

Draft Submittal

(Pink Paper)

NORTH ANNA 2006-302

RETAKES

- RO WRITTEN
- SRO ADMIN

DRAFT Written Exam Quality Checklist (ES-401-6)

& Written Exam Sample Plan

DRAFT

Comments on North Anna Administrative Walk-Through Exam.

Admin 1A 1-PT-23 QPTR Determination Review:

This JPM is a go/no-go with only one critical step. It should have a Key that will be kept with the exam material in ADAMS.

Admin 1B Calculate the maximum allowable reactor vessel Hydrogen venting time.

Need to change initiating cue to:

Perform step 22 of 1-FR-I.3 to determine.....

Admin 2 0-PT-80 AC Sources Operability Verification.

At step 6 have the applicant apply the appropriate T/S, and LCO entry.

Admin 3 Assess personnel exposure.

This JPM is a math problem and does not discriminate between a competent operator and a non-competent operator. Need to develop something more discriminating.

Admin 4 Event Classification. No discriminating value, no pars. Need something more discriminating.

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Admin 1B Calculate the maximum allowable reactor vessel Hydrogen venting time.

Need to change initiating cue to:

Perform step 22 of 1-FR-1.3 to determine. *How*

Admin 2 0-PT-80 AC Sources Operability Verification.

At step 6 have the applicant apply the appropriate T/S, and LCO entry.

Admin 3 Assess personnel exposure.

This JPM is a math problem and does not discriminate between a competent operator and a non-competent operator. Need to develop something more discriminating. *(added exp)*

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ES-401, Rev. 9 North Anna 2006-302 RO Written Examination Review Worksheet

Form ES-401-9

Q#	1. LOK (F/H)	2. LOD (1-5)	3. Psychometric Flaws					4. Job Content Flaws				5. Other		6. U/E/S	7. Explanation	
			Stem Focus	Cues	T/F	Cred. Dist.	Partial	Job- Link	Minutia	#/ units	Back- ward	Q= K/A	SRO Only			
<p style="text-align: center;">Instructions</p> <p style="text-align: center;">[Refer to Section D of ES-401 and Appendix B for additional information regarding each of the following concepts.]</p> <ol style="list-style-type: none"> 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: <ul style="list-style-type: none"> 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: <ul style="list-style-type: none"> 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. <u>Check questions that are sampled</u> for conformance with the approved K/A and those that are <i>designated SRO-only</i> (K/A and license level mismatches are unacceptable). 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). 																
1	H	2												S	002K3.03 Question appears to match K/A. BANK	

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Q#	1. LOK (F/H)	2. LOD (1-5)	3. Psychometric Flaws					4. Job Content Flaws				5. Other		6. U/E/S	7. Explanation
			Stem Focus	Cues	T/F	Cred. Dist.	Partial	Job- Link	Minutia	#/ units	Back- ward	Q= K/A	SRO Only		
2	F	2	X				X							U	003A1.03 Question appears to match K/A. All the distractors can be considered correct. Stem should read "Which ONE of the following describes the effect on RCP temperatures, and the action that is required to mitigate the event" or something similar. Also need to work on how to make the distractors incorrect. Need to rework question. NEW
3	H	2	X											U	003AA2.04 Question appears to match K/A. Will NI's actually reach these values? Does the plant have a positive or negative flux trip? If it does the reactor will trip before these conditions can be reached. Need to verify that the plant could actually get to these conditions with only one dropped rod. NEW.
4	F	2				X (2)								E	003K6.04 Question appears to match the K/A. Very simple What is the PDTT, is this a credible distractor. BANK
5	H	3												S	004K5.35 Question appears to match the K/A. SAT NEW
6	H	2												S	005K5.02 Kind of matches K/A, NPSH relates to subcooling. BANK

Q#	1. LOK (F/H)	2. LOD (1-5)	3. Psychometric Flaws					4. Job Content Flaws				5. Other		6. U/E/S	7. Explanation
			Stem Focus	Cues	T/F	Cred. Dist.	Partial	Job- Link	Minutia	#/ units	Back- ward	Q= K/A	SRO Only		
7	F	2												S	006K6.19 Question appears to match K/A. Question is actually at the fundamental level. If you took the conditions in the top of the stem and placed them in the Which ONE of the.....statement the question would be the same. SAT NEW .
8	H	2				X								E	007A3.01 Question appears to match the K/A. simple What is the PDTT, is this a credible distractor. BANK
9	F	2												S	007EA2.05 Question appears to match the K/A. Kind of simple, but matches K/A. SAT NEW
10	H	2				X (2)								U	007K3.01 Question appears to match K/A. What makes the distractors credible. Need to have some numbers that are variations of the psia/psig relationship. The correct answer is the only answer with a .something in it. Fix distractors to make others plausible. (the set point should be a distractor also. NEW
11	F	2				X (2)								U	008A4.07 Question appears to match K/A. If primary grade water is not able to be sent to the CC Surge tank then distractors A and B are not credible. (What is the back up source for makeup to the CC surge tank). NEW

Q#	1. LOK (F/H)	2. LOD (1-5)	3. Psychometric Flaws					4. Job Content Flaws				5. Other		6. U/E/S	7. Explanation
			Stem Focus	Cues	T/F	Cred. Dist.	Partial	Job- Link	Minutia	#/ units	Back- ward	Q= K/A	SRO Only		
12	H	2				X (2)								U	008AA1.02 Question appears to match K/A. Due to the way the stem is worded, distractors A and D are not credible. The stem states in accordance with ES-1.2 Continuous Action Page. Only two of these items are on the continuous action page. Need to reword stem to allow distractors A and D to become credible. NEW.
13	H	2				X								E	009EK3.27 Question appears to match K/A. Distractor D as written is not credible. The reason that is listed in the distractor analysis is much more credible. Use it. Otherwise question is SAT. (Minimize subcooling to maintain pressureizer level above the lower limit to allow pressurizer heater operation to reduce the rate of increase of pressurizer level) BANK
14	F	3												S	010K2.02 Question appears to match K/A. SAT NEW.
15	H	3				X (3)								U	012A2.07 Question appears to match K/A. Distractors need some work. Distractor A second part, to make this credible put some actions listed in ARP. What other annunciators would come in based on a DC power supply failure? Distractors need some work. BANK

Q#	1. LOK (F/H)	2. LOD (1-5)	3. Psychometric Flaws					4. Job Content Flaws				5. Other		6. U/E/S	7. Explanation
			Stem Focus	Cues	T/F	Cred. Dist.	Partial	Job- Link	Minutia	#/ units	Back- ward	Q= K/A	SRO Only		
16	H	2												S	012A3.05 Question appears to match K/A. SAT BANK
17	H	3												S	013A1.06 Question kind of matches K/A. SAT BANK
18	H	2				X (2)								E	014K5.02 Question appears to match K/A. Distractors C and D do not appear to be credible. Why would anyone think that the reactor would trip, and that only 2 group step counters would reset to zero. Work on C and D distractors.
19	H	2												S	015AA1.07 Question appears to match K/A. SAT. NEW
20	F	1										X		U	017K1.01 Question does not meet the K/A. The K/A is for the Core Exit Thermocouple system and the knowledge of the physical connections and or cause-effect relationships between the system and the plant computer. Needs to be written to match K/A. NEW
21	H	2												S	022K3.02 Question appears to match K/A. SAT BANK

