

## 2004 NRC RO EXAM ANALYSIS

QUESTION	ANALYSIS	ACTION TO BE TAKEN
8	B is the correct answer. 7 out of 14 answered C, which gave Iodine as 135 and not 131 in addition to stating that the heaters operated continuously. This appears to be a knowledge issue with system operation.	Knowledge issue will be fed back to the ILC Supervisor. Add EPNs for further clarification prior to inclusion in the exam bank.
10	C is the correct answer. 5 answered D and 3 answered B. This appears to be a knowledge issue with system operation.	Knowledge issue will be fed back to the ILC Supervisor. Change full core display to 4 rod display prior to inclusion in the exam bank.
15	C is given as the correct answer. However, C is incorrect. A detailed analysis is attached.	Delete this question; there are no correct answers.
18	C is the correct answer. B had the most incorrect answers with 8. A had 3 and D had 1. This was a bank question and appears to be a knowledge question.	Knowledge issue will be fed back to the ILC Supervisor.
20	A is the correct answer. 8 selected B, 2 selected C, and 1 selected D. This appears to be an issue of reading the question. A packing leak in the drywell ends up in the FDR sump in the drywell and goes to R3. The question asks which valves isolate to contain radioactivity in the <u>Reactor Building</u> . Only A is correct.	Add noun name to EDR-P-5 prior to inclusion in the exam bank.
22	A is correct. However, since the actions listed would also occur for B, C, and D, all would be correct. See the attached justification	Delete this question, all responses are correct.

26	B is correct. 7 answered B and 3 answered C. Based on feedback from the class, this is a knowledge issue with the number of LPRMs feeding each APRM.	Knowledge issue will be fed back to the ILC Supervisor.
58	C is the correct answer. 10 people answered A. The RWM goes into the scram mode when a scram is sensed. There are no rod blocks enforced in the scram mode.	Knowledge issue will be fed back to the ILC Supervisor.
61	B is the correct answer. 6 answered A, 1 answered C, and 2 answered D. This is a knowledge issue.	Knowledge issue will be fed back to the ILC Supervisor.

After a review of the results of these questions there appears to be no common system knowledge questions. However, there does appear to be a general weakness of the depth of system knowledge concerning interlocks and system arrangements.

### RO QUESITON #15

The Emergency Operating Procedures caution against operating the RCIC turbine at speeds below 2100 RPM.

One of the bases for this caution is that at speeds below 2100 RPM:

- A. .... the RCIC pump may overheat due to low flow conditions.
- B. there may be increased turbine blade erosion and/or damage due to low steam pressure/high steam flow through the turbine.
- C. the potential exists for water in the turbine exhaust line damaging the exhaust line check valves.
- D. the RCIC turbine may trip on high exhaust pressure.

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ANSWER: C  
QUESTION TYPE: RO  
KA# & KA VALUE: 217000/G2.4.20 & 3.3 – RCIC – Knowledge of Operational Implications of EOP Warnings/Cautions/and notes.  
REFERENCE: Procedure 5.0.10, revision 7, page 70.  
SOURCE: New Question – RO Tier 2, Group 1  
LEARNING OBJECTIVE: 8495 - Given a list, identify three possible results of operating RCIC below its minimum turbine speed.  
RATING: 2  
ATTACHMENTS: None  
JUSTIFICATION: The bases for the 2100 RPM caution is to ensure there is sufficient hydraulic pressure for throttle operation, ensure the speed is high enough for turbine lubrication from the turbine shaft driven pumps, and prevent damage to the exhaust check valves. Therefore the correct answer is C.  
10CFR55 BASIS: 10CFR55.41 (10)  
COMMENTS: Q 15

## **RO QUESTION #15 JUSTIFICATION**

This question concerns the basis for Caution 3 of the EOPs. Caution 3 states, “Operating the RCIC turbine below 2100 rpm may result in unstable system operation and equipment damage.” PPM 5.0.10 states the speed is based on three conditions, one of which is alluded to as the correct answer for the question, “Operation of the turbine at very low speed and thus low steam flow positions the turbine governor control valve very close to its seat. This condition may cause water hammer to occur in the exhaust line, and repeated occurrence can physically damage the exhaust check valves.”

