Facility: CATAWBA. Date of Examination: 12/1/2008

Developed by: Written - Facility [X] NRC [ ] // Operating - Facility [X] NRC [ ]

Target Date*	Task Description (Reference)	Chief Examiner's Initials
-180	1. Examination administration date confirmed (C.1.a; C.2.a and b)	
-120	2. NRC examiners and facility contact assigned (C.1.d; C.2.e)	8/6
-120	3. Facility contact briefed on security and other requirements (C.2.c)	8/6
-120	4. Corporate notification letter sent (C.2.d)	8/7
[-90]	[5. Reference material due (C.1.e; C.3.c; Attachment 3)]	9/2
{-75}	6. Integrated examination outline(s) due, including Forms ES-201-2, ES-201-3, ES-301-1, ES-301-2, ES-301-5, ES-D-1's, ES-401-1/2, ES-401-3, and ES-401-4, as applicable (C.1.e and f; C.3.d)	9/17
{-70}	{7. Examination outline(s) reviewed by NRC and feedback provided to facility licensee (C.2.h; C.3.e)}	9/22
{-45}	8. Proposed examinations (including written, walk-through JPMs, and scenarios, as applicable), supporting documentation (including Forms ES-301-3, ES-301-4, ES-301-5, ES-301-6, and ES-401-6, and any Form ES-201-3 updates), and reference materials due (C.1.e, f, g and h; C.3.d)	10/17
-30	9. Preliminary license applications (NRC Form 398's) due (C.1.l; C.2.g; ES-202)	10/31
-14	10. Final license applications due and Form ES-201-4 prepared (C.1.l; C.2.i; ES-202)	11/17
-14	11. Examination approved by NRC supervisor for facility licensee review (C.2.h; C.3.f)	11/17
-14	12. Examinations reviewed with facility licensee (C.1.j; C.2.f and h; C.3.g)	11/17
-7	13. Written examinations and operating tests approved by NRC supervisor (C.2.i; C.3.h)	11/24
-7	14. Final applications reviewed; 1 or 2 (if >10) applications audited to confirm qualifications / eligibility; and examination approval and waiver letters sent (C.2.i; Attachment 5; ES-202, C.2.e; ES-204)	11/24
-7	15. Proctoring/written exam administration guidelines reviewed with facility licensee (C.3.k)	11/24
-7	16. Approved scenarios, job performance measures, and questions distributed to NRC examiners (C.3.i)	11/24

* Target dates are generally based on facility-prepared examinations and are keyed to the examination date identified in the corporate notification letter. They are for planning purposes and may be adjusted on a case-by-case basis in coordination with the facility licensee.
[Applies only] {Does not apply} to examinations prepared by the NRC.

1.Pre-Examination

I acknowledge that I have acquired specialized knowledge about the NRC licensing examinations scheduled for the week(s) of Dec 2008 as of the date of my signature. I agree that I will not knowingly divulge any information about these examinations to any persons who have not been authorized by the NRC chief examiner. I understand that I am not to instruct, evaluate, or provide performance feedback to those applicants scheduled to be administered these licensing examinations from this date until completion of examination administration, except as specifically noted below and authorized by the NRC (e.g., acting as a simulator booth operator or communicator is acceptable if the individual does not select the training content or provide direct or indirect feedback). Furthermore, I am aware of the physical security measures and requirements (as documented in the facility licensee's procedures) and understand that violation of the conditions of this agreement may result in cancellation of the examinations and/or an enforcement action against me or the facility licensee. I will immediately report to facility management or the NRC chief examiner any indications or suggestions that examination security may have been compromised.

2.Post-Examination

To the best of my knowledge, I did not divulge to any unauthorized persons any information concerning the NRC licensing examinations administered during the week(s) of Dec 2008. From the date that I entered into this security agreement until the completion of examination administration, I did not instruct, evaluate, or provide performance feedback to those applicants who were administered these licensing examinations, except as specifically noted below and authorized by the NRC.

