

U. S. Nuclear Regulatory Senior Reactor Operator  
Written Examination Review  
February 2004

Question 22 had a 60% miss rate

The question and answer was reviewed and determined the identified correct answer is correct per station procedures and no other correct answers exist.

Position answer stands as is.

Material is covered in station training materials and is objective based.

Question 27 had a 20% miss rate

**Per NUREG 1021, Appendix E, Part B, #7, “When answering a question, do not make assumptions regarding conditions that are not specified in the questions unless they occur as a consequence of other conditions that are stated in the question.” Therefore, assuming NO operator actions are performed, ‘B’ is correct, as Drywell Chilled Water isolates at 1.23 psig Drywell pressure. See attached *Automatic Isolations* ONEP, 05-1-02-III-5, pages 11 and 12 which states P71 (Plant Chilled Water) and P72 (Drywell Chilled Water) will isolate on high drywell pressure of 1.23 psig.**

**During the exam two students asked for clarification “Were operator actions performed?” The answer given by the proctor was “yes”. Auxiliary Building restoration should be completed and Drywell Chilled Water and PSW have been restored per *Automatic Isolations* ONEP, 05-1-02-III-5, page 2, step 3.5.3. Based on this assumption answer ‘C’ is correct.**

**The students that asked for clarification responded with answer ‘C’, the given answer (correct with additional operator actions). However, the students that didn’t ask responded with answer ‘B’ (correct with no additional operator action). The proctor did not share the additional information from the student questions with the entire class.**

**Both cases demonstrate understanding and comprehension of system operation under varying conditions. Therefore, it is a valid question with two answers, one for those given the additional information, and one for those not given the additional information.**

Stance is to ACCEPT two answers ‘B’ and ‘C’.

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Question 30 had 60% miss rate

Answer 'B' is NOT correct because the ADHR pumps would have already tripped long before a Reactor water level of -50 inches was reached. Therefore, the ADHR pumps would NOT "continue to run" as the answer states.

With the ADHR system in the Spent Fuel Pool to Reactor flow path, the *Shutdown Cooling and Alternate Decay Heat Removal Operation* SOI, 04-1-01-E12-2, page 71, step 4.9.1.f, (attached) requires that all pools be connected with the pool gates removed. The FSAR section 9.1.3.3 page 9.1-17 (attached) states a minimum level of 23 feet of water will be maintained over irradiated fuel at all times. With the high density fuel racks installed, this level equates to an elevation of 204' 1-3/8". As level in the reactor cavity is reduced, the level in all pools is also reduced. When the Reactor water level reaches a steady value of -50 inches indicated, this equates to an elevation of approximately 163'. Drawing M-1351J and M1850 sheet 38 (attached) indicates the ADHR suction piping becomes uncovered at an elevation of approximately 203'. The ADHR system would have already tripped due to loss of level in the spent fuel pool.

Answer 'A' is incorrect because the isolation of E12-F008 and F009 has no effect on the ADHR system in the given lineup.

Answer 'C' is incorrect because the suction valves from the spent fuel pool have no automatic actions.

Answer 'D' is incorrect because the ADHR pumps will NOT "continue to operate."

Stance is to DELETE the question.

Material is covered in station training materials and is objective based.

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Question 52 had a 80% miss rate

The question and answer was reviewed and determined the identified correct answer is correct per station procedures and no other correct answers exist.

Position answer stands as is.

Material is covered in station training materials and is objective based.

Question 55 had a 100% miss rate

**With orders from the Control Room Supervisor to place the SGBT system in standby the operator could use either section in the System Operating Instructor to perform this task.**

**By placing SGBT in standby per SOI 04-1-01-T48-1 step 4.1 (attached page 2 *Placing SGTS in Standby Mode*) the system would re-initiate on a high-high radiation signal. Therefore, 'A' is correct.**

**By placing SGBT in standby per SOI 04-1-01-T48-1 step 5.2 (5.2.2.d) (attached page 4 and 5 *Operation after Automatic or Manual Initiation*) the system would only automatically start on the following:**

- **Low flow in the running Enclosure Building recirc fan**
- **Low flow in the running charcoal train**
- **Low negative pressure in the Enclosure Building**

**None of these conditions have occurred, SGBT 'A' will remain in standby making answer 'C' correct.**

**With the SGBT system in standby per step 5.2 above and given the conditions in the stem, a high-high radiation signal will not restart the system without manual operator initiation to resume operation. (attached page 3 *Manual System Initiation*).**

Based on three correct answers, the question must be DELETED.