It is, however, not the water itself that can damage the check valves but the hammering force after considerable water buildup. Water hammer is the stated occurrence in the exhaust line that damages the exhaust check valves. The answer identified as correct states, “the potential exists for water in the turbine exhaust line damaging the exhaust line check valves.” This is incorrect. The RCIC turbine is designed to operate on low quality steam implying that certain levels of moisture are expected. It is only at low RPMs that sufficient water accumulates to induce hammering. As stated above, the correct failure mechanism is water hammer. There are no other correct answers listed.

Because there are no correct answers, the question should be deleted from the exam.

## RO QUESITON #15 REFERENCE

### From PPM 5.0.10

#### 6.3 Caution 3

RCIC system injection flowrate can be controlled by adjusting turbine speed. This caution identifies the minimum speed, which permits continuous unrestricted system operation. This speed is based upon the following considerations:

- The RCIC turbine is cooled and lubricated by shaft-driven pumps. A minimum speed is required to maintain the fluid flow required for adequate cooling and lubrication.
- A minimum speed is required to generate sufficient control oil pressure to enable the turbine control valve to function properly.
- Operation of the turbine at very low speed and thus low steam flow positions the turbine governor control valve very close to its seat. This condition may cause water hammer to occur in the exhaust line, and repeated occurrence can physically damage the exhaust check valves.

Caution 3 is utilized in PPM 5.1.1, PPM 5.1.2, PPM 5.1.3, PPM 5.1.4, PPM 5.1.5 and PPM 5.1.6 where RCIC system operation may be required.

## RO QUESITON #22

Off-Gas (OG) Adsorber Bypass valve OG-V-45 will close and Adsorber Inlet valves OG-V-51A and B will open if the bypass valve control switch is in AUTO and:

- A. one OG Post Treatment Process Radiation Monitor reaches the HI RADIATION setpoint.
  - B. two OG Post Treatment Process Radiation Monitors reach the HI RADIATION setpoint.
  - C. one of the OG Post Treatment Process Radiation Monitor reaches the HI HI RADIATION setpoint.
  - D. two of the OG Post Treatment Process Radiation Monitors reach the HI HI RADIATION setpoint.
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ANSWER: A  
QUESTION TYPE: RO  
KA# & KA VALUE: 271000/A1.12 & 3.1 – Off Gas/Process radiation monitoring indications  
REFERENCE: LO000187, Revision 10, Page 24.  
SOURCE: New Question – RO Tier 2, Group 2.  
LEARNING OBJECTIVE: 5620 – List the OG system response to increasing Post Treatment Radiation.  
RATING: 1  
ATTACHMENTS: None  
JUSTIFICATION: If one of the OG Post Treatment Process Radiation Monitors reaches the HI RADIATION setpoint the referenced adsorber valves will shift positions. Therefore, answer A is correct.  
10CFR55 BASIS: 10CFR55.41 (5)  
COMMENTS: Q 22

## **RO QUESTION #22 JUSTIFICATION**

Question 22 has 4 correct answers. A, which is given as the correct answer is a subset of B, C, and D. Each of the responses results in the actions given in the stem. The answer listed for question 22 is correct as stated, as are all of the available selections.

NUREG 1021 states that a question with more than 2 correct answers must be deleted from the exam.

Question 22 should be deleted.

## 2004 NRC SRO EXAM ANALYSIS

QUESTION	ANALYSIS	ACTION TO BE TAKEN
3	<p>D is the correct answer.            6 answered C, 1 each answered A and B.</p> <p>This question is an application of TS concerning 2 entries into an action statement with a concurrent entry into 3.0.3. With 2 entries into the action statement, and no separate entries allowed, TS 1.3 (not supplied in the reference package) must be applied to determine the allowable extension. This appears to be a knowledge issue with allowable extensions in TS.</p>	<p>Knowledge issue will be fed back to the ILC Supervisor.</p>
4	<p>C is the correct answer.            6 answered D.</p> <p>This is a straight knowledge issue with the basis for scrambling the reactor with a control rod drifting out in an uncontrolled fashion. The basis for this is from ABN-ROD.</p>	<p>Knowledge issue will be fed back to the ILC Supervisor.</p>
5	<p>C is the correct answer.            6 answered B, 2 answered A, and 1 answered D.</p> <p>This is also a basis question. This is straight from the Applicable Safety Analysis section of B3.7.6.</p>	<p>Knowledge issue will be fed back to the ILC Supervisor.            Add to systems text for clarification of purpose.</p>