PRINTED NAME	JOB TITLE / RESPONSIBILITY	SIGNATURE (1)	DATE	SIGNATURE (2)	DATE	NOTE
1. TIMOTHY SHEARIN	SRO		09/24/08		02/11/09	
2. BARRY PROPHETER	RO		09/24/08		01/07/09	
3. William D Johnson	SRO		09/25/08		01/21/09	
4. GARY Burgess	RO		09/25/08		02/10/09	
5. PAUL MANLY	RO		09.25.08		02/11/09	
6. Glenn M. Jackson	RO		09-26-08		01/13/09	
7. Ronnie D. Locklear	RO		09/26/08		01/13/09	
8. AARON C MICHALSKE	SRO		09/26/08		01/07/09	
9. Hubert C Dampson	RO		9/30/08		12/11/08	
10. JAMES W FOWLER IV	RO		10-01-08		01/05/09	
11. David Peel	RO		10-06-08	12/06/08		
12. Darryl Hilton	RO		10-08-08	12/12/08		
13. John Robinson	SRO		10-08-08	12-17-08		
14. Chris Miller	RO		10-08-08		12/17/08	
15. DONALD WISNIEWSKI	SRO		10-16-08		12/16/08	

1. Pre-Examination

I acknowledge that I have acquired specialized knowledge about the NRC licensing examinations scheduled for the week(s) of 12-01-08 as of the date of my signature. I agree that I will not knowingly divulge any information about these examinations to any persons who have not been authorized by the NRC chief examiner. I understand that I am not to instruct, evaluate, or provide performance feedback to those applicants scheduled to be administered these licensing examinations from this date until completion of examination administration, except as specifically noted below and authorized by the NRC (e.g., acting as a simulator booth operator or communicator is acceptable if the individual does not select the training content or provide direct or indirect feedback). Furthermore, I am aware of the physical security measures and requirements (as documented in the facility licensee's procedures) and understand that violation of the conditions of this agreement may result in cancellation of the examinations and/or an enforcement action against me or the facility licensee. I will immediately report to facility management or the NRC chief examiner any indications or suggestions that examination security may have been compromised.

2. Post-Examination

To the best of my knowledge, I did not divulge to any unauthorized persons any information concerning the NRC licensing examinations administered during the week(s) of _____. From the date that I entered into this security agreement until the completion of examination administration, I did not instruct, evaluate, or provide performance feedback to those applicants who were administered these licensing examinations, except as specifically noted below and authorized by the NRC.

	PRINTED NAME	JOB TITLE / RESPONSIBILITY	SIGNATURE (1)	DATE	SIGNATURE (2)	DATE	NOTE
1.	Charles Eric Morse	NLO		12-03-08		12/03/08	1
2.	Edwin R Reese	NLO		12-03-08		12/03/08	1
3.	James R. Feierstein	NEO		12-04-08		12/04/08	2
4.	Dwight Jones	NEO		12-04-08		12/04/08	2
5.	James P. Rhodes	NEO		12-04-08		12-04-08	2
6.	BRAD S TURNER	NEO		12-04-08		12-04-08	2
7.	Corey B. Sims	NEO		12-04-08		12/04/08	2
8.	KEVIN S. LYALL	RES/DPS		12/4/08	Kevin Lyall-Holdaner	2/4/09	3
9.							
10.							
11.							
12.							
13.							
14.							
15.							

NOTES: #1 Performed sequestering on 12/3/08 only.
#2 Performed sequestering on 12/4/08 only
#3 Signed out by Robert Daner via e-mail confirmation - attached

1. Pre-Examination

I acknowledge that I have acquired specialized knowledge about the NRC licensing examinations scheduled for the week(s) of DEC 2008 as of the date of my signature. I agree that I will not knowingly divulge any information about these examinations to any persons who have not been authorized by the NRC chief examiner. I understand that I am not to instruct, evaluate, or provide performance feedback to those applicants scheduled to be administered these licensing examinations from this date until completion of examination administration, except as specifically noted below and authorized by the NRC (e.g., acting as a simulator booth operator or communicator is acceptable if the individual does not select the training content or provide direct or indirect feedback). Furthermore, I am aware of the physical security measures and requirements (as documented in the facility licensee's procedures) and understand that violation of the conditions of this agreement may result in cancellation of the examinations and/or an enforcement action against me or the facility licensee. I will immediately report to facility management or the NRC chief examiner any indications or suggestions that examination security may have been compromised.

