

Q#	1. LOK (F/H)	2. LOD (1-5)	3. Psychometric Flaws					4. Job Content Flaws				5. Other		6. B/M/N	7. U/E/S	8. Explanation
			Stem Focus	Cues	T/F	Cred. Dist.	Partial	Job-Link	Minutia	#/units	Backward	Q=K/A	SRO Only			
1	F	3												N	E S	100% correct – LOD 3.0 Should be RC-3B not RC-2B. Also Don't list procedure revision number in stem Changes made.
2	H	4												N	E S	67% correct -LOD 3.2 Change ""should operators do to verify correct operation of the pressurizer level controller" to "is the expected system response." Changes made.
3	H	2												N	S	100% correct – LOD 3.0
4	F	3												N	S	17% correct – LOD 3.3
5	F	3							X					N		0% Correct – LOD 4.3 Operators are not expected to know this level of detail from memory – Power

Instructions
[Refer to Section D of ES-401 and Appendix B for additional information regarding each of the following concepts.]

- Enter the level of knowledge (LOK) of each question as either (F)undamental or (H)igher cognitive level.
- Enter the level of difficulty (LOD) of each question using a 1 – 5 (easy – difficult) rating scale (questions in the 2 – 4 range are acceptable).
- Check the appropriate box if a psychometric flaw is identified:
 - The stem lacks sufficient focus to elicit the correct answer (e.g., unclear intent, more information is needed, or too much needless information).
 - The stem or distractors contain cues (i.e., clues, specific determiners, phrasing, length, etc).
 - The answer choices are a collection of unrelated true/false statements.
 - The distractors are not credible; single implausible distractors should be repaired, more than one is unacceptable.
 - One or more distractors is (are) partially correct (e.g., if the applicant can make unstated assumptions that are not contradicted by stem).
- Check the appropriate box if a job content error is identified:
 - The question is not linked to the job requirements (i.e., the question has a valid K/A but, as written, is not operational in content).
 - The question requires the recall of knowledge that is too specific for the closed reference test mode (i.e., it is not required to be known from memory).
 - The question contains data with an unrealistic level of accuracy or inconsistent units (e.g., panel meter in percent with question in gallons).
 - The question requires reverse logic or application compared to the job requirements.
- Check questions that are sampled for conformance with the approved K/A and those that are *designated SRO-only* (K/A and license level mismatches are unacceptable).
- Enter question source: (B)ank, (M)odified, or (N)ew. Check that (M)odified questions meet criteria of ES-401 Section D.2.f.
- Based on the reviewer's judgment, is the question as written (U)nsatisfactory (requiring repair or replacement), in need of (E)ditorial enhancement, or (S)atisfactory?
- At a minimum, explain any "U" ratings (e.g., how the Appendix B psychometric attributes are not being met).

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																supplies for individual MOVs. NRC disagrees. FCS wrote a new question as a suggestion to replace this question. The knowledge to answer the question is in knowing the connectivity of the pipes (ie LPSI injection piping has four parallel paths with a valve in each path and all four would have different power supplies but you can answer the question without knowing the power supplies, therefore this is KA mismatch. FCS agreed that the question will have to be accepted as is with a training deficiency for power supply knowledge.
6	H	3												B	S	100% correct LOD 2.7
7	F	4												N	S	100% correct - LOD 3.2 Remove procedure rev number from stem. FCS owes us explanation during validation if this is correct. (yes) Also FCS needs to answer question of: Is digital feedwater control system in full auto during a normal down-power and if so does the auto transfer occur as stated in lesson plans? (in red text on the question)(yes) Change made.
8	F	3												N	S	100% correct - LOD 2.2
9	H	3					X							N	E	100% correct – LOD 2.7 Two correct answers, B&D, because the minimum flow position on HCV-341 is closed. S Changed distractor to 10% open.
10	F	3												B	S	100% correct - LOD 2.3
11	F	2												N	S	100% correct – LOD 2.5 AC-10C and AC-10B are Raw Water Pumps not CCW pumps Changes made.
12	H	3												N	E	100% correct - LOD 2.7 Suggested stem changes: "Plant is in Mode 3 with CPR in progress", Remove "Containment cooling and filtering units shift to charcoal filtered mode" (They are permanently failed to filtered mode position) Reword last bullet to "Containment ventilation release paths isolate." S Changes made.

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13	F	2						X					X		N	S	33% Correct – LOD 3.8 We do not expect operators to know the detailed design basis of components. Question does not address operating PRTS controls per K/A Replaced with a bank question used on 2004 NRC exam, 07-11-20 148.
14	H	3							X						N	E S	50% correct - LOD 4.0 We do not expect operators to recall instrument bypass power sources from memory NRC disagrees. Your substitute question seems okay provided you send us an updated question with all the pedigree, distractor credibility, etc. Question is now SAT.
15	F	3													N	S	100% correct – LOD 2.5
16	F	3													M	S	100% correct - LOD 2.7 Should hotel pumps be listed? That could be but it doesn't change the question content or validity.
17	H	2													N	S	67% correct – LOD 3.7
18	H	3							X						N	E S	17% correct - LOD 5.0 We do not expect operators to recall this much detail from memory. We would expect them to use reference material. Use Bank Question 7-12-25 078. (page 1528 on the exam bank we sent) It's a better K/A fit because it addresses automatic operation and power supplies both Replaced question with bank question (which FCS recommended)-then they submitted to us a different bank question. FCS agreed that the bank question 7-12-25-078 is SAT.
19	H	3													N	E S	83% correct – LOD 4.2 Operators won't know from memory what steps 24 and 25 are. Remove reference to step numbers from the stem. Changes made.
20	H	4													N	E S	50% correct - LOD 3.7 In stem, change "2C "to "RC-3C" For choices, capitalize word after "," Changes made.
21	F	3													N	S	100% correct – LOD 2.9
22	H	3													N	S	67% correct - LOD 3.7

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																	Requires Attached Figure Q22-1.
23	H	4					X							N	E	33% correct – LOD 3.7 Choice “A” could also be correct. The control band for TC-2987B is set between 110-115°F with an allowable band of plus or minus 2°F per OI-CH-1, Attachment 12 Also in stem, wording should say “TC-2897A , 8” Letdown Controller” and “TC-2897B, 2” letdown controller.”	
															S	Modified stem such that choice A is not correct.	
24	H	3												N	E	83% correct - LOD 3.3 Change Reactor Vessel Level to 43% (There is no step at 46%)	
															S	Question to FCS-what is the discrete value for RVLIS here that is above 43%? Answer is 63%. Changes made.	
25	F	2												N	S	100% correct – LOD 2.2	
26	F	4												N	E	100% correct - LOD 3.2 Last bullet should read “BT-1B4C is closed, powering bus 1B3C-4C”	
															S	Changes made.	
27	F	3												N	S	83% correct – LOD 4.5 We would not expect operators to memorize the acceptance criteria for surveillance tests. However, in this case, all the candidate needs to know to get the correct answer is that the VA-3A/3B fans have higher capacity than the VA-7C/7D fans. No changes need to be made.	
28	H	4												N	S	100% correct – LOD 3.5	
29	F	3												N	E	67% Correct - LOD 3.3 There is no pressure indication on AI-183. Control switches for FP-1A and FP-1B were in the “After-Stop” position. There is no local controller handswitch for FP-1A, just a pushbutton.	
															S	Modified stem to remove local operator and add operator in the control room where the fire main pressure indicator is located. Made the change to control switches to after stop and deleted reference to local controller HS-1A	
30	H	2												N	S	50% correct – LOD 3.5	
31	H	3												M	S	100% correct - LOD 3.0	
32	H	3												N	E	100% Correct – LOD 3.2 Delete “CVCS is in normal at power alignment except for” (HC-218-1 is normally in	

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															S	AUTO), Add "controlling" before "pressurizer level control channel" Changes made.
33	F	4						X	X					N	U	17% correct - LOD 4.3 Operators are not expected to memorize individual radiation monitor alarm setpoints. The task described in the stem is performed by I&C, not Operations. Utility to try and write a question to this KA. The substituted question that FCS wrote is unsat because although it was a bank question for the 2004 NRC exam its KA was different and this question will not work for the KA we selected for this exam. FCS agreed with the modified version of the original question that we wrote. S Question is Sat.
34	H	3					X							N	U	17% correct – LOD 3.8 More than one correct answer. OI-SFP-6, "Spent Fuel Pool Heatup Rate" contains a precaution that states "Historically, the Spent Fuel Pool heat up rate has been calculated to be between 5 and 6 degrees/hour." FCS validation. This question is composed of two bank questions that were combined to make one new question, so why is the sum of the parts not correct now? S FCS to provide answers and maybe write a new question for this topic. They tried and the question is unsat because two of the distracters are not credible and the answer is cued from the stem. We modified our original question to remove heatup rates of the SFP and they agreed with the changes.
35	H	3												B	E	67% correct - LOD 4.8 Not sure about RRD feature since DCS Mod. S FCS to provide an answer on this. (A) Mod does not affect the question as written. Question is SAT.
36	F	2												B	S	100% correct – LOD 2.2
37	H	3												N	E	33% correct - LOD 4.1 Is it possible for all indicators to read 1014? FCS to provide an answer on this. S Should TDB-3.20 be provided as a handout? We don't think this is necessary. FCS agrees, question is now SAT.