Q#	1. LOK (F/H)	2. LOD (1-5)	3. Psychometric Flaws					4. Job Content Flaws				5. Other		6. U/E/S	7. Explanation
			Stem Focus	Cues	T/F	Cred. Dist.	Partial	Job- Link	Minutia	#/ units	Back- ward	Q= K/A	SRO Only		
22	H	2												E	022AK 3.05 Question appears to match K/A. How does a loss of power render the blender inoperable. Is this credible? Otherwise question appears to be sat. Is this based on procedure guidance? NEW .
23	H	2												E	025AA1.03 Question kind of matches K/A. Use of the word "Preferred" in the stem should be avoided because if it is preferred, it is not required. Maybe use IAW AP11. Otherwise SAT. NEW
24	F	2												S	026A4.01 Question appears to match K/A. SAT BANK
25	H	2												E	027AK2.03 Question appears to match K/A. An applicant could by knowing that one of the channels opens the sprays and a PORV could discount distractor A. Try something like this: (A) Initiate an open signal to both spray valves and 1455C (B) Initiate an open signal to both spray valves and 1456C (C) Initiate an open signal to 1455C ONLY (D) Initiate an open signal to 1456C ONLY

Q#	1. LOK (F/H)	2. LOD (1-5)	3. Psychometric Flaws					4. Job Content Flaws				5. Other		6. U/E/S	7. Explanation
			Stem Focus	Cues	T/F	Cred. Dist.	Partial	Job- Link	Minutia	#/ units	Back- ward	Q= K/A	SRO Only		
26	H	2												S	029A4.04 Question appears to match K/A. Fuel building is capitalized in A, and Containment is not in C. They should be the same. Pick one. Otherwise SAT. NEW
27	F	2	X			X								U	029EG2.2.22 Question kind of matches K/A. The knowledge of limiting conditions for operation as well as safety limits are not being tested. This is a good attempt. C and D have ATWS in the distractor and ATWS is stated in the stem which directs the applicant to either C or D. The applicant need only know that AMSAC trips the turbine. Needs some work. NEW The first A in AMSAC stands for ATWS. Page 33 of 49 Topic 7.1 Reactor Protection System lesson plan 77-A.
28	F	2												E	033K5.04 Question appears to match K/A. This is one way that SDM is being maintained there are other ways to prevent criticality such as fuel placement, boron spacers Boroflex panels , etc. NEW
29	H	2												S	034A4.02 Question appears to match K/A. SAT NEW

Q#	1. LOK (F/H)	2. LOD (1-5)	3. Psychometric Flaws					4. Job Content Flaws				5. Other		6. U/E/S	7. Explanation
			Stem Focus	Cues	T/F	Cred. Dist.	Partial	Job- Link	Minutia	#/ units	Back- ward	Q= K/A	SRO Only		
30	F	2										X		U	035K4.03 Question appears to match a portion of the K/A*, the reset of these signals is not tested. Can this be put into the question? NEW
31	F	2												E	036AA1.04 Question kind of matches K/A. The AP calls for a safe location. Need to make sure that the other locations are not "safe". Otherwise SAT. NEW
32	F	2												E	038EA2.16 Question matches K/A Not sure D is totally credible, might use open two PORVs. E-3 does not direct opening 2 PORVs so it would be plausible and wrong. NEW
33	H	2				X								U	039A2.05 Question appears to match K/A. Distractors C and D are not credible. Even if the the main turbine was in imp out reactor power will increase some what due to the inefficient dumping of steam straight to the condenser. Attempt to word question using Mwe to further differentiate right from wrong. NEW
34	F	2												E	039K1.04 Kind of matches K/A, no mention of RCS temperature although that is what is being controlled. Low level of discrimination. Look at using tave-tref and tave and t-no-load. BANK

Q#	1. LOK (F/H)	2. LOD (1-5)	3. Psychometric Flaws					4. Job Content Flaws				5. Other		6. U/E/S	7. Explanation
			Stem Focus	Cues	T/F	Cred. Dist.	Partial	Job- Link	Minutia	#/ units	Back- ward	Q= K/A	SRO Only		
35	H/F	2					X							U	045A2.12 Question matches K/A. Do rods have to be withdrawn in manual after the RCS boration? The AR states to manually withdraw control rods. If this is correct, manual needs to be in the distractors. This question could also be considered as memory for actions contained in the AR. NEW
36	H	2												E	056AK1.03 Question appears to match K/A. No value was determined from an incorrect use of RCS pressure (1865). This would make a good distractor along with Thot, and CETCs . Attempt to place a value based on this for one of the distractors. NEW
37	F	1					X							U	056G2.1.30 Question kind of matches K/A. If suction pressure decreases, so will discharge pressure, therefore D could be considered correct. This question is very simple, is there not something that is controlled locally like a start stop switch or breaker that could be operated on a control room evacuation or plant fire? BANK

Q#	1. LOK (F/H)	2. LOD (1-5)	3. Psychometric Flaws					4. Job Content Flaws				5. Other		6. U/E/S	7. Explanation
			Stem Focus	Cues	T/F	Cred. Dist.	Partial	Job- Link	Minutia	#/ units	Back- ward	Q= K/A	SRO Only		
38	H	2												S	057AA2.15 Question appears to match K/A. Kind of simple. NEW . (Could any of the associated control signals cause a reactor trip allowing B to be correct)?
39	F	2				X						X		U	058AK1.01 Question does not appears to match K/A. There is no loss of DC power. Distractor D does not appear to be credible. NEW Rated as a fundamental knowledge, This question could be asked by Just using the stem without the conditions. NEW
40	F	2			X									U	059K1.03 Question kind of matches K/A. This question is asking what does P-14 do? Maybe a reason why would help tie it to the K/A better. NEW This is a fundamental level question. If you took away the stem you could ask which one of the following is correct and the answer would be the same. NEW
41	H	2					X							E	059K3.02 Question appears to match K/A. Where does the FF to the SG get measured. If the leak was down steam of these flow measurement devices then the FF/SF mismatch would not be seen and no reactor trip will occur, and C would be the correct answer. NEW

Q#	1. LOK (F/H)	2. LOD (1-5)	3. Psychometric Flaws					4. Job Content Flaws				5. Other		6. U/E/S	7. Explanation
			Stem Focus	Cues	T/F	Cred. Dist.	Partial	Job- Link	Minutia	#/ units	Back- ward	Q= K/A	SRO Only		
42	F	2												E	061AK1.01 Question appears to match K/A. Very simple. Use a value higher than E-7 so that some knowledge is tested. (One could get this correct just by guessing the highest value listed must be correct. NEW
43	H	2												E	The sample plan has this K/A listed as 061K6.08 which has an importance factor of 2.1 for ROs. The question is actually written to 061K6.02 which has an importance factor of 2.6 for ROs. Does the turbine driven if it starts feed all three steam generators? Some assumptions need to be taken as written. Leave the K/A as is (061K6.02) and ensure that the correct answer is the only correct answer. NEW
44	H	2	X			X		X						U	062AG2.4.6 Question appears to match K/A. However, the step in E-0 states if less than 4 service water pumps are running then ensure Unit 2 operator initiates 0-AP-47. This is different than the correct answer in the question. Need to find a resolution. Maybe you sent me the incorrect reference. NEW
45	H	2												S	062K2.01 Question appears to match K/A SAT. BANK