2. Post-Examination

To the best of my knowledge, I did not divulge to any unauthorized persons any information concerning the NRC licensing examinations administered during the week(s) of DEC 2008. From the date that I entered into this security agreement until the completion of examination administration, I did not instruct, evaluate, or provide performance feedback to those applicants who were administered these licensing examinations, except as specifically noted below and authorized by the NRC.

	PRINTED NAME	JOB TITLE / RESPONSIBILITY	SIGNATURE (1)	DATE	SIGNATURE (2)	DATE NOTE
1.	JOHN K. SUPIENA	EXAM DEVELOPER		4/5/08		12/4/08
2.	RONALD K COOKE	SIMULATOR SUPPORT		4/5/08		12/12/08
3.	Teresa A. Wilkins	NIT		5/21/08		2-9-09
4.	GARY DANIELS	INST		08/04/08		12-11-08
5.	Jody Lawter	Engineer		08/22/08		12/11/08
6.	Gayle L. Wood	Engineer		6/10/08		12/12/08
7.	BRIAN D Miller	SENIOR REACTOR OPERATOR		~~08~~ 06/30/08		01/12/09
8.	CRAIG BIGHAM	NUCLEAR SHIFT SUP.		07-31-08		12/16/08
9.	GILBERT P ANDERSON	NUCLEAR SHIFT SUP.		07-31-08		01/27/09
10.	Tom Chandler	Reactor Operator		08/05/08		01/27/09
11.	Jean Mathews	Reactor Operator		08-07-08		12-17-08
12.	Gary Hamilton	OPT training		~~8~~ 9-3-08		12-15-08
13.	Sue Brooks	OPT TNG - Sim Supp		9-15-08		12/15/08
14.	RON KATAICNICH	INSTRUCTOR/SIM SUPPORT		9-15-08		12/12/08
15.	Terry Odoms	Reactor Operator		9/24/08		02/03/09

NOTES:

1. Pre-Examination

I acknowledge that I have acquired specialized knowledge about the NRC licensing examinations scheduled for the week(s) of 12/1/08 as of the date of my signature. I agree that I will not knowingly divulge any information about these examinations to any persons who have not been authorized by the NRC chief examiner. I understand that I am not to instruct, evaluate, or provide performance feedback to those applicants scheduled to be administered these licensing examinations from this date until completion of examination administration, except as specifically noted below and authorized by the NRC (e.g., acting as a simulator booth operator or communicator is acceptable if the individual does not select the training content or provide direct or indirect feedback). Furthermore, I am aware of the physical security measures and requirements (as documented in the facility licensee's procedures) and understand that violation of the conditions of this agreement may result in cancellation of the examinations and/or an enforcement action against me or the facility licensee. I will immediately report to facility management or the NRC chief examiner any indications or suggestions that examination security may have been compromised.

2. Post-Examination

To the best of my knowledge, I did not divulge to any unauthorized persons any information concerning the NRC licensing examinations administered during the week(s) of 12-1-08. From the date that I entered into this security agreement until the completion of examination administration, I did not instruct, evaluate, or provide performance feedback to those applicants who were administered these licensing examinations, except as specifically noted below and authorized by the NRC.