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38	H	3												B	S	100% correct – LOD 3.5
39	H	4												N	E S	100% correct - LOD 3.3 Choice B – change “allow continued” to “and continue” Changes made.
40	F	3					X							B	E S	50% correct – LOD 3.5 Two correct answers as written. Change sentence in stem to “Other than for NPSH considerations, which one of the following is the basis for taking this action?” Change choice B to “ To prevent excessive uplift force on the fuel assemblies” (This is why we only run 3 RCPs below 500°F) Changes made.
41	H	3					X							N	E S	50% correct - LOD 3.3 Two correct answers as written. EOP-03 cooldowns are “controlled” to not exceed 100°F per hour. Change stem to “commence a plant cooldown and depressurization _____” Reword A and B to “within the limits of EOP/AOP Attachment 27, “P-T Limit Restoration. Reword C&D to “not to exceed 100°F per hour.” Changes made.
42	H	4												N	E S	33% correct – LOD 4.3 Very complex as written. Delete everything in the stem after the first bulleted list except for the last sentence. Add the following to the bulleted list. <ul style="list-style-type: none"> Charging and letdown have been isolated LCV-218-2 has been closed Changes made.
43	F	2												N	S	100% correct - LOD 3.0
44	H	2												N	S	100% correct - LOD 3.0
45	H	4												B	E S	67% correct – LOD 3.5 Add to stem “ The RO unit is Out of service” Changes made.
46	H	4												N	S	100% correct – LOD 3.3
47	H	3												B	S	100% correct - LOD 3.4

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48	H	3												N	S	100% correct - LOD 3.2
49	H	4												B	E S	0% correct - LOD 3.8 New inverters since this bank question was first written. What does this mean FCS? They replied that it does not affect the written exam question and it is SAT.
50	H	4												N	E S	0% correct - LOD 3.5 Change Choice B and C to "AFW will feed only S/G RC-2A but not S/G RC-2B" No changes made since wording is correct as written.
51	F	2												N	S	100% correct - LOD 2.6
52	H	3												M	S	100% correct - LOD 3.0
53	F	2												N	S	100% correct - LOD 2.7
54	H	2												N	S	50% correct - LOD 3.3
55	H	3												N	E S	83% - LOD 3.8 Change stem: CA-1B is running and loaded, Annunciator should be "DC BUS 1 LOW VOLTAGE, CA-1A control switch is in AFTER-START" Made recommended changes.
56	H	4							X					N	U S	17% correct - LOD 4.5 Operator should know that over or under excitation can cause overheating of generator. However, they are not expected to know if over heating is field heating or armature coil and heating. The OI-ST-1 curve is used in the control room. The system Operator (OPPD does not use the title of load dispatcher.) does not request a "leading power factor" but rather requests a value of MVARs in or out. FCS wrote a new question and it needs editing to better tie to the KA. Distractors and answer need modifications. Use the 70P and 90P switches and use under and overexcited in the answer selections. FCS made the requested changes and the question is now SAT.
57	H	4												N	S	50% correct - LOD 4.0
58	H	3							X			X		N	U	33% correct - LOD 4.7 Operators are not expected to memorize the potential consequences of a fire in each area of the plant. They are expected to be able to use AOP-06, AOP-06-01, AOP-06-02 and AOP-06-03 as references. Question does not ask action but rather basis for action. FCS has 28 attachments to this AOP for fires in various locations and the

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																<p>operators can not be expected to know the various cable paths through each of these spaces in order to determine reasons for actions within a given space.</p> <p>The K/A is knowledge of the reasons for...which is a direct fit to the KA. FCS tried to write a new question for this KA and it does not address the reasons for the actions contained in the procedure therefore it is unsat. FCS is trying one last time to write a new question on this topic the week of 3/26/2012. FCS submitted new question which matches KA and is now SAT.</p>
59	H	3												B	E	83% correct – LOD 3.9 Change bulleted item in the stem to "VCT level and pressure are slowly lowering"
60	F	3												N	S	100% correct – LOD 2.5
61	H	2												N	U	83% correct – LOD 3.7 This procedure has been revised since I received my references, therefore this question MUST be checked against the latest version of the procedure to determine if it's still correct. Also, check to ensure that the two condenser pressures are operationally valid with 1 dp between the two instruments and that the values in the stem do not need any changes.
															S	The referenced alarms no longer exist. They have been replaced by a DCS-EHC alarm, "Exhaust Hood A/B Low Pressure Alarm." The septoint is still 23.85 ' Hg Question-does this alarm replace all of the other previous alarms? We need to get updated procedures for this change and then modify the question appropriately. Got updated procedures, FCS wrote a new question on this KA with the new digital system incorporated into the question and we modified this question to better tie to the KA and also to strengthen the distracters. Question is Sat.
62	H	3												M	S	100% correct – LOD 3.6
63	F	3												N	S	67% correct – LOD 3.2
64	H	3												N	E	50% correct – LOD 3.3 Change 4 th bullet to "with sample pump running" Get rid of numbers 1,2 and 3. VA-66 in filtered mode is a pre-requisite for moving fuel. Choices: A. Start second AB Supply fan B. Shutdown AB Supply fan

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																<p>C. Start second AB exhaust fan</p> <p>D. Start all AB exhaust fans</p> <p>S Disagree with changing all choices, however, sample pump running comment was incorporated.</p>
65	H	3												N	S	100% correct – LOD 3.0
66	H	3					X							N	<p>U 33% correct – LOD 3.9</p> <p>ALL four choices are correct</p> <p>Choice A – EADs are required for RCA entry. RHRAs are inside the RCA.</p> <p>Choice B – If C is correct, B must also be correct.</p> <p>Choice D – we do not enter radiation areas without a sound operational or safety reason</p> <p>Stem should also say “2R/hr general area dose rate”</p> <p>S FCS wrote a new question on this KA and stated in the pedigree that it was pulled from the 2004 exam and we found this to be incorrect. Substitute question is okay as written with pedigree updates, actual NRC exam it came off of, etc. pedigree submitted and question is now SAT.</p>	
67	H	2												B	S	67% correct - LOD 4.0
68	F	4												N	<p>E 0% correct – LOD 4.5</p> <p>Although the stem says “no alternates have been designated”, having the Manager-Shift Operations perform the duties of the Manager-Operations.</p> <p>S Suggest changing choice C to Supervisor – Operations Engineering.</p> <p>Made change as recommended.</p>	
69	F	3												B	S	100% correct – LOD 2.8
70	H	2					X							N	<p>U 67% correct – LOD 4.5</p> <p>TSC ventilation is operated by the Shift Chemist, not Operations.</p> <p>Information provided to NRC is not substantial enough to write a valid question on this K/A that was not used on the previous exam. FCS –you write a new question for this one.</p> <p>S No-RO has no responsibility for ERO. K/A rejected. New K/A 2.4.17. FCS wrote new question on this new KA and question is now SAT.</p>	
71	F	3												N	S	100% correct – LOD 2.8
72	F	3												N	S	100% correct – LOD 2.7

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73	F	3												N	S	83% correct – LOD 3.5
74	F	2						X						M	E	50% correct – LOD 3.8 Choices A and C are identical Suggest adding "CB-20" to C and D Stem should read BOPO not "Secondary Plant RO"
															S	Changed distractor A to make it different than C. Question is now SAT.
75	F	2												N	E	67% correct – LOD 3.3 Note: The ATCO does have the authority to trip the reactor without SRO approval. Change stem to "Following a complicated reactor trip, the ATCO recommends that an action be taken to protect the health and safety of the public during an emergency event. This action is contrary to plant procedures and technical specification requirements. Which one of the following is correct per 10 CFR 50.54(x) &(y)?"
															S	Modified the stem as suggested except left the TS out and did not include 10 CFR 50.54(x) and (y) since this is cueing to the answer.
76	H	3												N	S	100% correct – LOD 3.0
77	H	4												N	S	75% correct – LOD 3.0
78	H	4						X	X					N	U	75% correct – LOD 5.0 Low operational validity. Operators cannot determine if tube rupture is a hot side or cold side break. The procedural actions are identical for both. Operators are not required to memorize the details of chapter14 safety analysis. Recommend: Which one of the following would result in the smallest Iodine release assuming a SGTR cannot be isolated? A. A cooldown using the steam dump and bypass valves B. A cooldown using MS-291 and MS-292 C. A cooldown using HCV-1040 D. A cooldown using S/G blowdown
															S	Replaced question with bank question 07-62-08 39, not on any previous NRC exams. We modified two distracters to improve credibility (A and D)
79	H	2												N	S	100% correct – LOD 3.5
80	F	4												N	E	75% correct – LOD 4.0 Change stem to read "161KV line voltage to drop from 165.2 KV to 161 KV" "What Technical Specification actions should the control room take?"