Stance is to DELETE the question.

Material is covered in station training materials and is objective based.

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Question 64 had a 100% miss rate

Upon review of the question, the answer on the key as correct was incorrect and should be changed to Answer C. The RHR System when power is lost to the system with in operating in Suppression Pool Cooling will result in draining of system piping to the Suppression Pool due to elevations. This would require the system to undergo a full system fill and vent to prevent water hammer. The only answer of the four presented that had this option was answer C which placed the system in Standby per the SOI then restart Suppression Pool Cooling. The answer listed only vented the Heat Exchangers. This would be an unacceptable operation due to the piping at higher elevations being drained.

Stance is to change the answer key to answer 'C'.

Material is covered in station training materials and is objective based.

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Question 66 had a 80% miss rate

The question and answer was reviewed and determined the identified correct answer is correct per station procedures and no other correct answers exist.

Position answer stands as is.

Material is covered in station training materials and is objective based.

Question 69 had a 60% miss rate

The question and answer was reviewed and determined the identified correct answer is correct per station drawings and procedures and no other correct answers exist.

Position answer stands as is.

Material is covered in station training materials and is objective based.

Question 86 had a 80% miss rate

The question and answer was reviewed and determined the identified correct answer is correct per station Technical Specifications and no other correct answers exist.

Position answer stands as is.

Material is covered in station training materials and is objective based.

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Question 89 had a 80% miss rate

The question and answer was reviewed and determined the identified correct answer is correct per station procedures and no other correct answers exist.

Position answer stands as is.

Material is covered in station training materials and is objective based.

Question 90 had a 60% miss rate

The question and answer was reviewed and determined the identified correct answer is correct per station procedures and no other correct answers exist.

Position answer stands as is.

Material is covered in station training materials and is objective based.

Question 99 had a 60% miss rate

The question and answer was reviewed and determined the identified correct answer is correct per station procedures and no other correct answers exist.

Position answer stands as is.

Material is covered in station training materials and is objective based.

Question Number	Question	Given Answer	Request	Justification																
27	<p>A flange rupture on the RWCU Regenerative Heat Exchanger inlet has caused an isolation of RWCU.</p> <p>RPV water level dropped to -20 inches on wide range before recovering.</p> <p>The following conditions exist in the plant:</p> <table> <tr> <td>Reactor level</td> <td>+36 inches and stable</td> </tr> <tr> <td>Reactor pressure</td> <td>1000 psig and stable</td> </tr> <tr> <td>Drywell pressure</td> <td>+1.5 psig and slowly rising</td> </tr> <tr> <td>Drywell temperature</td> <td>110° F</td> </tr> <tr> <td>Containment pressure</td> <td>+1.5 psig</td> </tr> <tr> <td>Containment temperature</td> <td>175° F</td> </tr> <tr> <td>Suppression Pool temperature</td> <td>86° F</td> </tr> <tr> <td>Suppression Pool level</td> <td>18.6 feet</td> </tr> </table> <p>Which one of the following describes the available methods to remove heat from the Containment under the present conditions?</p> <p>A. Containment Coolers with chilled water Containment Steam Tunnel Coolers with chilled water</p> <p>B. Containment Coolers without chilled water Containment Steam Tunnel Coolers without chilled water</p> <p>C. Containment Coolers without chilled water Containment Steam Tunnel Coolers with chilled water</p> <p>D. Containment Coolers with chilled water Containment Steam Tunnel Coolers without chilled water</p>	Reactor level	+36 inches and stable	Reactor pressure	1000 psig and stable	Drywell pressure	+1.5 psig and slowly rising	Drywell temperature	110° F	Containment pressure	+1.5 psig	Containment temperature	175° F	Suppression Pool temperature	86° F	Suppression Pool level	18.6 feet	C.	2 answers correct, 'B' and 'C'	<p>Per NUREG 1021, Appendix E, Part B, #7, "When answering a question, do not make assumptions regarding conditions that are not specified in the questions unless they occur as a consequence of other conditions that are stated in the question." Therefore, assuming NO operator actions are performed, 'B' is correct, as Drywell Chilled Water isolates at 1.23 psig Drywell pressure. See attached <i>Automatic Isolations</i> ONEP, 05-1-02-III-5, pages 11 and 12 which states P71 (Plant Chilled Water) and P72 (Drywell Chilled Water) will isolate on high drywell pressure of 1.23 psig.</p> <p>During the exam two students asked for clarification "Were operator actions performed?" The answer given by the proctor was "yes". Auxiliary Building restoration should be completed and Drywell Chilled Water and PSW have been restored per <i>Automatic Isolations</i> ONEP, 05-1-02-III-5, page 2, step 3.5.3. Based on this assumption answer 'C' is correct.</p> <p>The students that asked for clarification responded with answer 'C', the given answer (correct with additional operator actions). However, the students that didn't ask responded with answer 'B' (correct with no additional operator action). The proctor did not share the additional information from the student questions with the entire class.</p> <p>Both cases demonstrate understanding and comprehension of system operation under varying conditions. Therefore, it is a valid question with two answers, one for those given the additional information, and one for those not given the additional information.</p>
Reactor level	+36 inches and stable																			
Reactor pressure	1000 psig and stable																			
Drywell pressure	+1.5 psig and slowly rising																			
Drywell temperature	110° F																			
Containment pressure	+1.5 psig																			
Containment temperature	175° F																			
Suppression Pool temperature	86° F																			
Suppression Pool level	18.6 feet																			