Q#	1. LOK (F/H)	2. LOD (1-5)	3. Psychometric Flaws					4. Job Content Flaws				5. Other		6. U/E/S	7. Explanation
			Stem Focus	Cues	T/F	Cred. Dist.	Partial	Job- Link	Minutia	#/ units	Back- ward	Q= K/A	SRO Only		
46	H	2	X									X		U	063K2.01 Question does not really meet the K/A. The K/A asks for the knowledge of electrical power supplies to Major DC loads. By stating that DC power was loss to the 2J bus (I understand that control power could be considered a major DC load) but all the question requires is that the applicant know what comes off of 2J AC bus. Furthermore can you have a loss of DC power to only one bus. Can this be verified? This question requires some more work. BANK
47	H	2												S	064A3.01 Question appears to match K/A The distractor analysis states that D is the correct answer. Although the check is on B, and the explanation supports selection B. If B is the correct answer, then question appears to be SAT. NEW
48	H	2										X		U	065AG2.1.23 This question is based on a note at the beginning of AP-28, and with pressurizer level approaching this level the reactor should be tripped. I am not sure this meets the intent of the K/A. If any other scenario was taking place or if nothing else was taking place, this still would be the correct action to take. I believe the intent of the K/A is to show the ability to perform actions IAW a Loss of instrument air, not a loss of pressurizer level unless they are related. NEW

Q#	1. LOK (F/H)	2. LOD (1-5)	3. Psychometric Flaws					4. Job Content Flaws				5. Other		6. U/E/S	7. Explanation
			Stem Focus	Cues	T/F	Cred. Dist.	Partial	Job- Link	Minutia	#/ units	Back- ward	Q= K/A	SRO Only		
49	F	2										X		U	069AK1.01 Question does not really meet the K/A there is not a loss of containment integrity involved. In fact this is the design accident that the containment can survive and maintain integrity. Needs more work . Is Not NEW. BANK
50	F	2												S	073A1.01 Question appears to match K/A. Do the vacuum pumps trip due to the discharge valves going closed, or is it a direct trip? It may be better to pursue this. BANK.
51	H	2				X		X						U	076G2.1.2 Question appears to match K/A. Required action in accordance with ? D distractor does not appear to be credible. It would be more credible to commence a shutdown within one hour and be in cold shutdown in.... Do you expect ROs to know technical specifications of this nature. BANK
52	F	2												S*	076K1.17 *Assuming these pumps are from the Service Water system this question matches the K/A. If not we have more work to do. Otherwise SAT. NEW
53	F	2												S	078G2.1.28 Question appears to match K/A. Distractors A and C need to say automatically closes above 90 psig increasing instead of at. This is not credible. Otherwise SAT. NEW

Q#	1. LOK (F/H)	2. LOD (1-5)	3. Psychometric Flaws					4. Job Content Flaws				5. Other		6. U/E/S	7. Explanation
			Stem Focus	Cues	T/F	Cred. Dist.	Partial	Job- Link	Minutia	#/ units	Back- ward	Q= K/A	SRO Only		
54	F	2												S	078K4.01 Question appears to match K/A Very simple. NEW
55	F	2												S	086G2.1.28 Kind of matches K/A. SAT BANK
56	F	2												S	103K4.01 Question appears to match K/A. NEW
57	H	2												S	WE03EA2.1 Question appears to match K/A SAT BANK
58	F	2												S	WE04EK3.4 Question appears to match K/A. SAT BANK
59	H	2										X		U	WE05EK1.3 Does not really match K/A. There are annunciators in the stem but also a statement that all attempts to establish AFW were unsuccessful. So there are no remedial actions based on the annunciators. See if we can work on something to tie it to the K/A BANK .

Q#	1. LOK (F/H)	2. LOD (1-5)	3. Psychometric Flaws					4. Job Content Flaws				5. Other		6. U/E/S	7. Explanation
			Stem Focus	Cues	T/F	Cred. Dist.	Partial	Job- Link	Minutia	#/ units	Back- ward	Q= K/A	SRO Only		
60	H	2		X								X		U	<p>WE06EK3.1 Question does not really meet the K/A. The only tie to the degraded core cooling is that you discuss you are there in the stem. The injection of the accumulators at any time could cause the same problem. I understand that it is in a note at the beginning of the procedure, but the applicant is not figuring out that he has degraded core conditions, you are telling him that he does.</p> <p>Also teaching in the distractors, you list four of the six CSFs. This question needs some work.</p> <p>BANK</p>
61	H	2												E	<p>WE09EA1.3 Question appears to match K/A. Distractor C is not credible, Why would you attempt to block low pressure SI prior to going below 2000 psig? Cooldown continues throughout the procedure until the unit is on RHR. BANK</p>
62	H	2												S	<p>WE10EK2.2 Question appears to match K/A. SAT BANK</p>

Q#	1. LOK (F/H)	2. LOD (1-5)	3. Psychometric Flaws					4. Job Content Flaws				5. Other		6. U/E/S	7. Explanation
			Stem Focus	Cues	T/F	Cred. Dist.	Partial	Job- Link	Minutia	#/ units	Back- ward	Q= K/A	SRO Only		
63	H	2												U	WE11EK2.1 Question appears to match K/A. How does one verify that NO back flow is occurring from the RWST to the CTMT sump? Distractors A and B do not mention quench spray pumps. But Distractors C and D state to secure all pumps. So with only two pumps listed in A and B why would you pick them. Not Credible. Verifying no back flow is not credible unless you can come up with a way this is accomplished. BANK
64	H	2												E	WE12EK2.1 Question appears to match K/A. Not enough procedures steps included in material to verify that this is the correct actions IAW your procedures. Provide more info. BANK
65	H	2												S	WE15EG2.1.23 Question appears to match K/A. SAT NEW .
66	F	2												E	G2.1.1 Kind of matches K/A, better matches 2.1.29. Under what K/A did this question appear on the 2004 North Anna Exam? Wait on determination until this is researched. BANK
67	F	2												S	G2.1.22 Question appears to match K/A. SAT MOD

Q#	1. LOK (F/H)	2. LOD (1-5)	3. Psychometric Flaws					4. Job Content Flaws				5. Other		6. U/E/S	7. Explanation
			Stem Focus	Cues	T/F	Cred. Dist.	Partial	Job- Link	Minutia	#/ units	Back- ward	Q= K/A	SRO Only		
68	F	1												U	G2.1.3 Question Matches K/A. But has little discriminatory value. What is included in a short-term relief? Distractor D is not credible BANK
69	F	2												S	G2.2.11 Question appears to match K/A SAT NEW
70	F	2												S	G2.2.24 Question appears to match K/A. SAT NEW . Question is at the Fundamental level.
71	F	2				X								E	2.2.4 Question appears to match K/A. Very Simple BANK Explain plausibility of B and D.
72	F	2									X			E	G2.3.2 Question appears to match K/A. This is a NOT question and should be avoided. BANK
73	F	2												E	G2.3.9 Question appears to match K/A. There is no documentation to prove that 100A or 101 cannot be used. Is there any documentation, or do we need to say IAW 1-OP-21.2 after containment? NEW
74	H	2												E	G2.4.14 Question Kind of matches K/A. Distractor D is not credible. BANK

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			Stem Focus	Cues	T/F	Cred. Dist.	Partial	Job- Link	Minutia	#/ units	Back- ward	Q= K/A	SRO Only		
75	F	2						X						E	G2.4.43 Question appears to match K/A. Is the notification time normally the job of the RO? Otherwise SAT. NEW

General Comment; the material included for support of the correct answer was usually satisfactory. The information on why a distractor was credible on not credible was not. For example the PDTT was used several times but no information was given as to what drains to it, its location, and what makes it a credible distractor.