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																<p>May want to change choice A to "Power buses 1A3 and 1A4 from the Diesel Generators."</p> <p>S Made the stem voltage change, however, you can not change the stem to ask requires TS action because that cues to the answer, which is not allowed. Also, some distracters are not TS actions.</p> <p>No change to distractor A since not credible-transferring a bus that carries RCPs or loading an EDG with an RCP which is not credible during a startup.</p>
81	H	3												N	S	100% correct – LOD 3.3
82	F	3												N	U	<p>0% correct – LOD 4.5</p> <p>Believe the key answer to be incorrect.</p> <p>TS 2.10.2 Reactivity Control Systems and Core Physics Parameters Limits Applicability</p> <p>Applies to operation of control element assemblies and monitoring of selected core parameters whenever the reactor is in cold or hot shutdown, hot standby, or power operation conditions.</p> <p>TS 2.10.2(7) is labeled Regulating CEA insertion limits during Hot Standby and Power Operation. Depending on which CEA dropped, PDIL may be violated.</p> <p>S Question may be moot because OP-2A requires a manual trip for this situation.</p> <p>Substituted bank question 07-12-25 007 from NRC FCS 1999 exam.</p>
83	H	4												N	E	<p>25% correct – LOD 4.8</p> <p>Believe the key (84 hours) to be incorrect with no correct answer provided.</p> <p>S Correct answer is 2222 July 8th which is not one of the choices.</p> <p>Corrected answer to 2222 on July 8th. Question is now SAT.</p>
84	H	3												N	E	<p>0% correct – LOD 4.8</p> <p>Key answer is incorrect. C is the correct answer. Delta T is 55°F. According to Floating step "C", Delta T must be 50°F or less to verify subcooled natural circulation. The contingency column says "start all available charging pumps"</p> <p>There is no procedural guidance to "secure from the cooldown"</p> <p>Recommend make "C" correct answer</p> <p>Change choices A and B to "has been established.</p> <p>Change choices C and D to "has not been established" and "to establish 2 phase N/C"</p> <p>Theresa wrote new question with new KA-thru out the topic because of inadequate EOP-did not detail the concern with loop transit time delay in est. nat. circ as</p>

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															S	discussed in transient lesson plan. Question is SAT.
85	H	3												N	E S	75% correct – LOD 4.0 Complete explanation section of question Made recommended changes.
86	F	3						X						N	U S	25% correct – LOD 4.3 Operators do not determine priority 1 or 2 procedures changes except for the 1 or 2 Operators in the EOP/AOP procedure group. How about: A temporary Procedure Change would be implemented immediately and a permanent procedure change would be made within 24 hours. A temporary Procedure Change would be implemented within 4 hours and a permanent procedure change would be made within 24 hours. A temporary Procedure Change would be implemented immediately and a permanent procedure change would be made within 7 days. A temporary Procedure Change would not be made Theresa replaced the KA with 2.2.38 and write new question because the generic KA 2.2.5 is not appropriate to use for a Tier 1 or 2 question per NUREG-1021.Question is now SAT.
87	F	3												N	S	100% correct – LOD 3.0
88	H	3												M	E S	100% correct – LOD 2.8 Add to stem "Reactor power is 100% Change made.
89	H	3												N	E S	75% correct – LOD 4.0 D is correct answer as written. We would stay in AOP-06 but also implement AOP-18. In choices A and B, change "Transition to" to "Implement" "B" is then correct. Change "D" to use Demineralized Water to cool the CCW system components. Add "CCW" before "exit temperature" in stem All changes made as recommended. Question is now SAT.
90	H	4												N	E S	25% correct – LOD 3.8 Diesel Fuel Oil Technical Specification is complex. Provide as handout NRC Disagrees-all that is asked is the 2.01 requirement for not having enough Fuel Oil. This question only requires recognizing that you don't have enough Fuel Oil and must immediately start a shutdown. Question is SAT as written.

Q#	1. LOK (F/H)	2. LOD (1-5)	3. Psychometric Flaws					4. Job Content Flaws				5. Other		6. B/M/N	7. U/E/S	8. Explanation
			Stem Focus	Cues	T/F	Cred. Dist.	Partial	Job-Link	Minutia	#/units	Backward	Q=K/A	SRO Only			
91	F	2												N	S	25% correct – LOD 4.0
92	F	2												N	E S	50% correct – LOD 5.0 FCS states too hard and requests replacement question. Replaced question with a bank question that was used on the 1997 NRC exam.
93	H	3												B	S	100% correct – LOD 3.3
94	H	3												N	S	75% correct – LOD 3.5
95	F	3												N	E S	100% correct – LOD 3.8 For 100% power operation, group 4 would be at 126" Use 98% power. Add group 4 CEAs were initially at 120" Changes made.
96	F	2												B	S	100% correct – LOD 3.0
97	F	3												N	S	100% correct – LOD 3.3
98	H	3												M	S	75% correct – LOD 3.3
99	H	3												N	E S	100% correct – LOD 3.0 Should be EOP-00 both in the stem and choice A. Change made.
100	H	3												B	S	100% correct – LOD 3.5

RO TOTALS:			B= 15	F= 34	E=											
			M= 7	H= 41	U=	Additional Notes: These are final stats for the written exam										
			N= 53													
SRO TOTALS:			B= 6	F= 7	E=											
			M= 1	H= 18	U=	Additional Notes: These are final stats for the written exam										
			N= 18													
<u>GENERAL COMMENTS:</u>																
1. Bank questions are indicated by B; Modified are indicated by M; New questions are indicated by N.																

2. Chief Examiner comments are indicated in *blue*. Facility comments in *red*.
3. Average difficulty is 2.98 on the RO exam and 3.04 on the SRO exam.
4. The 10CFR55.41/43 distribution is: RO / SRO
- | | |
|------------|-----------|
| 41.1 = 0 | 43.1 = 0 |
| 41.2 = 2 | 43.2 = 7 |
| 41.3 = 0 | 43.3 = 1 |
| 41.4 = 1 | 43.4 = 0 |
| 41.5 = 14 | 43.5 = 15 |
| 41.6 = 1 | 43.6 = 1 |
| 41.7 = 30 | 43.7 = 0 |
| 41.8 = 3 | |
| 41.9 = 0 | |
| 41.10 = 20 | |
| 41.11 = 0 | |
| 41.12 = 2 | |
| 41.13 = 1 | |
| 41.14 = 1 | |
5. The answer distribution is: RO / SRO
- | | | |
|--------------|---|---------|
| A = 13 (17%) | / | 4 (24%) |
| B = 19 (22%) | / | 7 (28%) |
| C = 21 (28%) | / | 7 (20%) |
| D = 22 (33%) | / | 7 (28%) |
6. There are 2 questions with attachments provided (Q22, Q83).

From: [KOSKE, JERRY E](#)
To: [Clayton, Kelly](#)
Cc: [CADE, RANDALL B](#)
Subject: [WARNING: MESSAGE ENCRYPTED][Not Virus Scanned] Op Test Validation Report and Written Exam grading and LOD spreadsheets (Password protected)
Date: Monday, March 05, 2012 1:42:48 PM
Attachments: [2012 NRC EXAM SCORING.xls](#)
[FCS LOD.xls](#)
[Notes on Validation of Operating Test..doc](#)

Hi Kelly

The Validation report for the Op Test and the Written Exam grading spreadsheet and Level of Difficulty spreadsheet are attached. All are password protected.

Jerry

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Question #	R1	R2	S1	S2	S3	S4	
1	3	3	3	3	3	3	3.0
2	3	4	3	3	3	3	3.2
3	3	3		3	4	2	3.0
4	3	3	4	4	3	3	3.3
5	4	4	5	5	3	5	4.3
6	3	2	3	3	3	2	2.7
7	3	4	3	3	3	3	3.2
8	3	2	2	2	2	2	2.2
9	3	3	2	3	2	3	2.7
10	2	3	2	2	3	2	2.3
11	5	2	2	2	2	2	2.5
12	3	2	3	2	3	3	2.7
13	5	3	4	3	4	4	3.8
14	4	3	5	5	3	4	4.0
15	2	3	3	3	2	2	2.5
16	2	3	3	3	2	3	2.7
17	4	3	3	5	4	3	3.7
18	5	5	5	5	5	5	5.0
19	4	4	4	5	4	4	4.2
20	4	3	4	5	3	3	3.7
21	3.5	3	3	3	2	3	2.9
22	4	3	4	4	3	4	3.7
23	3	3	3	3	5	5	3.7
24	3	3	3	3	4	4	3.3
25	2	3	2	2	2	2	2.2
26	3	3	3	3	4	3	3.2
27	5	4	5	5	4	4	4.5
28	4	3	3	3	4	4	3.5
29	4	3	4	3	3	3	3.3
30	4	3	4	4	3	3	3.5
31	4	3	3	2	3	3	3.0
32	3	4	3	2	3	4	3.2
33	5	4	4	5	4	4	4.3
34	4	4	4	4	4	3	3.8
35	5	5	5	5	5	4	4.8
36	2	2	3	2	2	2	2.2
37	5	4	4.5	4	4	3	4.1
38	4	4	3	4	3	3	3.5
39	3	4	3	3	3	3.5	3.3
40	4	4	4	4	2	3	3.5
41	4	4	3	3	3	3	3.3
42	4	5	4.5	4	5	3	4.3
43	3	3	3	3	3	3	3.0
44	3	3	3	3	3	3	3.0
45	4	4	4	3	3	3	3.5
46	4	3	4	3	3	3	3.3