Question Number	Question	Given Answer	Request	Justification
30	<p>The plant is in Mode 5.</p> <p>ADHR is in service in Spent Fuel Pool to Reactor mode.</p> <p>Under vessel work resulted in a leak causing RPV level to lower to -50 inches.</p> <p>Which one of the following describes the affects on ADHR shutdown cooling operation?</p> <p>A. ADHR pumps will trip due to a loss of suction pressure when E12-F008 and F009, RHR SDC Isolation valves isolate on low reactor level.</p> <p>B. ADHR will continue to operate as long as level in the Spent Fuel Pool remains sufficient to provide makeup to the suction of the ADHR pumps.</p> <p>C. ADHR suction valves from the Spent Fuel Pool will isolate causing a loss of suction pressure to the ADHR pumps which will subsequently trip.</p> <p>D. ADHR will continue to operate indefinitely, however cooling to the ADHR heat exchangers is lost until Plant Service Water is restored.</p>	B.	Removal from exam because NO answers are correct.	<p>Answer 'B' is NOT correct because the ADHR pumps would have already tripped long before a Reactor water level of -50 inches was reached. Therefore, the ADHR pumps would NOT "continue to run" as the answer states.</p> <p>With the ADHR system in the Spent Fuel Pool to Reactor flow path, the <i>Shutdown Cooling and Alternate Decay Heat Removal Operation</i> SOI, 04-1-01-E12-2, page 71, step 4.9.1.f, (attached) requires that all pools be connected with the pool gates removed. The FSAR section 9.1.3.3 page 9.1-17 (attached) states a minimum level of 23 feet of water will be maintained over irradiated fuel at all times. With the high density fuel racks installed, this level equates to an elevation of 204' 1-3/8". As level in the reactor cavity is reduced, the level in all pools is also reduced. When the Reactor water level reaches a steady value of -50 inches indicated, this equates to an elevation of approximately 163'. Drawing M-1351J and M1850 sheet 38 (attached) indicates the ADHR suction piping becomes uncovered at an elevation of approximately 203'. The ADHR system would have already tripped due to loss of level in the spent fuel pool.</p> <p>Answer 'A' is incorrect because the isolation of E12-F008 and F009 has no effect on the ADHR system in the given lineup.</p> <p>Answer 'C' is incorrect because the suction valves from the spent fuel pool have no automatic actions.</p> <p>Answer 'D' is incorrect because the ADHR pumps will NOT "continue to operate."</p>