23 Unsats 23 enhancements 29 satisfactory = 75 total RO questions.
Several questions off of 2004 exam
8 questions that do not match the K/A.

DRAFT

ES-401**Written Examination Quality Checklist****Form ES-401-6**

Facility: <u>North Anna</u>		Date of Exam: <u>11/14/06</u>		Exam Level: RO <input checked="" type="checkbox"/> SRO <input type="checkbox"/>	
Item Description	Initial				
	a	b*	c*		
1. Questions and answers are technically accurate and applicable to the facility.	SC	US			
2. a. NRC K/As are referenced for all questions. b. Facility learning objectives are referenced as available.	SC	US			
3. SRO questions are appropriate in accordance with Section D.2.d of ES-401	SC ^{NA}	NA ^{US}			
4. The sampling process was random and systematic (If more than 4 RO or 2 SRO questions were repeated from the last 2 NRC licensing exams, consult the NRR OL program office).					
5. Question duplication from the license screening/audit exam was controlled as indicated below (check the item that applies) and appears appropriate: ① <input checked="" type="checkbox"/> the audit exam was systematically and randomly developed; or ___ the audit exam was completed before the license exam was started; or ___ the examinations were developed independently; or ___ the licensee certifies that there is no duplication; or ___ other (explain) <u>② For outline; test to be developed</u>	SC	US			
6. Bank use meets limits (no more than 75 percent from the bank, at least 10 percent new, and the rest new or modified); enter the actual RO / SRO-only question distribution(s) at right.	Bank <u>NA 100% NA</u>	Modified <u>1.3% 1 NA</u>	New <u>54.7% NA</u>	SC	US
7. Between 50 and 60 percent of the questions on the RO exam are written at the comprehension/ analysis level; the SRO exam may exceed 60 percent if the randomly selected K/As support the higher cognitive levels; enter the actual RO / SRO question distribution(s) at right.	Memory <u>NA 100% 1 NA</u>	C/A <u>600% 1 NA</u>		SC	US
8. References/handouts provided do not give away answers or aid in the elimination of distractors.	SC	US			
9. Question content conforms with specific K/A statements in the previously approved examination outline and is appropriate for the tier to which they are assigned; deviations are justified.	SC	US			
10. Question psychometric quality and format meet the guidelines in ES Appendix B.	SC	US			
11. The exam contains the required number of one-point, multiple choice items; the total is correct and agrees with the value on the cover sheet.	SC	US			
a. Author b. Facility Reviewer (*) c. NRC Chief Examiner (#) d. NRC Regional Supervisor		Printed Name / Signature <u>Steve Crawford</u> <u>Steve Crawford</u> <u>Walt Shura</u> <u>Walt Shura</u>		Date <u>9/28/06</u> <u>9/28/06</u>	
Note: * The facility reviewer's initials/signature are not applicable for NRC-developed examinations. # Independent NRC reviewer initial items in Column "c"; chief examiner concurrence required.					

DRAFT

Facility: North Anna														Date of Exam				
Tier	Group	RO K/A Category Points												SRO-Only Points				
		K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G*	Total	K	A	A2	G*	Total
1. Emergency & Abnormal Plant Evolution:	1	3	3	3				3	3			3	18					
	2	2	1	1				2	2			1	9					
	Tier Totals	5	4	4				5	5			4	27					
2. Plant Systems	1	3	3	3	2	2	3	3	2	3	2	2	28					
	2	1	0	1	2	1	0	0	1	0	2	2	10					
	Tier Totals	4	3	4	4	3	3	3	3	3	4	4	38					
3. Generic Knowledge and Abilities Category					1	2	3	4						1	2	3	4	
					3	3	2	2					10					

1. Ensure that at least two topics from every K/A category are sampled within each tier of the RO outline (i.e., the "Tier Totals" in each K/A category shall not be less than two). Refer to Section D.1.c for additional guidance regarding SRO sampling.

2. The point total for each group and tier in the proposed outline must match that specified in the table. The final point total for each group and tier may deviate by ± 1 from that specified in the table based on NRC revisions. The final RO exam must total 75 points and the SRO-only exam must total 25 points.

3. Select topics from many systems and evolutions; avoid selecting more than two K/A topics from a given system or evolution unless they relate to plant-specific priorities.

4. Systems/evolutions within each group are identified on the associated outline.

5. The shaded areas are not applicable to the category/tier.

6.* The generic (G) K/As in Tiers 1 and 2 shall be selected from Section 2 of the K/A Catalog, but the topics must be relevant to the applicable evolution or system. The SRO K/As must also be linked to 10 CFR 55.43 or an SRO-level learning objective.

7. On the following pages, enter the K/A numbers, a brief description of each topic, the topics' importance ratings (IR) for the applicable license level, and the point totals for each system and category. Enter the group and tier totals for each category in the table above; summarize all the SRO-only knowledge and non-A2 ability categories in the columns labeled "K" and "A". Use duplicate pages for RO and SRO-only exams.

8. For Tier 3, enter the K/A numbers, descriptions, importance ratings, and point totals on Form ES-401-3.

9. Refer to ES-401, Attachment 2, for guidance regarding the elimination of inappropriate K/A

Tier 1 Group 1

ame/Safety Function	K1	K2	K3	A1	A2	G	KA	Question Type	K/A Topic(s)	RO	SRO
Reactor Trip - Stabilization - Recovery / 1	0	0	0	0	1	0	007EA2.05	Ability to determine and interpret the following as they apply to (EMERGENCY PLANT EVOLUTION):(CFR: 41.10 / 43.5 / 45.13)	Reactor trip first-out indication	3.4	3.9
Pressurizer Vapor Space Accident / 3	0	0	0	1	0	0	008AA1.02	Ability to operate and / or monitor the following as they apply to (ABNORMAL PLANT EVOLUTION):(CFR: 41.7 / 45.5 / 45.6)	HPI pump to control PZR level/pressure	4.1	3.9
Small Break LOCA / 3	0	0	1	0	0	0	009EK3.27	Knowledge of the reasons for the following responses as they apply to (EMERGENCY PLANT EVOLUTION):(CFR: 41.5 / 41.10 / 45.6 / 45.13)	Manual depressurization or HPI recirculation for sustained high pressure	3.6	3.8
Large Break LOCA / 3	0	0	0	0	0	0	011EK2.02	Knowledge of the interrelations between (EMERGENCY PLANT EVOLUTION) and the following:(CFR: 41.7 / 45.7 / 45.8)	K/A Randomly Rejected	2.6	2.7
RCP Malfunctions / 4	0	0	0	1	0	0	015AA1.07	Ability to operate and / or monitor the following as they apply to (ABNORMAL PLANT EVOLUTION):(CFR: 41.7 / 45.5 / 45.6)	RCP seal water injection subsystem	3.5	3.4
Loss of Rx Coolant Makeup / 2	0	0	1	0	0	0	022AK3.05	Knowledge of the reasons for the following responses as they apply to (ABNORMAL PLANT EVOLUTION):(CFR: 41.5 / 41.10 / 45.6 / 45.13)	Need to avoid plant transients	3.2	3.4
Loss of RHR System /	0	0	0	1	0	0	025AA1.19	Ability to operate and / or monitor the following as they apply to (ABNORMAL PLANT EVOLUTION):(CFR: 41.7 / 45.5 / 45.6)	Block orifice bypass valve controller and indicators	2.6	2.4