7	C is given as the correct answer. There is not enough information given in the question stem to direct the operator to PPM 5.1.2. The correct answer, with the information provided, is PPM 5.1.1. See the attached detailed justification.	No correct answer, delete the question.
12	C is the correct answer. 4 answered A, 2 answered B, and 1 answered D. This is a straight knowledge issue concerning who can authorize the self-administration of Thyro-Block.	Knowledge issue will be fed back to the ILC Supervisor.
14	B is the correct answer. 3 answered C and 4 answered D. This is a straight knowledge question from TS Bases.	Knowledge issue will be fed back to the ILC Supervisor.
16	C is the correct answer. 1 answered A, 3 answered B, and 4 answered D. Due to the spread of the responses, this appears to either be a knowledge issue or a Tech Spec usage issue. The question will be review prior to inclusion in the exam bank.	TS knowledge/usage issue, will be fed back to the ILC Supervisor. Review the question prior to inclusion in the exam bank.

17	B is the correct answer. 6 answered C. This is an analysis question concerning ATWS conditions. This appears to be an issue with the candidate's ability to evaluate information given in the stem.	Analysis issue with the information given. Feed back to the ILC Supervisor.
25	C is the correct answer. 6 answered B and 1 answered D. This is another basis question for ABNs. Most answered that minimizing RPV Cool down would minimize thermal stratification, when just the opposite is true. This is a knowledge issue.	Knowledge issue will be fed back to the ILC Supervisor.

It appears that there is a weakness in the ability to interpret/apply Tech Specs based on the questions missed by the candidates. In addition to the Tech Spec issues, there seems to be general weakness in knowledge of bases in both Tech Specs and procedures.

## SRO QUESTION #7

The plant was operating at 100% power when an electrical transient resulted in a trip of RRC-P-1A and a runback of RRC-P-1B to minimum speed. Following the transient, plant conditions are as follows:

Reactor power is 75% on the APRMs  
Reactor Recirc flow is 20 percent of rated flow.  
All bypass valves are closed.  
Reactor pressure and level are stable in the normal band.

Based on an analysis of these conditions, which of the following procedures take precedence?

- A.ABN-CORE, Unplanned Core Operating Conditions.
- B.ABN-RRC-LOSS, Loss of Reactor Recirc Flow.
- C.PPM 5.1.2, RPV Control ATWS
- D.ABN-POWER, Unplanned Reactor Power Change.

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ANSWER:C

QUESTION TYPE:SRO

KA# & KA VALUE:295001AA1.02 & 3.3 - Partial or Complete Loss of Forced Core Flow Circulation

REFERENCE:PPM 5.1.1, RPV Control and Procedure 1.3.1, Conduct of Operations, step 4.11, Procedure Usage.

SOURCE:New Question – SRO Tier 1, Group 1

LEARNING OBJECTIVE:CAF.

RATING:3

ATTACHMENTS:None.

JUSTIFICATION:With reactor recirc flow at 20 percent, a power to flow reactor scram should have occurred at 70.6 percent APRM power. The plant is now in an ATWS condition which requires entering PPM 5.1.2, RPV Control ATWS. Therefore the correct answer is C.

10CFR55 BASIS:10CFR55.43 (5)

COMMENTS: Q7

## **SRO QUESTION #7 JUSTIFICATION**

The answer given for this question is C, PPM 5.1.2 RPV Control ATWS. This is incorrect.

From the information given in the stem, the candidate can deduce they have an entry into PPM 5.1.1 RPV Control. The entry condition is a scram required with power greater than 5%. The first step in PPM 5.1.1, RC-1, directs placing the Mode Switch to shutdown. The result of this action/step is considered in decision block Q-1. Then and only then can the determination be made to enter PPM 5.1.2. This information was not given in the question stem as a plant condition. The candidate has no way of knowing whether this action has been taken. Until the Mode Switch is placed in shutdown, PPM 5.1.1 is the correct answer. PPM 5.1.1 was not provided as a possible selection.

This question should be deleted because there are no correct answers.