Question Number	Question	Given Answer	Request	Justification
55	<p>Both trains of Standby Gas Treatment (SBGT) System were started for a surveillance using the Manual Initiate pushbuttons.</p> <p>SBGT 'A' was placed in standby per the SOI.</p> <p>A valid Fuel Handling Area exhaust high-high radiation signal was received.</p> <p>Which one of the following describes the response of the Standby Gas Treatment System and required operator response?</p> <p>A. SBGT 'A' will automatically re-initiate and SBGT 'B' will remain operating, requiring NO additional operator action.</p> <p>B. SBGT 'A' will remain in standby and requires manual operator initiation to resume operation, SBGT 'B' will remain operating.</p> <p>C. SBGT 'A' will remain in standby, SBGT 'B' will perform all required actions as long as Enclosure Building pressures remain satisfactory NO further operator action is required.</p> <p>D. SBGT 'A' Enclosure Building and Exhaust fans will automatically restart without repositioning of building dampers and SBGT 'B' will remain operating controlling building pressure. The operator must follow by depressing manual initiation pushbuttons to get the dampers operating.</p>	B.	Removal from exam because 3 (three) answers are correct.	<p>With orders from the Control Room Supervisor to place the SBGT system in standby the operator could use either section in the System Operating Instructor to perform this task.</p> <p>By placing SBGT in standby per SOI 04-1-01-T48-1 step 4.1 (attached page 2 <i>Placing SGTS in Standby Mode</i>) the system would re-initiate on a high-high radiation signal. <b>Therefore, 'A' is correct.</b></p> <p>By placing SBGT in standby per SOI 04-1-01-T48-1 step 5.2 (5.2.2.d) (attached page 4 and 5 <i>Operation after Automatic or Manual Initiation</i>) the system would only automatically start on the following:</p> <ul style="list-style-type: none"> <li>• Low flow in the running Enclosure Building recirc fan</li> <li>• Low flow in the running charcoal train</li> <li>• Low negative pressure in the Enclosure Building</li> </ul> <p>None of these conditions have occurred, SBGT 'A' will remain in standby making <b>answer 'C' correct.</b></p> <p>With the SBGT system in standby per step 5.2 above and given the conditions in the stem, a high-high radiation signal will not restart the system without manual operator initiation to resume operation. (attached page 3 <i>Manual System Initiation</i>). <b>Therefore, 'B' is correct.</b></p>

Question Number	Question	Given Answer	Request	Justification
64	<p>The plant is operating at rated conditions.</p> <p>RHR 'A' was placed in Suppression Pool cooling following a RCIC run.</p> <p>While RHR was operating, power was lost to bus 15AA for approximately 4 minutes.</p> <p>Power has been restored from an offsite source.</p> <p>Which one of the following describes the actions to be taken to re-establish Suppression Pool Cooling?</p> <p>A. Start RHR 'A' pump and verify E12-F024A Suppression Pool Test Return is open and E12-F048A RHR Heat Exchanger Bypass valve is closed.</p> <p>B. With system as is, open E12-F073A and F074A RHR Heat Exchanger Vents for 30 seconds, then re-start RHR 'A' pump in Suppression Pool Cooling..</p> <p>C. Return RHR 'A' system to LPCI standby then realign RHR 'A' pump in Suppression Pool Cooling.</p> <p>D. RHR 'A' will automatically resume Suppression Pool Cooling when Load Sequencing Occurs.</p>	B.	Change answer to 'C'	<p><i>Loss of AC Power</i> ONEP, 05-1-02-I-4, page 2, step 3.1 CAUTION (attached) states "If any fluid system was in operation before the loss of power and the bus has been deenergized for longer than two minutes unless required for adequate core cooling, refer to the applicable SOI for restart instructions to prevent possible piping damage due to water hammer unless system is needed for adequate core cooling."</p> <p>System Operating Instruction (SOI) 04-1-01-E12-1, <i>Residual Heat Removal System</i>, page 7, step 3.11, (attached) states "Opening F024A(B) without associated RHR PMP A(B) running, or with F003A(B) and F048A(B) closed, results in draining a large portion of RHR piping to Suppression Pool." The E12-F024A is open for Suppression Pool Cooling mode. Therefore, the system will drain if power to the pump is lost.</p> <p>Therefore, with the system having been without power for 4 minutes, and not required for adequate core cooling, the majority of the system has drained and requires a complete fill and vent. Venting the system through E12-F073A and F074A <b><u>only vents the heat exchanger portion of the system</u></b>. Therefore answer 'B' is not correct.</p> <p>Placing the RHR system in standby per (SOI) 04-1-01-E12-1, <i>Residual Heat Removal System</i>, page 9, step 4.1.1.a, (attached) requires the applicable loop to be completely filled and vented per section 5.1 (attached). Therefore 'C' is the correct answer.</p>