Tier 1 Group 1

Time/Safety Function	K1	K2	K3	A1	A2	G	KA	Question Type	K/A Topic(s)	RO	SRO
Loss of Component Cooling Water / 8	0	0	0	0	0	0	026AK2	Knowledge of the interrelations between (ABNORMAL PLANT EVOLUTION) and the following:(CFR: 41.7 / 45.7 / 45.8)	K/A Randomly Rejected	0	0
Pressurizer Pressure Control System malfunction / 3	0	1	0	0	0	0	027AK2.03	Knowledge of the interrelations between (ABNORMAL PLANT EVOLUTION) and the following:(CFR: 41.7 / 45.7 / 45.8)	Controllers and positioners	2.6	2.8
TWS / 1	0	0	0	0	0	1	029EG2.2.22	This is a Generic, no stem statement is associated.	Knowledge of limiting conditions for operations and safety limits.	3.4	4.1
Steam Gen. Tube Rupture / 3	0	0	0	0	1	0	038EA2.16	Ability to determine and interpret the following as they apply to (EMERGENCY PLANT EVOLUTION):(CFR: 41.10 / 43.5 / 45.13)	Actions to be taken if S/G goes solid and water enters steam line	4.2	4.6
Steam Line Rupture - Excessive Heat Transfer / 4	0	0	0	0	0	0	040AK2.02	Knowledge of the interrelations between (ABNORMAL PLANT EVOLUTION) and the following:(CFR: 41.7 / 45.7 / 45.8)	K/A Randomly Rejected	2.6	2.6
Loss of Main Feedwater / 4	0	0	0	0	0	0	054AA1.01	Ability to operate and / or monitor the following as they apply to (ABNORMAL PLANT EVOLUTION):(CFR: 41.7 / 45.5 / 45.6)	K/A Randomly Rejected	4.5	4.4
Station Blackout / 6	0	0	0	0	0	0	055EG2.1.27	This is a Generic, no stem statement is associated.	K/A Randomly Rejected	2.8	2.9
Loss of Off-site Power /	1	0	0	0	0	0	056AK1.03	Knowledge of the operational implications of the following concepts as they apply to the (ABNORMAL PLANT EVOLUTION):(CFR: 41.8 to 41.10 / 45.3)	Definition of subcooling: use of steam tables to determine it	3.1	3.4

Tier 1 Group 1

Time/Safety Function	K1	K2	K3	A1	A2	G	KA	Question Type	K/A Topic(s)	RO	SRO
Loss of Vital AC Inst. / 6	0	0	0	0	1	0	057AA2.02	Ability to determine and interpret the following as they apply to ABNORMAL PLANT EVOLUTION):(CFR: 41.10 / 43.5 / 45.13)	Core flood tank pressure and level indicators	3.7	3.8
Loss of DC Power / 6	1	0	0	0	0	0	058AK1.01	Knowledge of the operational implications of the following concepts as they apply to the (ABNORMAL PLANT EVOLUTION):(CFR: 41.8 to 41.10 / 45.3)	Battery charger equipment and instrumentation	2.8	3.1
Loss of Nuclear Svc / later / 4	0	0	0	0	0	1	062AG2.4.6	This is a Generic, no stem statement is associated.	Knowledge symptom based EOP mitigation strategies.	3.1	4
Loss of Instrument Air /	0	0	0	0	0	1	065AG2.1.23	This is a Generic, no stem statement is associated.	Ability to perform specific system and integrated plant procedures during all modes of plant operation.	3.9	4
OCA Outside Containment / 3	0	0	1	0	0	0	WE04EK3.4	Knowledge of the reasons for the following responses as they apply to (EMERGENCY PLANT EVOLUTION):(CFR: 41.5 / 41.10 / 45.6 / 45.13)	RO or SRO function within the control room team as appropriate to the assigned position, in such a way that procedures are adhered to and the limitations in the facilities license and amendments are not violated.	3.6	3.8
Loss of Emergency Coolant Recirc. / 4	0	1	0	0	0	0	WE11EK2.1	Knowledge of the interrelations between (EMERGENCY PLANT EVOLUTION) and the following:(CFR: 41.7 / 45.7 / 45.8)	Components and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes and automatic and manual features.	3.6	3.9
Steam Line Rupture - Excessive Heat Transfer / 4	0	1	0	0	0	0	WE12EK2.1	Knowledge of the interrelations between (EMERGENCY PLANT EVOLUTION) and the following:(CFR: 41.7 / 45.7 / 45.8)	Components and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes and automatic and manual features.	3.4	3.7

Tier 1 Group 1

ame/Safety Function	K1	K2	K3	A1	A2	G	KA	Question Type	K/A Topic(s)	RO	SRO
adequate Heat ransfer - Loss of econdary Heat Sink /	1	0	0	0	0	0	WE05EK1.3	Knowledge of the operational implications of the following concepts as they apply to the EMERGENCY PLANT EVOLUTION):(CFR: 41.8 to 41.10 / 45.3)	Annunciators and conditions indicating signals, and remedial actions associated with the (Loss of Secondary Heat Sink).	3.9	4.1

Tier 1 Group 2

ame / Safety Function	K1	K2	K3	A1	A2	G	KA	Question Type	K/A Topic(s)	RO	SRO
Continuous Rod Withdr	0	0	0	0	0	0	001AA1.06	Ability to operate and / or monitor the following as they apply to (ABNORMAL PLANT EVOLUTION):(CFR: 41.7 / 45.5 / 45.6)	K/A Randomly Rejected	3	2.9
Dropped Control Rod /	0	0	0	0	1	0	003AA2.04	Ability to determine and interpret the following as they apply to ABNORMAL PLANT EVOLUTION):(CFR: 41.10 / 43.5 / 45.13)	Rod motion stops due to dropped rod	3.4	3.6
Inoperable/Stuck Contr	0	0	0	0	0	0	005AA2.01	Ability to determine and interpret the following as they apply to ABNORMAL PLANT EVOLUTION):(CFR: 41.10 / 43.5 / 45.13)	K/A Randomly Rejected	3.3	4.1
Emergency Boration / 1	0	0	0	0	0	0	024AK1.02	Knowledge of the operational implications of the following concepts as they apply to the (ABNORMAL PLANT EVOLUTION):(CFR: 41.8 to 41.10 / 45.3)	K/A Randomly Rejected	3.6	3.9
Pressurizer Level Malfu	0	0	0	0	0	0	028AK1.01	Knowledge of the operational implications of the following concepts as they apply to the (ABNORMAL PLANT EVOLUTION):(CFR: 41.8 to 41.10 / 45.3)	K/A Randomly Rejected	2.8	3.1
Loss of Source Range I	0	0	0	0	0	0	032AK2.01	Knowledge of the interrelations between (ABNORMAL PLANT EVOLUTION) and the following:(CFR: 41.7 / 45.7 / 45.8)	K/A Randomly Rejected	2.7	3.1
Loss of Intermediate R	0	0	0	0	0	0	033AK1.01	Knowledge of the operational implications of the following concepts as they apply to the (ABNORMAL PLANT EVOLUTION):(CFR: 41.8 to 41.10 / 45.3)	K/A Randomly Rejected	2.7	3
Nuclear Fuel Handling Accident	0	0	0	1	0	0	036AA1.03	Ability to operate and / or monitor the following as they apply to (ABNORMAL	Reactor building containment evacuation alarm enable switch	3.5	3.9