47	3	3	4.5	3	3	4	3.4
48	4	3	3	2	4	3	3.2
49	4	4	4	3	5	3	3.8
50	4	4	4	3	3	3	3.5
51	3	2		2	3	3	2.6
52	3	3	3	2	4	3	3.0
53	3	3	3	2	3	2	2.7
54	4	3	3	3	3	4	3.3
55	4	5	4	3	3	3.5	3.8
56	4	5	4	5	4	5	4.5
57	4	4	4	4	4	4	4.0
58	5	4	5	5	4	5	4.7
59	4	3	4.5	5	4	3	3.9
60	3	2	3	2	3	2	2.5
61	4	4	4	4	3	3	3.7
62	3	4		3	4	4	3.6
63	4	3		3	3	3	3.2
64	4	3	4	3	3	3	3.3
65		3	3	3	3	3	3.0
66	4	4	4.5	4	4	3	3.9
67	4	4	4.5	3	4	4.5	4.0
68	4	5	4	5	4	5	4.5
69	3	3	3	3	3	2	2.8
70	5	4	5	5	4	4	4.5
71	4	3	3	2	3	2	2.8
72	2	3	4	3	2	2	2.7
73	4	4	3	4	3	3	3.5
74	5	4	3	4	4	3	3.8
75	4	4	3	3	3	3	3.3
76			3	3	3	3	3.0
77			3	3	3	3	3.0
78			5	5	5	5	5.0
79			3	3	4	4	3.5
80			4	4	4	4	4.0
81			3	3	4	3	3.3
82			4	4	5	5	4.5
83			4	5	5	5	4.8
84			4	5	5	5	4.8
85			4	4	4	4	4.0
86			4	4	4	5	4.3
87			3	3	3	3	3.0
88			3	3	3	2	2.8
89			3	5	4	4	4.0
90			3	4	4	4	3.8
91			4	4	4	4	4.0
92			5	5	5	5	5.0
93			3	4	3	3	3.3

94	3	4	3	4	3.5
95	4	4	4	3	3.8
96	3	3	3	3	3.0
97		3	3	4	3.3
98	3	3	3	4	3.3
99	3	3	3	3	3.0
100	3	4	4	3	3.5

RO AVG

3.4

SRO AVG

3.7

2007 NRC WRITTEN EXAM GRADING and ANALYSIS

QUESTION #	ANSWER KEY	ALT. ANSWER	R1	R2	S1	S2	S3	S4	POINTS						ITEM ANALYSIS							
									CORRECT													
									SCORE													
									R1	R2	S1	S2	S3	S4	R1	R2	S1	S2	S3	S4	% CORRECT	"a"
1	d		d	d	d	d	d	d	1	1	1	1	1	1	100%	0	0	0	6			
2	a		a	c	b	a	a	a	1	0	0	1	1	1	67%	4	1	1	0			
3	a		a	a	a	a	a	a	1	1	1	1	1	1	100%	6	0	0	0			
4	d		d	b	b	b	a	a	1	0	0	0	0	0	17%	2	3	0	1			
5	b		d	d	c	c	a	c	0	0	0	0	0	0	0%	1	0	3	2			
6	a		a	a	a	a	a	a	1	1	1	1	1	1	100%	6	0	0	0			
7	a		a	a	a	a	b	a	1	1	1	1	1	1	100%	6	0	0	0			
8	c		c	c	c	c	c	c	1	1	1	1	1	1	100%	0	0	6	0			
9	b		b	b	b	b	b	b	1	1	1	1	1	1	100%	0	6	0	0			
10	b		b	b	b	b	b	b	1	1	1	1	1	1	100%	0	6	0	0			
11	b		b	b	b	b	b	b	1	1	1	1	1	1	100%	0	6	0	0			
12	b		b	b	b	b	b	b	1	1	1	1	1	1	100%	0	6	0	0			
13	b		c	b	c	d	b	d	0	1	0	0	1	0	33%	0	2	2	2			
14	a		c	a	c	a	c	a	0	1	0	1	0	1	50%	3	0	3	0			
15	c		c	c	c	c	c	c	1	1	1	1	1	1	100%	0	0	6	0			
16	a		a	a	a	a	a	a	1	1	1	1	1	1	100%	6	0	0	0			
17	b		b	b	b	a	d	b	1	1	1	0	0	1	67%	1	4	0	1			
18	a		b	b	c	a	c	d	0	0	0	1	0	0	17%	1	2	2	1			
19	d		d	d	b	d	d	d	1	1	0	1	1	1	83%	0	1	0	5			
20	d		d	b	d	b	d	c	1	0	1	0	1	0	50%	0	2	1	3			
21	d		d	d	d	d	d	d	1	1	1	1	1	1	100%	0	0	0	6			
22	b		b	a	b	b	b	a	1	0	1	1	1	0	67%	2	4	0	0			
23	b		b	b	c	a	d	a	1	1	0	0	0	0	33%	2	2	1	1			
24	c		c	c	c	c	c	d	1	1	1	1	1	1	83%	0	0	5	1			
25	b		b	b	b	b	b	b	1	1	1	1	1	1	100%	0	6	0	0			
26	c		c	c	c	c	c	c	1	1	1	1	1	1	100%	0	0	6	0			
27	c		c	b	c	c	c	c	1	1	0	1	1	1	83%	0	1	5	0			
28	a		a	a	a	a	a	a	1	1	1	1	1	1	100%	6	0	0	0			
29	b		c	b	c	b	b	b	0	1	0	1	1	1	67%	0	4	2	0			
30	d		a	d	c	d	c	d	0	1	0	1	0	1	50%	1	0	2	3			
31	a		a	a	a	a	a	a	1	1	1	1	1	1	100%	6	0	0	0			
32	a		a	a	a	a	a	a	1	1	1	1	1	1	100%	6	0	0	0			
33	b		a	a	b	a	d	a	0	0	1	0	0	0	17%	4	1	0	1			
34	d		b	b	b	d	b	b	0	0	0	1	0	0	17%	0	5	0	1			
35	d		d	d	d	d	a	a	1	1	1	1	0	0	67%	2	0	0	4			
36	d		d	d	d	d	d	d	1	1	1	1	1	1	100%	0	0	0	6			
37	a		a	b	b	c	a	d	0	1	1	0	0	0	33%	2	2	1	1			
38	c		c	c	c	c	c	c	1	1	1	1	1	1	100%	0	0	6	0			
39	b		b	b	b	b	b	b	1	1	1	1	1	1	100%	0	6	0	0			
40	c		c	b	b	c	c	b	1	0	0	1	1	0	50%	0	3	3	0			
41	d		b	d	d	b	d	b	0	1	1	0	1	0	50%	0	3	0	3			
42	c		b	b	c	a	d	c	0	0	1	0	0	1	33%	1	2	2	1			
43	a		a	a	a	a	a	a	1	1	1	1	1	1	100%	6	0	0	0			
44	c		c	c	c	c	c	c	1	1	1	1	1	1	100%	0	0	6	0			
45	c		d	c	c	c	b	c	0	1	1	1	0	1	67%	0	1	4	1			
46	d		d	d	d	d	d	d	1	1	1	1	1	1	100%	0	0	0	6			
47	c		c	c	c	c	c	c	1	1	1	1	1	1	100%	0	0	6	0			
48	a		a	a	a	a	a	a	1	1	1	1	1	1	100%	6	0	0	0			
49	c		b	b	b	b	b	b	0	0	0	0	0	0	0%	0	6	0	0			
50	c		a	b	b	a	d	a	0	0	0	0	0	0	0%	3	2	0	1			
51	a		a	a	a	a	a	a	1	1	1	1	1	1	100%	6	0	0	0			
52	c		c	c	c	c	c	c	1	1	1	1	1	1	100%	0	0	6	0			
53	a		a	a	a	a	a	a	1	1	1	1	1	1	100%	6	0	0	0			
54	d		a	d	d	c	d	c	0	1	1	0	1	0	50%	1	0	2	3			
55	d		d	d	a	d	d	d	1	1	0	1	1	1	83%	1	0	0	5			
56	b		a	c	a	c	b	c	0	0	0	0	1	0	17%	2	1	3	0			
57	d		a	d	d	a	d	d	0	1	1	0	0	1	50%	3	0	0	3			
58	c		a	c	a	a	c	a	0	1	0	0	1	0	33%	4	0	2	0			
59	b		b	b	b	a	b	b	1	1	1	0	1	1	83%	1	5	0	0			
60	d		d	d	d	d	d	d	1	1	1	1	1	1	100%	0	0	0	6			
61	a		a	a	a	a	d	a	1	1	1	1	0	1	83%	5	0	0	1			
62	d		d	d	d	d	d	d	1	1	1	1	1	1	100%	0	0	0	6			
63	d		b	d	d	b	d	d	0	1	1	0	1	1	67%	0	2	0	4			
64	c		a	c	a	c	a	c	0	1	0	1	0	1	50%	3	0	3	0			
65	c		c	c	c	c	c	c	1	1	1	1	1	1	100%	0	0	6	0			
66	c		d	c	a	b	b	c	0	1	0	0	0	1	33%	1	2	2	1			
67	c		d	c	d	c	c	c	0	1	0	1	1	1	67%	0	0	4	2			
68	d		c	c	c	c	c	c	0	0	0	0	0	0	0%	0	0	6	0			
69	c		c	c	c	c	c	c	1	1	1	1	1	1	100%	0	0	6	0			
70	b		b	b	d	c	b	b	1	1	0	0	1	1	67%	0	4	1	1			
71	d		d	d	d	d	d	d	1	1	1	1	1	1	100%	0	0	0	6			
72	c		c	c	c	c	c	c	1	1	1	1	1	1	100%	0	0	6	0			
73	c		c	d	c	c	c	c	1	0	1	1	1	1	83%	0	0	5	1			
74	d		d	b	d	d	c	b	1	0	1	1	0	0	50%	0	2	1	3			
75	c		c	d	b	c	c	c	1	0	0	1	1	1	67%	0	1	4	1			
76	a		a	a	a	a	a	a	1	1	1	1	1	1	100%	4	0	1	0			
77	a		a	a	c	a	a	a	1	1	1	0	1	1	67%	3	0	1	0			
78	a		a	a	a	b	a	a	1	1	1	1	0	0	67%	3	1	0	0			
79	b		b	b	b	b	b	b	1	1	1	1	1	1	100%	0	4	0	0			
80	d		a	d	d	d	d	d	1	1	0	1	1	1	100%	1	0	0	3			
81	d		d	d	d	d	d	d	1	1	1	1	1	1	100%	0	0	0	4			
82	d		c	a	c	a	a	a	1	1	0	0	0	0	0%	2	0	2	0			
83	d		d	a	b	a	a	a	1	1	1	0	0	0	0%	2	1	0	1			
84	a		c	b	c	c	c	c	1	1	0	0	0	0	0%	0	1	3	0			
85	c		c	b	c	c	c	c	1	1	1	0	1	1	67%	0	1	3	0			
86	c		a	a	c	a	a	a	1	1	0	0	1	0	33%	3	0	1	0			
87	b		b	b	b	b	b	b	1	1	1	1	1	1	100%	0	4	0	0			
88	b		b	b	b	b	b	b	1	1	1	1	1	1	100%	0	4	0	0			
89	b		b	c	b	b	b	b	1	1	1	0	1	1	67%	0	3	1	0			
90	d		a	d	a	a	a	a	1	1	0	1	0	0	33%	3	0	0	1			
91	b		a	c	a	b	b	b	1	1	0	0	0	1	33%	2	1	1	0			
92	b		b	c	a	b	b	b	1	1	1	0	0	1	33%	1	2	1	0			
93	a		a	a	a	a	a	a	1	1	1	1	1	1	100%	4	0	0	0			
94	c		c	a	c	c	c	c	1	1	1	0	1	1	67%	1	0	3	0			
95	d		d	d	d	d	d	d	1	1	1	1	1	1	100%	0	0	0	4			
96	a		a	a	a	a	a	a	1	1	1	1	1	1	100%	4	0	0	0			
97	c		c	c	c	c	c	c	1	1	1	1	1	1	100%	0	0	4	0			
98	c		c	c	c	a	a	a	1	1	1	1	1	0	67%	1	0	3	0			
99	d		d	d	d	d	d	d	1	1	1	1	1	1	100%	0	0	0	4			
100	c		c	c	c	c	c	c	1	1	1	1	1	1	100%	0	0	4	0			