	PRINTED NAME	JOB TITLE / RESPONSIBILITY	SIGNATURE (1)	DATE	SIGNATURE (2)	DATE	NOTE
1.	Danny G Hester	SRO		10/22/08		1-7-09	
2.	Ray G Transou	RO		10/22/08		01/05/09	
3.	Chad L Underwood	RO		10/22/08		01/05/09	
4.	Mark W Hawes	Reactor Engineering		10/23/08	MAY HAWES PER TELECON	12/29/08	*
5.	[illegible]	SRO		10.23.08		01-2009	
6.	Mike Bentt	RO		10-23-08		01-21-09	
7.	[illegible]	RO Nurse/H Husky		10-23-08		01/21/09	
8.	Jamie McConnell	SOM		11/10/08		12/5/08	
9.	Harvey W Jarman	SRO		11/18/08		1/15/09	
10.	Robert J. Carnwell	SRO		11/18/08		12-7-08	
11.	Thomas W. Garrison	OSM ops TRAINING SUC		12/01/08		12/15/08	
12.	Dennis D Probst	NLO		12-01-08		12-03-08	1,3
13.	~~Ryan G. Kleman~~	NLO		12/01/08		12/01/08	1
14.	Duane Lodsetter	NLO		12/02/08		12/03/08	3
15.	David Gumford	NLO		12/02/08		12/02/08	2

NOTES: 1: Conducted Sequestering on 12/1/08 only.
2: Conducted Sequestering on 12/2/08 only
3: Conducted Sequestering on 12/3/08 only

* PER TELECON W/ JOHN SORSEN 12/29/08

Dameron, Hubert C

From: Lyall, Kevin S
Sent: Wednesday, February 04, 2009 11:48 AM
To: Dameron, Hubert C; Wilkins, Teresa A
Subject: Re: HLP exam security

I attest that I did not divulge any exam material to any one and that the statements below are true.

I turned my badge back into Sam Brooks when I left.

Kevin

Kevin

From: Dameron, Hubert C
To: Lyall, Kevin S; Wilkins, Teresa A
Sent: Wed Feb 04 10:53:14 2009
Subject: HLP exam security

Both of you signed the exam security agreement for the 08 HLP exam. I need both of you to sign back out. While it's best for you to physically sign out of the document I can deal with via e-mail.

When you sign out you attest to the following:

To the best of my knowledge, I did not divulge to any unauthorized persons any information concerning the NRC licensing examinations administered during the week(s) of Dec. 2008. From the date that I entered into this security agreement until the completion of the examination administration, I did not instruct, evaluate, or provide performance feedback to those applicants who were administered these licensing examinations, except as specifically noted below and authorized by the NRC.

A reply to this email stating that you attest that the statement is correct is sufficient. Please mail the badge to me at CN01A.

FINAL

ES-201 **Examination Outline Quality Checklist** **Form ES-201-2**

Facility: CATAWBA Date of Examination: 12/01/08

Item	Task Description	Initials a	Initials b*	Initials c#
1. WRITTEN	a. Verify that the outline(s) fit(s) the appropriate model, in accordance with ES-401.			
	b. Assess whether the outline was systematically and randomly prepared in accordance with Section D.1 of ES-401 and whether all K/A categories are appropriately sampled.			
	c. Assess whether the outline over-emphasizes any systems, evolutions, or generic topics.			
	d. Assess whether the justifications for deselected or rejected K/A statements are appropriate.			
2. SIMULATOR	a. Using Form ES-301-5, verify that the proposed scenario sets cover the required number of normal evolutions, instrument and component failures, technical specifications, and major transients.			
	b. Assess whether there are enough scenario sets (and spares) to test the projected number and mix of applicants in accordance with the expected crew composition and rotation schedule without compromising exam integrity, and ensure that each applicant can be tested using at least one new or significantly modified scenario, that no scenarios are duplicated from the applicants' audit test(s), and that scenarios will not be repeated on subsequent days.			
	c. To the extent possible, assess whether the outline(s) conform(s) with the qualitative and quantitative criteria specified on Form ES-301-4 and described in Appendix D.			
3. W/T	a. Verify that the systems walk-through outline meets the criteria specified on Form ES-301-2: (1) the outline(s) contain(s) the required number of control room and in-plant tasks distributed among the safety functions as specified on the form (2) task repetition from the last two NRC examinations is within the limits specified on the form (3) no tasks are duplicated from the applicants' audit test(s) (4) the number of new or modified tasks meets or exceeds the minimums specified on the form (5) the number of alternate path, low-power, emergency, and RCA tasks meet the criteria on the form.			
	b. Verify that the administrative outline meets the criteria specified on Form ES-301-1: (1) the tasks are distributed among the topics as specified on the form (2) at least one task is new or significantly modified (3) no more than one task is repeated from the last two NRC licensing examinations			
	c. Determine if there are enough different outlines to test the projected number and mix of applicants and ensure that no items are duplicated on subsequent days.			
4. GENERAL	a. Assess whether plant-specific priorities (including PRA and IPE insights) are covered in the appropriate exam sections.			
	b. Assess whether the 10 CFR 55.41/43 and 55.45 sampling is appropriate.			
	c. Ensure that K/A importance ratings (except for plant-specific priorities) are at least 2.5.			
	d. Check for duplication and overlap among exam sections.			
	e. Check the entire exam for balance of coverage.			
	f. Assess whether the exam fits the appropriate job level (RO or SRO).			