Tier 1 Group 2

ame / Safety Function	K1	K2	K3	A1	A2	G	KA	Question Type	K/A Topic(s)	RO	SRO
								PLANT EVOLUTION):(CFR: 41.7 / 45.5 / 45.6)			
eam Generator Tube	0	0	0	0	0	0	037AA2.01	Ability to determine and interpret the following as they apply to ABNORMAL PLANT EVOLUTION):(CFR: 41.10 / 43.5 / 45.13)	K/A Randomly Rejected	3	3.4
oss of Condenser Vac	0	0	0	0	0	0	051AA2.02	Ability to determine and interpret the following as they apply to ABNORMAL PLANT EVOLUTION):(CFR: 41.10 / 43.5 / 45.13)	K/A Randomly Rejected	3.9	4.1
ccidental Liquid RadV	0	0	0	0	0	0	059AK3.03	Knowledge of the reasons for the following responses as they apply to (ABNORMAL PLANT EVOLUTION):(CFR: 41.5 / 41.10 / 45.6 / 45.13)	K/A Randomly Rejected	3	3.7
ccidental Gaseous Ra	0	0	0	0	0	0	060AK1.04	Knowledge of the operational implications of the following concepts as they apply to the (ABNORMAL PLANT EVOLUTION):(CFR: 41.8 to 41.10 / 45.3)	K/A Randomly Rejected	2.5	3.7
RM System Alarms / 7	1	0	0	0	0	0	061AK1.01	Knowledge of the operational implications of the following concepts as they apply to the (ABNORMAL PLANT EVOLUTION):(CFR: 41.8 to 41.10 / 45.3)	Detector limitations	2.5	2.9
lant Fire On-site / 9 8	0	0	0	0	0	0	067AK3.04	Knowledge of the reasons for the following responses as they apply to (ABNORMAL PLANT EVOLUTION):(CFR: 41.5 / 41.10 / 45.6 / 45.13)	K/A Randomly Rejected	3.3	4.1
ontrol Room Evac. / 8	0	0	0	0	0	0	068AK1	Knowledge of the operational implications of the following concepts as they apply to the (ABNORMAL PLANT EVOLUTION):(CFR:	K/A Randomly Rejected	0	0

Tier 1 Group 2

ame / Safety Function	K1	K2	K3	A1	A2	G	KA	Question Type	K/A Topic(s)	RO	SRO
								41.8 to 41.10 / 45.3)			
Loss of CTMT Integrity	1	0	0	0	0	0	069AK1.01	Knowledge of the operational implications of the following concepts as they apply to the (ABNORMAL PLANT EVOLUTION):(CFR: 41.8 to 41.10 / 45.3)	Effect of pressure on leak rate	2.6	3.1
Rad. Core Cooling / 4	0	0	0	0	0	0	074EK3.10	Knowledge of the reasons for the following responses as they apply to (EMERGENCY PLANT EVOLUTION):(CFR: 41.5 / 41.10 / 45.6 / 45.13)	K/A Randomly Rejected	3.5	3.8
High Reactor Coolant A	0	0	0	0	0	0	076AA1.04	Ability to operate and / or monitor the following as they apply to (ABNORMAL PLANT EVOLUTION):(CFR: 41.7 / 45.5 / 45.6)	K/A Randomly Rejected	3.2	3.4
Rediagnosis / 3	0	0	0	0	0	0	WE01EG2.2.22	This is a Generic, no stem statement is associated.	K/A Randomly Rejected	3.4	4.1
Steam Generator Over-	0	0	0	0	0	0	WE13EK2.1	Knowledge of the interrelations between (EMERGENCY PLANT EVOLUTION) and the following:(CFR: 41.7 / 45.7 / 45.8)	K/A Randomly Rejected	3.0	3.1
Containment Flooding /	0	0	0	0	0	1	WE15EG2.1.33	This is a Generic, no stem statement is associated.	Ability to recognize indications for system operating parameters which are entry-level conditions for technical specifications.	3.4	4
High Containment Radi	0	0	0	0	0	0	WE16EA2.2	Ability to determine and interpret the following as they apply to (EMERGENCY PLANT EVOLUTION):(CFR: 41.10 / 43.5 / 45.13)	K/A Randomly Rejected	3.0	3.3
Termination / 3	0	0	0	0	0	0	WE02EK2.1	Knowledge of the interrelations between	K/A Randomly Rejected	3.4	3.9

Tier 1 Group 2

ame / Safety Function	K1	K2	K3	A1	A2	G	KA	Question Type	K/A Topic(s)	RO	SRO
								(EMERGENCY PLANT EVOLUTION) and the following:(CFR: 41.7 / 45.7 / 45.8)			
DCA Cooldown - Depi	0	0	0	0	1	0	WE03EA2.1	Ability to determine and interpret the following as they apply to (EMERGENCY PLANT EVOLUTION):(CFR: 41.10 / 43.5 / 45.13)	Facility conditions and selection of appropriate procedures during abnormal and emergency operations.	3.4	4.2
atural Circ. / 4	0	0	0	1	0	0	WE09EA1.3	Ability to operate and / or monitor the following as they apply to (EMERGENCY PLANT EVOLUTION):(CFR: 41.7 / 45.5 / 45.6)	Desired operating results during abnormal and emergency situations.	3.5	3.8
atural Circ. With Sean	0	1	0	0	0	0	WE10EK2.2	Knowledge of the interrelations between (EMERGENCY PLANT EVOLUTION) and the following:(CFR: 41.7 / 45.7 / 45.8)	Facility's heat removal systems, including primary coolant, emergency coolant, the decay heat removal systems and relations between the proper operation of these systems to the operation of the facility.	3.6	3.9
CS Overcooling - PTS	0	0	0	0	0	0	WE08EG2.1.3	This is a Generic, no stem statement is associated.	K/A Randomly Rejected	3.4	3.8
egraded Core Cooling	0	0	1	0	0	0	WE06EK3.1	Knowledge of the reasons for the following responses as they apply to (EMERGENCY PLANT EVOLUTION):(CFR: 41.5 / 41.10 / 45.6 / 45.13)	Facility operating characteristics during transient conditions, including coolant chemistry and the effects of temperature, pressure and reactivity changes and operating limitations and reasons for these operating characteristics.	3.4	3.8
aturated Core Cooling	0	0	0	0	0	0	WE07EG2.4.4	This is a Generic, no stem statement is associated.	K/A Randomly Rejected	4	4
oss of CTMT Integrity.	0	0	0	0	0	0	WE14EG2.4.4	This is a Generic, no stem statement is associated.	K/A Randomly Rejected	4	4