From: [KOSKE, JERRY E](#)
To: [Clayton, Kelly](#)
Cc: [GIEBELHAUSEN, THOMAS E](#); [CADE, RANDALL B](#)
Subject: Password Protected Documents for you
Date: Tuesday, March 20, 2012 1:32:45 PM
Attachments: [Read-me.doc](#)
[RO Replacement Questions.doc](#)

Hi Kelly

Here are two password protected documents for you.

Jerry

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Proposed Replacement Question 5:

The following plant conditions exist:

- 4160 volt bus 1A4 is deenergized
- RCS Temperature is 295°F
- Pressurizer Pressure is 290 psia
- All 480 volt buses are in normal alignment

Assuming no action is taken to crosstie 480 volt buses, which of the following actions require manual, local operation of MOVs during the establishment of shutdown cooling?

Manual, local operation of MOVs _____ required to establish a suction path from the RCS to the LPSI pumps.

Manual, local operation of MOVs _____ required to establish an injection path from the LPSI pumps to the RCS.

- A. is ; is
- B. is ; is not
- C. is not ; is
- D. is not ; is not

Answer : B

Explanation: With no power to bus 1A4 and its associated 480 volt buses, There will be no power to HCV-347. Since HCV-347 and HCV-348 are in series, the MOV for HCV-347 must be operated manually to establish a suction path from the RCS to the LPSI pumps. There are 4 LPSI injection valves in parallel from the LPSI pumps to the RCS, Power will be available to HCV-327 and HCV-331, so manual, local MOV operation is not required to establish an injection path.

This is a new question.

Proposed Replacement Question 14

All electrical systems were in normal alignment when the reactor tripped following a loss all power to DC bus#1 and 4160v Bus 1A3 deenergized.

What is the status of Instrument Buses A, B, C and D.

- A. Instrument buses A and B are deenergized.
- B. Instrument buses A and C are deenergized.
- C. Instrument buses B and D are deenergized.
- D. Instrument buses C and D are deenergized.

B is correct.

This is a new Question

Proposed Replacement Question 18

Given the following plant conditions:

- An inadvertent SGIS has occurred.
- Manual and automatic Rx trips from the RPS and CB-4 have failed.
- DSS Channel A or C (and B or D) has actuated.

Which one of the following describes how the diverse scram system (DSS) mitigates this event?

- A. Deenergizes 120VAC instrument buses A, B, C, and D
- B. Deenergizes RPS initiation logic relays
- C. Opens Inverter 1 and 2 input breakers
- D. Trips clutch power supply feeder breakers

Correct answer is D

Bank Question. Used on the 1999 NRC Exam

Proposed Replacement Question 33

The following RM-078 setpoints are provided in in the technical data book, TDB-IV.8.

Normal	<1.0 mrem
Warn/Alert	10 mrem
High	30 mrem

A radiation source is moved in Corridor 4 which causes the measured radiation level to rise to 45 mrem and then go back down to normal. What is the status of the alarm status lights on the RM-078 panel at AI-33 after the radiation levels have returned to normal? Assume no operator action has been taken.

- A. The Alert and Alarm status lights are both lit and will stay lit until the Reset button is pushed.
- B. The Alert status light has automatically reset and is off. The Alarm status light is lit and will stay lit until the Reset button is pushed.
- C. The Alarm status light has automatically reset and is off. The Alert status light is lit and will stay lit until the Reset button is pushed.
- D. The Alert and Alarm status lights have automatically reset and are off.

Correct answer is A.

This is a bank question. It was used on the 2004 NRC exam.

Proposed Replacement Question 34

Attachment B to AOP-36, "Alternate Spent Fuel Pool Cooling when not on SDC" uses _____ to remove heat from the spent fuel pool.

- A. A spent fuel pool cooling heat exchanger
- B. The letdown heat exchanger
- C. A CCW/RW heat exchanger
- D. A shutdown cooling heat exchanger

The correct answer is D

This is a bank question.

Proposed Replacement Question 56

The plant is operating at 100% power with the Excitation System AUTO/MANUAL control switch selected to "AUTO."

If the "AUTO" mode output voltage fails low, the system should automatically shift to the "MANUAL" mode, avoiding an underexcited condition.

What routine operator action, is responsible for ensuring a smooth transfer occurs?

- A. Periodically checking generator voltage to ensure incoming is higher than running by adjusting the Manual Raise/Lower control switch 70P.
- B. Maintaining the Excitation System transfer voltmeter zeroed with the Auto Adjust Potentiometer 90P.
- C. Ensuring generator VARS are always in the lagging direction using the Auto Adjust Potentiometer 90P.
- D. Maintaining the Excitation System transfer voltmeter zeroed with the Manual Raise/Lower control switch 70P.

The correct answer is D.

This is a bank question with the stem reworded to better address the K/A.

Proposed Replacement Question 58

Which of the following fires could create a common mode failure that prevents the operator from initiating emergency boration from the control room?

- A. A fire in room 19 affecting all 3 air compressors
- B. A fire in the battery room affecting DC bus #2
- C. A fire in the switchgear room affecting Instrument Inverter "B"
- D. A fire in the switchgear room affecting electrical bus 1A3

The correct answer is D.

This is a bank question that was used on the 2002 NRC exam.

Proposed Replacement Question 61

With the plant operating at full power, the following indications related to condenser vacuum were noted on the DCS-EHC alarm page:

- “Exhaust Hood A/B Low Pressure” is in alarm
- P5048_BD alarm was received
- PY5048, Exhaust Hood A Pressure, indicated 27.0” Hg
- PY5049, Exhaust Hood B Pressure, indicated 27.1” Hg

Which one of the following actions should be taken in response to these indications?

- A. Verify automatic bypass of an Exhaust Hood Pressure transmitter.
- B. Manually bypass one of the Exhaust Hood Pressure transmitters.
- C. Start all condenser evacuation pumps.
- D. Lower turbine load until the alarm clears.

Proposed Answer: A

This is a new question.

Proposed Replacement Question 66

The contingency plan for operating with failed fuel in Standing Order O-43 includes actions to align condenser off-gas to the auxiliary building stack. Why is this action performed?

- A. To provide filtering of radioactive noble gasses in case a primary to secondary leak occurs.
- B. To prevent an unmonitored release if RM-057 goes offscale due to primary to secondary leakage.
- C. To provide adequate decay time for N-16 gammas before discharge from the plant.
- D. To ensure control room habitability is not jeopardized by condenser off-gas in the event of a steam generator tube rupture.

