or Green)

OVERALL RISK: Yellow (or Green)

**RBS 2018-07 JPM A7 Post-Exam Comment: Regional Recommendation**

From: Thomas Farina, Chief Examiner

To: Vince Gaddy, Chief, Operations Branch

JPM Title: A7: Determine Plant Safety Level During Shutdown Conditions

JPM Summary: An SRO applicant is given shutdown plant conditions, which include the following:

- Refueling Outage in progress
- Upper Storage Pool [Reactor Cavity] Level = 23 ft 1 inch, with cavity gate closed
- Decay Heat = MEDIUM
- RHR 'A' and 'B' both available for Shutdown Cooling
- ADHR NOT available
- LPCS is available

Using OSP-0037, Shutdown Operations Protection Plan (SOPP), SRO applicant is directed to use the above conditions to determine individual risk levels for:

1. Shutdown Cooling Safety Function [YELLOW]
2. Inventory Control Safety Function [GREEN]
3. Fuel Building Safety Function [GREEN]
4. Overall Plant Risk [YELLOW]

The SRO applicant was expected to identify that Shutdown Cooling Safety Function, and therefore Overall Plant Risk, are YELLOW, for the following reason:

- OSP-0037 Step 4.2.8, "Shutdown Cooling Guideline," states: "Flooded Up condition requires greater than 23 ft in the Reactor Cavity and the Cavity Gate open."
- Reactor Cavity (aka Upper Storage Pool) level is GREATER than 23 ft; HOWEVER, Cavity Gate is CLOSED.
- Therefore, "FLOODED UP" condition is NOT satisfied (i.e., with Cavity Gate closed, insufficient inventory exists to satisfy Flooded Up definition).
- Using the intersection of "RHR A&B" row with "Med DH/Not FL" column, determine that Shutdown Cooling Safety Function is in "YELLOW" risk.



Shutdown Cooling Systems Available	Hi DH/ Not FL	Med DH/ Not FL	Low DH/ Not FL	Hi DH/ Flooded Up	Med DH/ Flooded	Low DH/ Flooded	Med DH & Hydro	Low DH & Hydro
RHR A	Red	Red	Red	Yellow (TS)	Yellow (TS)	Green (TS)	N/A	N/A
RHR B	Red	Red	Red	Yellow (TS)	Yellow (TS)	Green (TS)	N/A	N/A
ADHR	Red	Red	Red	Orange	Orange	Orange	N/A	N/A
RWCU/SFC	N/A	N/A	N/A	N/A	Orange	N/A	N/A	N/A
RWCU	N/A	N/A	Red	N/A	N/A	Orange	Red NOTE 1	Yellow (TS)
SFC	N/A	N/A	N/A	N/A	Orange NOTE 2	Orange	N/A	N/A
RHR A&B	Yellow (TS)	Yellow (TS)	Green (TS)	Green	Green	Green	N/A	N/A
RHR+ADHR	Orange	Orange	Yellow	Green	Green	Green	N/A	N/A

Post-Exam Comment / Applicant Actions: During administration of JPM A7, one SRO applicant asked the examiner for clarification of OSP-0037, Attachment 1, Note 5. This note partially reiterates the definition of “Flooded Up,” first defined in OSP-0037 Step 4.2.8. Note 5 reads, in part, “Flooded-up Condition requires that the cavity gate be open. ...” The applicant asked if “Flooded Up” meant the same thing as “Flooded.” The examiner, believing the controlled station procedure was correct as-written, replied to the applicant that there was enough information given in the problem statement to make a determination on the note. However, both the examiner and the applicant were unaware that the station-approved revision of OSP-0037, Attachment 1 contained typographical errors. Specifically, only one of the six columns that reference the condition of reactor cavity flooding uses the correctly-defined term, “Flooded Up”. Two of the six columns state “Flooded”, and three of the columns state “Not FL”, neither of which are defined terms in OSP-0037. Based on station feedback, the intent of these columns is that they read “Flooded Up,” and “Not Flooded Up,” respectively, as documented in RBS condition report CR-RBS-2018-04414.

Based on this typographical error, the applicant chose to use the “Med DH / Flooded” column of OSP-0037 Att 1, inferring that “Flooded” differed from “Flooded Up” in that the defined reactor cavity level of 23 ft 1 inch was satisfied, but the requirement for the cavity gate to be open was not satisfied. This caused the applicant to assess Shutdown Cooling Safety Function as “GREEN”, and therefore Overall Plant Risk as “GREEN,” as shown below. This assessment is logically plausible, in the absence of a formal definition for the erroneous term “Flooded”. Specifically, with two trains of RHR available, “High Decay Heat / Flooded Up” yields a Shutdown Cooling risk of “GREEN.” It is plausible that the lower decay heat under “Med DH/Flooded” conditions could offset the reduced cooling inventory available with the cavity gate closed, to retain a Shutdown Cooling risk of “GREEN”.

Shutdown Cooling Systems Available	Hi DH/ Not FL	Med DH/ Not FL	Low DH/ Not FL	Hi DH/ Flooded Up	Med DH/ Flooded	Low DH/ Flooded	Med DH & Hydro	Low DH & Hydro
RHR A	Red	Red	Red	Yellow (TS)	Yellow (TS)	Green (TS)	N/A	N/A
RHR B	Red	Red	Red	Yellow (TS)	Yellow (TS)	Green (TS)	N/A	N/A
ADHR	Red	Red	Red	Orange	Orange	Orange	N/A	N/A
RWCU/SFC	N/A	N/A	N/A	N/A	Orange	N/A	N/A	N/A
RWCU	N/A	N/A	Red	N/A	N/A	Orange	Red NOTE 1	Yellow (TS)
SFC	N/A	N/A	N/A	N/A	Orange NOTE 2	Orange	N/A	N/A
RHR A&B	Yellow (TS)	Yellow (TS)	Green (TS)	Green	Green	Green	N/A	N/A

Based on the above, River Bend Station has requested via post-exam comment to accept “GREEN” as an acceptable alternate answer for Shutdown Cooling Safety Function risk, and for Overall Plant Risk.

Recommendation: OSP-0037 is an approved station procedure, which is actively used to assess plant risk during shutdown conditions, to include those conditions provided in this JPM. In spite of the typographical errors present in the procedure, the other nine SRO applicants, as well as the pre-exam validators, chose “YELLOW” Shutdown Cooling and Overall Plant Risk, as expected. Because of this, it is the exam team’s opinion that JPM A7 is a valid tool for evaluating applicant performance, and should be retained on the exam. The one SRO applicant in question, however, recognized that there was a deviation between the defined condition of “Flooded Up,” and the as-written conditions in five of the columns of OSP-0037 Attachment 1, which read either “Flooded” or “Not FL”, and were not defined. The applicant exercised due diligence by asking the examiner to clarify if the procedure read as intended. The exam team was not able to identify that the approved station procedure was in error until after administration of JPM A7 was complete, and therefore accurate clarification was unable to be provided to the applicant during performance of the JPM. Because the applicant performed the JPM with the information available to him at the time, and because the applicant asked a clarifying question which was unable to be answered correctly at the time and which bore direct relevance to his choice of answer, it is recommended that this applicant should not be penalized for his answer of “GREEN” for “Shutdown Cooling” risk and “Overall Plant Risk.” Since there can only be one correct answer for a given set of plant conditions that were unchanged, it is recommended that JPM A7 be deleted from the exam for this SRO applicant only.

Final Resolution:

Branch Chief approved recommendation. [8/16/18]