Tier 2 Group 1

me / Safety Function	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	Question Type	K/A Topic(s)	KA	RO	SRO
Reactor Coolant Pump	0	0	0	0	0	1	0	0	0	0	0	Knowledge of the effect that a loss or malfunction of the following will have on the (SYSTEM):(CFR: 41.7 / 45.7)	Containment isolation valves affecting RCP operation	003K6.04	2.8	3.1
Chemical and Volume Control	0	0	0	0	1	0	0	0	0	0	0	Knowledge of the operational implications of the following concepts as they apply to the (SYSTEM):(CFR: 41.5 / 45.7)	Types and effects of radiation, dosimetry and shielding-time-distance	004K5.17	2.6	3.1
Residual Heat Removal	0	0	0	0	1	0	0	0	0	0	0	Knowledge of the operational implications of the following concepts as they apply to the (SYSTEM):(CFR: 41.5 / 45.7)	Need for adequate subcooling	005K5.02	3.4	3.5
Emergency Core Cooling	0	0	0	0	0	1	0	0	0	0	0	Knowledge of the effect that a loss or malfunction of the following will have on the (SYSTEM):(CFR: 41.7 / 45.7)	HPI/LPI systems (mode change)	006K6.19	3.7	3.9
Pressurizer Relief/Quench Tank	0	0	0	0	0	0	0	0	1	0	0	Ability to monitor automatic operations of the (SYSTEM) including:(CFR: 41.7 / 45.5)	Components which discharge to the PRT	007A3.01	2.7	2.9
Component Cooling Water	0	0	0	0	0	0	0	0	0	1	0	Ability to manually operate and/or monitor in the control room:(CFR: 41.7 / 45.5 to 45.8)	Control of minimum level in the CCWS surge tank	008A4.07	2.9	2.9
Pressurizer Pressure Control	0	1	0	0	0	0	0	0	0	0	0	Knowledge of electrical power supplies to the following:(CFR: 41.7)	Controller for PZR spray valve	010K2.02	2.5	2.7
Reactor Protection	0	0	0	0	0	0	0	0	1	0	0	Ability to monitor automatic operations of the (SYSTEM) including:(CFR: 41.7 / 45.5)	Single and multiple channel trip indicators	012A3.05	3.6	3.7
Engineered Safety	0	0	0	0	0	0	1	0	0	0	0	Ability to predict and/or monitor changes	RWST level	013A1.06	3.6	3.9

Tier 2 Group 1

me / Safety Function	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	Question Type	K/A Topic(s)	KA	RO	SRO
atures Actuation												In parameters associated with operating the (SYSTEM) controls including:(CFR: 41.5 / 45.5)				
ontainment ooling	0	0	1	0	0	0	0	0	0	0	0	Knowledge of the effect that a loss or malfunction of the (SYSTEM) will have on the following:(CFR: 41.7 / 45.6)	Containment instrumentation readings	022K3.02	3.0	3.3
e Condenser	0	0	0	0	0	0	0	0	0	0	0		K/A Rejected	025A2.04	0	0
ontainment Spray	0	0	0	0	0	0	0	0	0	1	0	Ability to manually operate and/or monitor in the control room:(CFR: 41.7 / 45.5 to 45.8)	CSS controls	026A4.01	4.5	4.3
ain and Reheat eam	0	0	0	0	0	0	0	1	0	0	0	Ability to (a) predict the impacts of the following on the (SYSTEM) and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal operation:(CFR: 41.5 / 43.5 / 45.3 / 45.13)	Increasing steam demand, its relationship to increases in reactor power	039A2.05	3.3	3.6
ain Feedwater	1	0	0	0	0	0	0	0	0	0	0	Knowledge of the physical connections and/or cause-effect relationships between (SYSTEM) and the following:(CFR: 41.2 to 41.9 / 45.7 to 45.8)	S/GS	059K1.03	3.1	3.3
uxiliary/Emergency eedwater	0	0	0	0	0	1	0	0	0	0	0	Knowledge of the effect that a loss or malfunction of the following will have on the (SYSTEM):(CFR: 41.7 / 45.7)	Pumps	061K6.08	2.6	2.7
Electrical istribution	0	1	0	0	0	0	0	0	0	0	0	Knowledge of electrical power supplies to the following:(CFR: 41.7)	Major system loads	062K2.01	3.3	3.4

Tier 2 Group 1

me / Safety Function	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	Question Type	K/A Topic(s)	KA	RO	SRO
C Electrical Distribution	0	1	0	0	0	0	0	0	0	0	0	Knowledge of electrical power supplies to the following:(CFR: 41.7)	Major DC loads	063K2.01	2.9	3.1
Emergency Diesel Generator	0	0	0	0	0	0	0	0	1	0	0	Ability to monitor automatic operations of the (SYSTEM) including:(CFR: 41.7 / 45.5)	Automatic start of compressor and ED/G	064A3.01	4.1	4.0
Process Radiation Monitoring	0	0	0	0	0	0	1	0	0	0	0	Ability to predict and/or monitor changes in parameters associated with operating the (SYSTEM) controls including:(CFR: 41.5 / 45.5)	Radiation levels	073A1.01	3.2	3.5
Service Water	0	0	0	0	0	0	0	0	0	0	1	This is a Generic, no stem statement is associated.	Knowledge of operator responsibilities during all modes of plant operation.	076GG2.1.2	3.0	4.0
Instrument Air	0	0	0	0	0	0	0	0	0	0	1	This is a Generic, no stem statement is associated.	Knowledge of the purpose and function of major system components and controls.	078GG2.1.28	3.2	3.3
Containment	0	0	0	1	0	0	0	0	0	0	0	Knowledge of (SYSTEM) design feature(s) and or interlock(s) which provide for the following:(CFR: 41.7)	Vacuum breaker protection	103K4.01	3.0	3.7
Reactor Protection	0	0	0	0	0	0	0	1	0	0	0	Ability to (a) predict the impacts of the following on the (SYSTEM) and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal operation:(CFR: 41.5 / 43.5 / 45.3 / 45.13)	Incorrect channel bypassing	012A2.03	3.4	3.7
Pressurizer Relief/Quench Tank	0	0	1	0	0	0	0	0	0	0	0	Knowledge of the effect that a loss or malfunction of the (SYSTEM) will have on the following:(CFR: 41.7 / 45.6)	Containment	007K3.01	3.3	3.6

Tier 2 Group 1

Item / Safety Function	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	Question Type	K/A Topic(s)	KA	RO	SRO
Service Water	1	0	0	0	0	0	0	0	0	0	0	Knowledge of the physical connections and/or cause-effect relationships between (SYSTEM) and the following:(CFR: 41.2 to 41.9 / 45.7 to 45.8)	PRMS	076K1.17	3.6	2.7
Main and Reheat Steam	1	0	0	0	0	0	0	0	0	0	0	Knowledge of the physical connections and/or cause-effect relationships between (SYSTEM) and the following:(CFR: 41.2 to 41.9 / 45.7 to 45.8)	RCS temperature monitoring and control	039K1.04	3.1	3.1
Main Feedwater	0	0	1	0	0	0	0	0	0	0	0	Knowledge of the effect that a loss or malfunction of the (SYSTEM) will have on the following:(CFR: 41.7 / 45.6)	AFW system	059K3.02	3.6	3.7
Reactor Coolant Pump	0	0	0	0	0	0	1	0	0	0	0	Ability to predict and/or monitor changes in parameters associated with operating the (SYSTEM) controls including:(CFR: 41.5 / 45.5)	RCP motor stator winding temperatures	003A1.03	2.6	2.6
Pressurizer Relief/Quench Tank	0	0	0	0	0	0	0	0	0	0	0		K/A Rejected	007K4.01	0	0
Instrument Air	0	0	0	1	0	0	0	0	0	0	0	Knowledge of (SYSTEM) design feature(s) and or interlock(s) which provide for the following:(CFR: 41.7)	Manual/automatic transfers of control	078K4.01	2.7	2.9