The correct answer is B

This is a bank question. It was used on the 2004 NRC exam.

Distractor D has been reworded to shorten its length.

Proposed Replacement question 70

A LOCA is in progress with RCS pressure Stable at 900 psia. RAS has NOT occurred. Under these conditions, the phrase "Maximize ECCS flow" in the EOPs means:

- A. Ensure all HPSI, all LPSI and all Charging pumps are running.
- B. Ensure two HPSI, two LPSI and all Charging pumps are running.
- C. Ensure all HPSI and all Charging Pumps are running and all LPSI pumps are off.
- D. Ensure two HPSI pumps and two Charging pumps are running and all LPSI pumps are off.

Correct answer B

This is a new question.

Reference: TDB-EOP-3 page 22

From: [KOSKE, JERRY E](#)
To: [Clayton, Kelly](#)
Subject: [WARNING: MESSAGE ENCRYPTED]Replacement Questions (password protected)
Date: Wednesday, March 28, 2012 3:42:36 PM
Attachments: [Replacement Question 78.docx](#)
[Replacement Question 14-R1.docx](#)
[Replacement Question 56-R1.docx](#)
[Replacement Question 58-Rev 1.docx](#)
[Replacement Question 66 Rev 1.docx](#)
[Replacement Question 70 Rev 1.docx](#)

Hi Kelly

Here are the replacement questions.

Jerry

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Proposed Replacement Question 14

All electrical systems were in normal alignment when the reactor tripped following a loss all power to DC bus#1 and 4160v Bus 1A3 deenergized.

What is the status of Instrument Buses A, B, C and D.

- A. Instrument buses A and B are deenergized.
- B. Instrument buses A and C are deenergized.
- C. Instrument buses B and D are deenergized.
- D. Instrument buses C and D are deenergized.

B is correct.

This is a new Question

Explanation: As Shown in the attached figure from the Electrical Distribution STM, DC Bus #1 is the normal power supply to the normal inverters for Instrument Buses A and C. DC Bus #1 also supplies the Swing Inverter for instrument buses A and C. The bypass transformers for Inverter A, Inverter C and Swing Inverter EE-8T are supplied by MCCs fed from 480 volt buses that are normally fed from 4160 V bus 1A3. With Bus 1A3 deenergized, Instrument buses A and C cannot be powered from their bypass transformers. Therefore Instrument buses A and C will be deenergized making "B" the correct answer.

Choice "C" would be correct if the stem said DC Bus#2 and Bus 1A4 were deenergized. Choices "A" and "D" are plausible distracters that could be chosen if the Applicant did not understand the power supply configuration.

Proposed Replacement Question 56 Rev 1

The plant is operating at 100% power with the Excitation System AUTO/MANUAL control switch selected to "AUTO."

If the "AUTO" mode output voltage fails low, the system should automatically perform a "bumpless" transfer to "MANUAL" mode, avoiding an _____ condition as long as the Operator maintained the Excitation System Transfer Voltmeter zeroed with _____ prior to the "AUTO" mode output voltage failure.

- A. overexcited, Auto Adjust Potentiometer 90P
- B. overexcited, Manual Raise/Lower control switch 70P
- C. underexcited, Auto Adjust Potentiometer 90P
- D. underexcited, Manual Raise/Lower control switch 70P

The correct answer is D.

This is a new question.

Explanation: With the Generator Excitation System operating in AUTO, the actual output voltage is controlled using Auto Adjust Potentiometer 90P. Manual Raise/Lower control switch 70P is operated to maintain the Excitation System Transfer Voltmeter zeroed to ensure a smooth transfer should the AUTO system fail. If the Auto output voltage failed low and the transfer did not occur, the result would be an underexcited condition. Therefore, "D" is the correct answer. Choices "A" and "B" are plausible if the Applicant does not realize that voltage failing low causes an underexcited condition. Choice "C" is plausible if the Applicant believes the Auto Adjust Potentiometer must be adjusted to maintain zero output on the transfer voltmeter.

Proposed Replacement Question 58

The actions performed using AOP-06, "Fire Emergency" ensures that the plant can establish and remain in a _____ condition for at least ___ hours following any postulated fire event.

- A. Hot Shutdown, 4
- B. Hot Shutdown, 8
- C. Cold Shutdown, 24
- D. Cold Shutdown, 42

The correct answer is "B"

This is a new question

Explanation: TBD-AOP-06, General Comments on AOP-06 state "AOP-06 provides direction to ensure that the plant is configured to support the conclusions of EA-FC-89-055, hereafter referred to as the Fire Safety Shutdown Analysis. " It also states that, "The Fire Safe Shutdown Analysis" establishes Plant configurations that ensure that the Plant can establish and remain in a hot shutdown condition for at least 8 hours following any postulated fire event. Therefore, "B" is the correct answer. Distracter "A" could be chosen by an Applicant who confuses the 4 hour blackout coping time with the Fire Safe Shutdown Analysis time. Distracters "C" and "D" could be chosen by an Applicant who believes cold shutdown is required by the analysis. 12 hours is used frequently in Tech Spec LCOs. 42 hours is the time to cold shutdown per TS 2.0.1.

Proposed Replacement Question 66 Rev 2

The contingency plan for operating with failed fuel in Standing Order O-43 includes actions to align condenser off-gas to the auxiliary building stack. Why is this action performed?

- A. To provide filtering of radioactive noble gases in case a primary to secondary leak occurs.
- B. To prevent an unmonitored release if RM-057 goes offscale due to primary to secondary leakage.
- C. To provide adequate decay time for N-16 gammas before discharge from the plant.
- D. To ensure control room habitability is not jeopardized by condenser off-gas in the event of a steam generator tube rupture.

The correct answer is B

This is a bank question. It was used on the 2001 NRC exam.

Distracter D has been reworded to shorten its length.

Explanation: SO-O-43, Attachment 7.4(page 29) Contains the following action,"Align condenser off-gas to the aux. Bldg. stack to address RM-064 limitations in detecting primary to secondary leakage when RM-057 is off0scale high or unavailable and RM-064 is reading background." Therefore, "B" is the correct answer. "A" is incorrect because filters will not remove noble gases. "C" is credible because it is a consideration in designing the letdown system, however, it is not a reason for realigning condenser evacuation. "D" is also credible, but not the basis for this action.

Replacement question 70

A LOCA is in progress with RCS pressure Stable at 900 psia. RAS has not occurred. Under these conditions, the phrase "Maximize ECCS flow" in the EOPs means:

- A. Ensure all HPSI, all LPSI and all Charging pumps are running.
- B. Ensure two HPSI, two LPSI and all charging pumps are running.
- C. Ensure all HPSI and all Charging Pumps are running and all LPSI pumps are off.
- D. Ensure two HPSI pumps and all charging pumps are running and all LPSI pumps are off.

Correct answer B

This is a new question

Explanation: EOP-3, step 8 reads " IF SIAS has actuated, THEN maximize Safety Injection and Charging flow to the RCS by operating ALL of the following available pumps: Either HPSI Pumps, SI-2A/B or SI-2B/C, LPSI Pumps, SI-1A/B, Charging Pumps CH-1A/B/C" Therefore, Choice "B" is correct. Distracter "A" could be chosen if the Applicant believed all three HPSI pumps should be running, Distracter "C" is incorrect because all HPSI is incorrect and All LPSI off is incorrect unless RAS has occurred. Distracter "D" would be correct if RAS had occurred.

Replacement Question 78

In order to minimize the release of radioactivity to the secondary during a steam generator tube rupture, EOP-04 directs maintaining steam generator level in the ruptured steam generator above_____.

- A. 44% Wide Range
- B. 44% Narrow Range
- C. 35% Wide Range
- D. 35% Narrow Range

Correct answer B

New Question

Explanation: Reference TDB-EOP-04, page 7 states "Maintaining S/G level greater than 44% NR will aid in minimizing radioactivity released from steaming. 44% NR is used because 26% NR is the top of the tube bundle, 10% is added for instrumentation inaccuracies, and 6% is added for margin. Therefore "B" is correct. Distracter "A" is incorrect because it refers to Wide range level instead of Narrow range Level. Distracter "D" is incorrect, 35% narrow range is the lower end of the range for EOP-00, Standard Post Trip Actions. "C" contains both the wrong value and Wide Range and is incorrect.

From: [Jerry Koske](#)
To: [Clayton, Kelly](#)
Subject: [WARNING: MESSAGE ENCRYPTED]FCS latest Comments on questions
Date: Tuesday, April 03, 2012 5:22:05 AM
Attachments: [FCS Comments -Question 24.docx](#)
[FCS Comments -Question 44.docx](#)
[FCS Comments Question 49.docx](#)
[FCS comments Question 70.docx](#)
[FCS Comments Question 80.docx](#)
[FCS Comments Question 82.docx](#)
[FCS comments Question 91.docx](#)

Hi Kelly

After Tom's latest review of the "as-given" exam, we have some comments on several of the questions.

The comments are in markup form.

Call us at FCS after you have had a chance to look them over.