	Printed Name/Signature	Date
a. Author	JOHN K. SUMERA	11/18/08
b. Facility Reviewer (*)	BRIAN D. MILLER IV	11/18/08
c. NRC Chief Examiner (#)	GERARD W. LASKA	11/19/2008
d. NRC Supervisor	MALCOLM T. WIDMANN	11/20/08

Note: # Independent NRC reviewer initial items in Column "c"; chief examiner concurrence required.
* Not applicable for NRC-prepared examination outlines

FINAL

ES-301, Rev. 9 | Administrative Topics Outline | Form ES-301-1

Facility: Catawba Nuclear Station | Date of Examination 12/1/2008

Exam Level: ☑ RO ☐ SRO | Operating Test No.: _____

Administrative Topic (see Note)	Type Code*	Describe activity to be performed
Conduct of Operations	R N	Using Data Book Figure 9 (Permissible Successive Attempts to Start Motors) determine the allowed starting time for NCP.
Conduct of Operations	R M	Perform a manual shutdown margin calculation (Unit at Power) per OP/0/A/6100/006 (Reactivity Balance Calculation) with untrippable rods
Equipment Control	S M	Calculate Unit Vent flow manually per PT/1/A/4450/017 (Unit Vent Flow Manual Calculation).
Radiation Protection	R M	Calculate the Maximum Permissible Stay Time Within Duke Power ALERT Administrative Dose Limits
Emergency Plan		

NOTE: All items (5 total) are required for SROs. RO applicants require only 4 items unless they are retaking only the administrative topics, when all 5 are required.

*Type Codes & Criteria:

(C)ontrol room, (S)imulator, or Class(R)oom
(D)irect from bank (≤ 3 for ROs; ≤ 4 for SROs & RO retakes)
(N)ew or (M)odified from bank (≥ 1)
(P)revious 2 exams (≤ 1; randomly selected)

FINAL

ES-301, Rev. 9 | Administrative Topics Outline | Form ES-301-1

Facility: Catawba Nuclear Station | Date of Examination 12/1/2008

Exam Level: ☐ RO ☑ SRO | Operating Test No.: _____

Administrative Topic (see Note)	Type Code*	Describe activity to be performed
Conduct of Operations	R M	Determine if a work hours extension is required and if so, which limits are exceeded.
Conduct of Operations	R M	Perform a manual shutdown margin calculation (Unit at Power) per OP/0/A/6100/006 (Reactivity Balance Calculation) with untrippable rods
Equipment Control	S M	Determine SLC requirements and complete a Unit Vent Flow Manual Calculation per PT/1/A/4450/017
Radiation Protection	R M	Calculate the Maximum Permissible Stay Time Within Duke Power ALERT Administrative Dose Limits
Emergency Plan	R D	Upgrade an Emergency Classification and Complete an Emergency Notification Form

NOTE: All items (5 total) are required for SROs. RO applicants require only 4 items unless they are retaking only the administrative topics, when all 5 are required.