Tier 2 Group 2

me / Safety Function	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	Question Type	K/A Topic(s)	KA	RO	SRO
hydrogen recombiner and Surge Control	0	0	0	0	0	0	0	0	0	0	0	This is a Generic, no stem statement is associated.	K/A Randomly Rejected	028GG2.4.50	3.3	3.3
Containment Purge	0	0	0	0	0	0	0	0	0	0	1	Ability to manually operate and/or monitor in the control room:(CFR: 41.7 / 45.5 to 45.8)	Containment evacuation signal	029A4.04	3.5	3.6
Spent Fuel Pool Cooling	0	0	0	1	0	0	0	0	0	0	0	Knowledge of (SYSTEM) design feature(s) and or interlock(s) which provide for the following:(CFR: 41.7)	Adequate SDM (boron concentration)	033K4.05	3.1	3.3
Reactor Handling Equipment	0	0	0	0	0	0	0	0	0	0	1	Ability to manually operate and/or monitor in the control room:(CFR: 41.7 / 45.5 to 45.8)	Neutron levels	034A4.02	3.5	3.9
Steam Generator	0	0	0	1	0	0	0	0	0	0	0	Knowledge of (SYSTEM) design feature(s) and or interlock(s) which provide for the following:(CFR: 41.7)	Automatic blowdown and sample line isolation and reset	035K4.03	2.6	2.8
Steam Pump/Turbine Bypass Control	0	0	0	0	0	0	0	0	0	0	0	Ability to (a) predict the impacts of the following on the (SYSTEM) and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal operation:(CFR: 41.5 / 43.5 / 45.3 / 45.13)	K/A Randomly Rejected	041A2.02	3.6	3.9
Main Turbine Generator	0	0	0	0	0	0	0	1	0	0	0	Ability to (a) predict the impacts of the following on the (SYSTEM) and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal operation:(CFR: 41.5 / 43.5 / 45.3 / 45.13)	Control rod insertion limits exceeded (stabilize secondary)	045A2.12	2.5	2.8

Tier 2 Group 2

me / Safety Function	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	Question Type	K/A Topic(s)	KA	RO	SRO
Condenser Air Removal	0	0	0	0	0	0	0	0	0	0	0	Ability to (a) predict the impacts of the following on the (SYSTEM) and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal operation:(CFR: 41.5 / 43.5 / 45.3 / 45.13)	K/A Randomly Rejected	055A2	0	0
Liquid Radwaste	0	0	0	0	0	0	0	0	0	0	0	Ability to (a) predict the impacts of the following on the (SYSTEM) and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal operation:(CFR: 41.5 / 43.5 / 45.3 / 45.13)	K/A Randomly Rejected	068A2.03	2.5	2.6
Waste Gas Disposal	0	0	0	0	0	0	0	0	0	0	0	Knowledge of the effect that a loss or malfunction of the following will have on the (SYSTEM):(CFR: 41.7 / 45.7)	K/A Randomly Rejected	071K6	0	0
Area Radiation Monitoring	0	0	0	0	0	0	0	0	0	0	0	Ability to manually operate and/or monitor in the control room:(CFR: 41.7 / 45.5 to 45.8)	K/A Randomly Rejected	072A4.03	3.1	3.1
Circulating Water	0	0	0	0	0	0	0	0	0	0	0	Ability to manually operate and/or monitor in the control room:(CFR: 41.7 / 45.5 to 45.8)	K/A Randomly Rejected	075A4.01	3.2	3.2
Exhaust Air	0	0	0	0	0	0	0	0	0	0	0	Knowledge of the effect that a loss or malfunction of the (SYSTEM) will have on the following:(CFR: 41.7 / 45.6)	K/A Randomly Rejected	079K3	0	0
Fire Protection	0	0	0	0	0	0	0	0	0	0	1	This is a Generic, no stem statement is associated.	Knowledge of the purpose and function of major system components and controls.	086G2.1.28	3.2	3.3

Tier 2 Group 2

ne / Safety Functio	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	Question Type	K/A Topic(s)	KA	RO	SRO
ontrol Rod Drive	0	0	0	0	0	0	0	0	0	0	0	Knowledge of electrical power supplies to the following:(CFR: 41.7)	K/A Randomly Rejected	001K2.05	3.1	3.5
actor Coolant	0	0	1	0	0	0	0	0	0	0	0	Knowledge of the effect that a loss or malfunction of the (SYSTEM) will have on the following:(CFR: 41.7 / 45.6)	Containment	002K3.03	4.2	4.6
essurizer Level ontrol	0	0	0	0	0	0	0	0	0	0	0	Knowledge of the effect that a loss or malfunction of the (SYSTEM) will have on the following:(CFR: 41.7 / 45.6)	K/A Randomly Rejected	011K3.02	3.5	3.7
od Position lication	0	0	0	0	1	0	0	0	0	0	0	Knowledge of the operational implications of the following concepts as they apply to the (SYSTEM):(CFR: 41.5 / 45.7)	RPIS independent of demand position	014K5.02	2.8	3.3
uclear strumentation	0	0	0	0	0	0	0	0	0	0	0	Ability to monitor automatic operations of the (SYSTEM) including:(CFR: 41.7 / 45.5)	K/A Randomly Rejected	015A3.02	3.7	3.9
on-nuclear strumentation	0	0	0	0	0	0	0	0	0	0	0	Ability to monitor automatic operations of the (SYSTEM) including:(CFR: 41.7 / 45.5)	K/A Randomly Rejected	016A3.01	2.9	2.9
-core emperature onitor	1	0	0	0	0	0	0	0	0	0	0	Knowledge of the physical connections and/or cause-effect relationships between (SYSTEM) and the following:(CFR: 41.2 to 41.9 / 45.7 to 45.8)	Plant computer	017K1.01	3.2	3.2
ontainment Iodine emoval	0	0	0	0	0	0	0	0	0	0	0	Knowledge of the effect that a loss or malfunction of the (SYSTEM) will have on the following:(CFR: 41.7 / 45.6)	K/A Randomly Rejected	027K3	0	0
ondensate	0	0	0	0	0	0	0	0	0	0	1	This is a Generic, no stem statement is	Ability to locate and operate	056G2.1.30	3.9	3.4

Tier 2 Group 2

me / Safety Functio	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	Question Type	K/A Topic(s)	KA	RO	SRO
												associated.	components, including local controls.			

Tier 3

Group	KA	Topic	RO	SRO
Conduct of Operations	G2.1.3	Knowledge of shift turnover practices.	3	3.4
Conduct of Operations	G2.1.22	Ability to determine Mode of Operation.	2.8	3.3
Conduct of Operations	G2.1.1	Knowledge of conduct of operations requirements.	3.7	3.8
Equipment Control	G2.2.11	Knowledge of the process for controlling temporary changes.	2.5	3.4
Equipment Control	G2.2.24	Ability to analyze the affect of maintenance activities on LCO status.	2.6	3.8
Equipment Control	G2.2.4	(multi-unit) Ability to explain the variations in control board layouts, systems, instrumentation and procedural actions between units at a facility.	2.8	3
Radiation Control	G2.3.9	Knowledge of the process for performing a containment purge.	2.5	3.4
Radiation Control	G2.3.2	Knowledge of facility ALARA program.	2.5	2.9
Emergency Procedures/Plan	G2.4.14	Knowledge of general guidelines for EOP flowchart use.	3	3.9
Emergency Procedures/Plan	G2.4.43	Knowledge of emergency communications systems and techniques.	2.8	3.5