Jerry

Question # 24

Examination Outline Cross-Reference:	Level	RO	SRO
	Tier #	<u>2</u>	<u> </u>
	Group #	<u>1</u>	<u> </u>
	K/A #	<u>006</u> K6.03	<u> </u>
	Importance Rating	<u>3.6</u>	<u> </u>

K/A Statement: (006 Emergency Core Cooling) Knowledge of the effect of a loss or malfunction the following will have on the ECCS: Safety Injection Pumps

Proposed Question:

A small break LOCA has occurred. The following plant conditions exist:

Pressurizer pressure is 750 psia and slowly rising/aising
 Pressurizer level is 0%
 Reactor Vessel level is 63% and trending upward
 RCS subcooling is 23 °F
 Both steam generator pressures are 700 psia
 Narrow range steam generator levels are 29%
 Containment pressure is 6 psig and stable
 All containment air coolers are running
 All charging pumps are currently running
 HPSI pump SI-2A is currently running
 HPSI pump SI-2B has tripped
 No containment spray pumps are running
 LPSI pump SI-1A is currently running
 LPSI pump SI-12B has tripped
 A recirculation actuation signal has not occurred

Per EOP-03, LOSS OF COOLANT ACCIDENT, what action should be taken?

- Start HPSI pump SI-2C to meet minimum required safety injection flow
- Stop HPSI pump SI-2A as HPSI trip and throttle criteria have been met
- Stop LPSI pump SI-1A as LPSI trip and throttle criteria have been met
- Start CS pump SI-3A to lower containment pressure~~commence cooling of recirculation flow~~

Proposed Answer: C

Explanation: Per EOP-03, and STM Vol. 15, LPSI pumps are supposed to trip following a RAS to ensure that they aren't operating at their shutoff head (and are not required for accident mitigation following a RAS). In this case, the pressurizer pressure is still above the LPSI shutoff head, and since the RAS has occurred, the recirculation flow path back to the SIRWT has been isolated. Therefore, LPSI pump SI-2A should have tripped and needs to be stopped to prevent damage to the pump. The LPSI trip and throttle criteria (per the EOP floating steps) has been reached. Answer "A" is plausible if minimum required safety injection flow was not being met,

but due to the fact that pressurizer pressure and reactor vessel water level are raising, adequate injection is being maintained. Answer "B" is plausible in that HPSI trip and throttle criteria would be met if pressurizer level was greater than 10%, which it is not here. One HPSI pump is still required per the floating steps for a LOCA, and all HPSI pumps are only stopped for a MSLB. Answer "D" is plausible in that it is a viable method to cool recirculation flow following a RAS, however, the requirements for entering shutdown cooling, per EOP-03, have not yet been met. The containment spray pumps are not started until shutdown cooling is entered.

Technical Reference(s): EOP-03 "Loss of Coolant Accident", EOP/AOP Floating Steps, EOP/AOP Attachments, STM Vol. 15 ECCS
(Attach if not previously provided) _____
(including version/revision number) _____

Proposed references to be provided to applicants during examination: _____

Learning Objective: _____ (As available)

Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X

Question History: Last NRC Exam N/A
(Optional: Questions validated at the facility since 10/95 will generally undergo less rigorous review by the NRC; failure to provide the information will necessitate a detailed review of every question.)

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 (7)
55.43 _____

Comments:

| [We discussed these changes on the phone during our initial review.](#)

Question # 44

Examination Outline Cross-Reference:	Level	RO	SRO
	Tier #	<u>1</u>	<u> </u>
	Group #	<u>1</u>	<u> </u>
	K/A #	<u>000038</u>	<u>EK3.06</u>
	Importance Rating	<u>4.2</u>	<u> </u>

K/A Statement: (000038 SGTR) Knowledge of the reasons for the following responses as they apply to the SGTR: Actions contained in EOP for RCS water inventory balance, S/G tube rupture, and plant shutdown procedures

Proposed Question:

Given the following conditions:

Steam generator tube rupture has occurred on RC-2B
 Reactor is tripped
 Safety injection has actuated
 Standard post trip actions are complete
 EOP-04 has been entered.
 RCS pressure is 1350 psig and stable
 RCS Th is 545°F

Per EOP-04, STEAM GENERATOR TUBE RUPTURE, the next steps the operators will take will be to cooldown the RCS to less than 1 T-hot because 2.

- A. 510 degrees F; this meets the 50 degrees subcooling requirement after depressurization
- B. 525 degrees F; this meets the 20 degrees subcooling requirement after depressurization
- C. 510 degrees F; this value is less than the saturation temperature to lift a main steam safety valve
- D. 525 degrees F; this value is less than the saturation temperature to lift a main steam safety valve

Proposed Answer: C

Explanation: Per TBD-EOP-04, page 17, the goal of this step is to reduce the RCS hot leg temperature to less than 510°F prior to isolating the affected S/G. This reduction in temperature is to prevent lifting main steam safety valves in the affected S/G. The temperature in the isolated S/G will be essentially Thot since it is no longer being used as a heat sink.

The first MSSVs open at 1000 psia which corresponds to a saturation temperature of 545°F. The next major step to prevent lifting the MSSVs will be to depressurize the RCS to less than 1000 psia. A hot leg temperature of 545°F and 1000 psia RCS pressure would result in a saturated RCS. A Thot less than 525°F would allow 20°F subcooling but this would not meet the RCP NPSH requirements. The 510°F is used because it is less than the saturation temperature to lift main steam safety valves and is low enough to meet the NPSH requirements for the RCPs

when RCS pressure is reduced to 1000 psia. This makes Distractor B and D incorrect because 525 degrees F is the wrong temperature. Distractor A is incorrect because the subcooling for RCP NPSH at 1000 psig is 20 degrees per the TBD-EOP basis document.

Technical Reference(s): EOP-04, "Steam Generator Tube Rupture", TBD-EOP-04,
 "Steam Generator Tube Rupture", Rev. 26, EOP/AOP
 Attachments, Attachment 3, Rev. 29, Lesson plans 7-15-
 33, Rev. 5 and 7-18-14, Rev. 17

(Attach if not previously provided) _____
(including version/revision number) _____

Proposed references to be provided to applicants during examination: None

Learning Objective: (As available)

Question Source: Bank #
Modified Bank # (Note changes or attach parent)
New X

Question History: Last NRC Exam N/A
(Optional: Questions validated at the facility since 10/95 will generally undergo less rigorous review by the NRC; failure to provide the information will necessitate a detailed review of every question.)

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis

10 CFR Part 55 Content: 55.41 (10)
55.43

| Comments: ~~Need to specify T-hot~~

Question # _49_

Examination Outline Cross-Reference:	Level	RO	SRO
	Tier #	<u>_1_</u>	<u>_____</u>
	Group #	<u>_1_</u>	<u>_____</u>
	K/A #	<u>_000057 2.2.37_</u>	<u>_____</u>
	Importance Rating	<u>_3.6_</u>	<u>_____</u>

K/A Statement: (0057 Loss of Vital AC Instrument Bus) Ability to determine operability and/or availability of safety related equipment associated with a Loss of Vital AC Instrument Bus.

Proposed Question:

With the plant operating at 25% power, the "INVERTER A TROUBLE" alarm annunciated. Just prior to the alarm, the ERF indicated Inverter "A" was at 117 volts and 25 amps.

Which of the following combination of indications would confirm that AI-40A (Instrument Bus A) is being supplied by the Bypass Transformer of Inverter "A"?

- A. Inverter output voltage zero, inverter output current zero, instrument bus current zero
- B. Inverter output voltage zero, inverter output current zero amps, instrument bus voltage 117 V
- C. Inverter output voltage 117 V, inverter output current 25 amps, instrument bus voltage 117 V
- D. Inverter output voltage 117 V, instrument bus voltage zero, instrument bus current zero

Proposed Answer: _C_

Explanation: Per Lesson Plan 0713-04, "125 VDC and 120 VAC Distribution", inverter output voltage should read between 115-118 V, inverter output current between 20-40 amps, and instrument bus voltage ~115 V. Therefore, answer C is correct. The other answers are plausible but incorrect based on the candidate misunderstanding the electrical scheme.

Technical Reference(s): LP 0713-04 "125 VDC and 120 VAC Distribution" Rev. 16, pages 31-32, 36

(Attach if not previously provided) _____
(including version/revision number) _____

Proposed references to be provided to applicants during examination: _None_Learning Objective: _0713-04 01.04_ (As available)

Question Source: Bank # 07-13-04 003
Modified Bank # _____ (Note changes or attach parent)
New _____

Question History: Last NRC Exam 1997
(Optional: Questions validated at the facility since 10/95 will generally undergo less rigorous review by the NRC; failure to provide the information will necessitate a detailed review of every question.)