*Type Codes & Criteria:

(C)ontrol room, (S)imulator, or Class(R)oom
(D)irect from bank (≤ 3 for ROs; ≤ 4 for SROs & RO retakes)
(N)ew or (M)odified from bank (≥ 1)
(P)revious 2 exams (≤ 1; randomly selected)

FINAL

ES-301, Rev. 9 | Control Room/In-Plant Systems Outline | Form ES-301-2

Facility: Catawba Nuclear Station | Date of Examination 12/1/2008

Exam Level: ☑ RO ☐ SRO-I ☐ SRO-U | Operating Test No.: _____

Control Room Systems (8 for RO); (7 for SRO-I); (2 or 3 for SRO-U, including 1 ES

System / JPM Title	Type Code*	Safety Function
a. Perform a Manual Makeup to the VCT (SNAP 191)	D S	1
b. Respond to NC System Leakage (SNAP 192)	A D S	2
c. Depressurize the NC System to Minimize Primary to Secondary Leakage during a SGTR (SNAP 193)	A D L S	3
d. Cooldown the PRT Using NCDT Heat Exchanger (SNAP 194)	D S	5
e. Restore Offsite Power to 6.9 kV Busses per AP/07 (Loss of Normal Power) Enclosure 21 (Black Restart Procedure) (SNAP 195)	A L N S	6
f. Perform the Immediate Actions of AP/1/A/5500/16, (Malfunction of Nuclear Instrumentation System), Case 4, (P/R Malfunction) (SNAP 196)	D S	7
g. Shirt Operating RC Pumps (SNAP 197)	A N S	8
h. Perform the Immediate Actions of AP/1/A/5500/004, (Loss of Reactor Coolant Pump) for Loss of One NC Pump) (SNAP 198)	A EN M S	4P
In-Plant Systems@(3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)		
i. Locally Break Vacuum on a Loss of Feedwater	D E	4S
j. Align Seal Injection to the Unit 2 NC Pumps	D E	2
k. Alternate Cooling to 1A NV Pump	D E R	8

@ All RO and SRO-I control room (and in-plant) systems must be different and serve different safety functions; all 5 SRO-U systems must serve different safety functions; in-plant systems and functions may overlap those tested in the control room

* Type Codes	Criteria for RO / SRO-I / SRO-U
(A)lternate path	4-6 / 4-6 / 2-3
(C)ontrol room	
(D)irect from bank	≤ 9 / ≤ 8 / ≤ 4
(E)mergency or abnormal in-plant	≥ 1 / ≥ 1 / ≥ 1
(EN)gineered safety feature	- / - / ≥ 1 (control room system)
(L)ow-Power / Shutdown	≥ 1 / ≥ 1 / ≥ 1
(N)ew or (M)odified from bank including 1(A)	≥ 2 / ≥ 2 / ≥ 1
(P)revious 2 exams	≤ 3 / ≤ 3 / ≤ 2 (randomly selected)
(R)CA	≥ 1 / ≥ 1 / ≥ 1
(S)imulator	

FINAL

ES-301, Rev. 9 | Control Room/In-Plant Systems Outline | Form ES-301-2

Facility: Catawba Nuclear Station | Date of Examination 12/1/2008

Exam Level: ☐ RO ☑ SRO-I ☐ SRO-U | Operating Test No.: _____

Control Room Systems (8 for RO); (7 for SRO-I); (2 or 3 for SRO-U, including 1 ES