Question Cognitive Level: Memory or Fundamental Knowledge
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 (7)
55.43

Comments:

[K/A mismatch. The K/A addresses loss of an instrument bus. The question addresses loss of an inverter, but the bus remains energized by the bypass transformer. Sorry we didn't catch this earlier.](#)

[Proposed Replacement Question](#)

[The plant is at 100% power when annunciators "INVERTER A TROUBLE" and "INSTRUMENT BUS A LOW VOLTAGE" alarm. In accordance with AOP-16, "Loss of Instrument Bus Power", what is the correct action to take?](#)

- [A. Cross tie instrument bus A to instrument bus C within 4 hours.](#)
- [B. Bypass all trip units on the affected channel.](#)
- [C. Manually trip the reactor and enter EOP-00.](#)
- [D. Direct I&C to trip all trip units on the affected channel](#)

[Correct answer is "B". Bamk question used on the 2004 NRC exam 07-17-16 001.](#)

← **Formatted:** List Paragraph, Numbered + Level: 1 + Numbering Style: A, B, C, ... + Start at: 1 + Alignment: Left + Aligned at: 0.25" + Indent at: 0.5"

↗ **Formatted:** Font: (Default) Arial, 11 pt

Question # 70

Examination Outline Cross-Reference:	Level	RO	SRO
	Tier #	<u>3</u>	_____
	Group #	_____	_____
	K/A #	<u>2.4.17</u>	_____
	Importance Rating	<u>3.9</u>	_____

K/A Statement: Knowledge of EOP terms and definitions

Proposed Question:

A LOCA is in progress with RCS pressure Stable at 900 psia. RAS has not occurred. Under these conditions, the phrase "Maximize ECCS flow" in the EOPs means:

- A. Ensure all HPSI, all LPSI and all Charging pumps are running.
- B. Ensure two HPSI, two LPSI and all Charging pumps are running.
- C. Ensure all HPSI and all Charging Pumps are running and all LPSI pumps are off.
- D. Ensure two HPSI pumps and all Charging pumps are running and all LPSI pumps are off.

Proposed Answer: B

Explanation: EOP-3, step 8 reads "IF SIAS has actuated, THEN maximize Safety Injection and Charging flow to the RCS by operating ALL of the following available pumps: Either HPSI Pumps, SI-2A/B or SI-2B/C, LPSI Pumps, SI-1A/B, Charging Pumps CH-1A/B/C" Therefore, Choice "B" is correct. Distracter "A" could be chosen if the Applicant believed all three HPSI pumps should be running, Distracter "C" is incorrect because all HPSI is incorrect and All LPSI off is incorrect unless RAS has occurred. Distracter "D" would be correct if RAS had occurred.

Technical Reference(s): EOP-3, Rev 36

(Attach if not previously provided)

(including version/revision number)

Proposed references to be provided to applicants during examination: None

Learning Objective: _____ (As available)

Question Source:	Bank #	_____
	Modified Bank #	_____ (Note changes or attach parent)
	New	<u>X</u>

Question History: Last NRC Exam N/A

(Optional: Questions validated at the facility since 10/95 will generally undergo less rigorous review by the NRC; failure to provide the information will necessitate a detailed review of every question.)

Question Cognitive Level:	Memory or Fundamental Knowledge	<u>X</u>
	Comprehension or Analysis	_____

10 CFR Part 55 Content: 55.41 (10)
55.43 _____

Comments:

[Need to capitalize "Charging" on choices B and D. Our mistake, we sent it to you this way.](#)

Question # 80

Examination Outline Cross-Reference:	Level	RO	SRO
	Tier #	_____	<u>1</u>
	Group #	_____	<u>1</u>
	K/A #	_____	056_G2.2.22_
	Importance Rating	_____	<u>4.7</u>

K/A Statement: (000056 Loss of Off-site Power) 2.2.22 Knowledge of limiting conditions for operations and safety limits.

Proposed Question:

The control room is raising power from 50% toward 100%. An electrical disturbance causes the 161 KV line voltage to drop from 165.2 KV to 161.0 KV. The 345 KV grid voltage is unaffected. What actions should the control room take?

- A. Restore 161 KV line to operable within 8 hours or be in Mode 3 within an additional 6 hours~~Continue the reactor power increase~~
- B. Restore 161 KV to operable within 24 hours or be in Mode 3 within an additional 6 hours~~Transfer Bus 1A3 and 1A4 to the Unit Aux Transformer, then continue the power increase~~
- C. Restore 161 KV line to operable within 48 hours or be in Mode 3 within an additional 12 hours~~Stop the load increase and hold power steady until the 161 KV voltage is restored~~
- D. Restore 161 KV line to operable within 72 hours or be in Mode 3 within an additional 12 hours

Proposed Answer: D

Explanation: Per AOP-31, if the 161 KV line voltage falls below 161.3 kV, the line is considered inoperable. The inoperability of the 161 KV incoming line renders both transformer T1A-3 and T1A-4 inoperable per Tech Spec 2.7(2)c. This requires restoring the 161 KV line to operable within 72 hours or be in Mode 3 within an additional 12 hours. The other answers are plausible because they are reasonable answers depending on the candidate's memory of the technical specifications.

Technical Reference(s): Tech Spec 2.7(2)c. AOP-31, "161 kV Grid Malfunctions" Rev.10

(Attach if not previously provided) _____
 (including version/revision number) _____

Proposed references to be provided to applicants during examination: _____

Learning Objective: _____ (As available)

Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X

Question History: Last NRC Exam _____
(Optional: Questions validated at the facility since 10/95 will generally undergo less rigorous review by the NRC; failure to provide the information will necessitate a detailed review of every question.)

Question Cognitive Level: Memory or Fundamental Knowledge _____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 (2)
55.43 _____

Comments:

[We have to do "D" but we could also do A, B or C in addition. We suggest all choices be tech spec LCOs \(see markup above\)](#)

Question # 82

Examination Outline Cross-Reference:	Level	RO	SRO
	Tier #	_____	<u>1</u>
	Group #	_____	<u>2</u>
	K/A #	_____	0003 <u>2.2.37</u>
	Importance Rating	_____	<u>4.6</u>

K/A Statement: (000003 Dropped Control Rod) 2.2.37 Ability to determine operability of safety related equipment.

Proposed Question:

According to Technical Specification 2.10.2, "Nontrippable CEA Position During Power Ops," which one of the following will require a plant shutdown if not corrected within one hour?make the non-trippable CEAs inoperable.

- A. It cannot be moved by its operator regardless of position
- B. It is not fully withdrawn
- C. It is misaligned from other NTCEAs by 9 inches
- D. It is misaligned from other NTCEAs by more than 12 inches

Proposed Answer: D

Changed answer from C to D, otherwise same question and answer.

Technical Reference(s): Tech Specs 2.10.2, Tech Spec Definitions
 (Attach if not previously provided) _____
 (including version/revision number) _____

Proposed references to be provided to applicants during examination: none

Learning Objective: 0712.25 _____ (As available)

Question Source: Bank # 07-12-25 007
 Modified Bank # _____ (Note changes or attach parent)
 New _____

Question History: Last NRC Exam NRC FCS 1999
 (Optional: Questions validated at the facility since 10/95 will generally undergo less rigorous review by the NRC; failure to provide the information will necessitate a detailed review of every question.)

Question Cognitive Level: Memory or Fundamental Knowledge X
 Comprehension or Analysis _____

10 CFR Part 55 Content: 55.41 _____
 55.43 (2)

| Comments: [TS does not mention operability for non-trippable CEAs](#)

Question # _91_

Examination Outline Cross-Reference:	Level	RO	SRO
	Tier #	_____	<u> 2 </u>
	Group #	_____	<u> 2 </u>
	K/A #		027 <u>2.2.25</u>
	Importance Rating	_____	<u> 4.2 </u>

K/A Statement: (027 Containment Iodine Removal) **Knowledge of the bases in Technical Specifications for LCO's and safety limits.**

Proposed Question:

According to the Technical Specifications (and their associated bases), what is required for iodine removal from the air in containment during the design basis Loss of Coolant Accident?

- A. One VA-7 cooling unit and one VA-3 cooler and filtering unit because sodium tetraborate only reduces particulate iodine.
- B. One VA-7 cooling unit and one VA-3 cooler and filtering unit because sodium tetraborate only reduces gaseous iodine.
- C. One containment spray pump and one VA-3 cooler and filtering unit because it contains a charcoal filter.
- D. One containment spray pump and one VA-7 cooling unit because it contains a HEPA filter.

Proposed Answer: B

Explanation:

Answer B is correct, One VA-7 cooling unit and one VA-3 cooler and filtering unit because sodium tetraborate only reduces gaseous iodine not particulate. [\(Need Reference\)](#)

Answer A is credible but not correct because the sodium tetraborate reduces the amount of iodine that becomes volatile from the RCS water in the sump by reducing [\(increasing?\)](#) the pH but can't reduce the particulate iodine. Answer C and D are not correct because the Containment Spray pumps are not credited in the TS bases for iodine removal due to sump clogging concerns (or at all for the LOCA DBA, only during the MSLB DBA are they required), although they would remove some iodine if started during the LOCA by scrubbing it from the air.

Technical Reference(s): TS 2.3 and 2.4 bases
 (Attach if not previously provided) _____
 (including version/revision number) _____

Proposed references to be provided to applicants during examination: None _____

Learning Objective: _____ (As available)

Question Source: Bank # _____
Modified Bank # _____ (Note changes or attach parent)
New X

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis _____

10 CFR Part 55 Content: 55.41 _____
55.43 2

Comments:

[The Technical Specification basis does not address gaseous vs particulate iodine. We need a better reference to differentiate between choices A and B](#)

Answer: on page 6 of TS 2.3 near the bottom it states that

“Hydrated Sodium tetraborate is required to adjust the pH of the recirc water to > 7.0 after a LOCA. This pH is necessary to prevent significant amounts of iodine, released from fuel failures and dissolved in the recirc water, from converting to a volatile form (ie gaseous iodine does this, not particulate,definition of volatile) and evolving into the containment atmosphere.

You are correct on the pH. It would be slightly acidic and therefore the NATB would increase or raise the pH.