System / JPM Title	Type Code*	Safety Function
a.		
b. Respond to NC System Leakage (SNAP 192)	A D S	2
c. Depressurize the NC System to Minimize Primary to Secondary Leakage during a SGTR (SNAP 193)	A D L S	3
d. Cooldown the PRT Using NCDT Heat Exchanger (SNAP 194)	D S	5
e. Restore Offsite Power to 6.9 kV Busses per AP/07 (Loss of Normal Power) Enclosure 21 (Black Restart Procedure) (SNAP 195)	A L N S	6
f. Perform the Immediate Actions of AP/1/A/5500/16, (Malfunction of Nuclear Instrumentation System), Case 4, (P/R Malfunction) (SNAP 196)	D S	7
g. Shirt Operating RC Pumps (SNAP 197)	A N S	8
h. Perform the Immediate Actions of AP/1/A/5500/004, (Loss of Reactor Coolant Pump) for Loss of One NC Pump) (SNAP 198)	A EN M S	4P
In-Plant Systems@(3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)		
i. Locally Break Vacuum on a Loss of Feedwater	D E	4S
j. Align Seal Injection to the Unit 2 NC Pumps	D E	2
k. Alternate Cooling to 1A NV Pump	D E R	8

@ All RO and SRO-I control room (and in-plant) systems must be different and serve different safety functions; all 5 SRO-U systems must serve different safety functions; in-plant systems and functions may overlap those tested in the control room

* Type Codes	Criteria for RO / SRO-I / SRO-U
(A)lternate path	4-6 / 4-6 / 2-3
(C)ontrol room	
(D)irect from bank	≤ 9 / ≤ 8 / ≤ 4
(E)mergency or abnormal in-plant	≥ 1 / ≥ 1 / ≥ 1
(EN)gineered safety feature	- / - / ≥ 1 (control room system)
(L)ow-Power / Shutdown	≥ 1 / ≥ 1 / ≥ 1
(N)ew or (M)odified from bank including 1(A)	≥ 2 / ≥ 2 / ≥ 1
(P)revious 2 exams	≤ 3 / ≤ 3 / ≤ 2 (randomly selected)
(R)CA	≥ 1 / ≥ 1 / ≥ 1
(S)imulator	

FINAL

ES-301, Rev. 9 | Control Room/In-Plant Systems Outline | Form ES-301-2

Facility: Catawba Nuclear Station | Date of Examination 12/1/2008

Exam Level: ☐ RO ☐ SRO-I ☑ SRO-U | Operating Test No.: _____

Control Room Systems (8 for RO); (7 for SRO-I); (2 or 3 for SRO-U, including 1 ES

System / JPM Title	Type Code*	Safety Function
a.		
b.		
c.		
d.		
e. Restore Offsite Power to 6.9 kV Busses per AP/07 (Loss of Normal Power) Enclosure 21 (Black Restart Procedure) (SNAP 195)	A L N S	6
f.		
g. Shirt Operating RC Pumps (SNAP 197)	A N S	8
h. Perform the Immediate Actions of AP/1/A/5500/004, (Loss of Reactor Coolant Pump) for Loss of One NC Pump) (SNAP 198)	A EN M S	4P
In-Plant Systems@(3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)		
i.		
j. Align Seal Injection to the Unit 2 NC Pumps	D E	2
k. Alternate Cooling to 1A NV Pump	D E R	8

@ All RO and SRO-I control room (and in-plant) systems must be different and serve different safety functions; all 5 SRO-U systems must serve different safety functions; in-plant systems and functions may overlap those tested in the control room

* Type Codes	Criteria for RO / SRO-I / SRO-U
(A)lternate path	4-6 / 4-6 / 2-3
(C)ontrol room	
(D)irect from bank	≤ 9 / ≤ 8 / ≤ 4
(E)mergency or abnormal in-plant	≥ 1 / ≥ 1 / ≥ 1
(EN)gineered safety feature	- / - / ≥ 1 (control room system)
(L)ow-Power / Shutdown	≥ 1 / ≥ 1 / ≥ 1
(N)ew or (M)odified from bank including 1(A)	≥ 2 / ≥ 2 / ≥ 1
(P)revious 2 exams	≤ 3 / ≤ 3 / ≤ 2 (randomly selected)
(R)CA	≥ 1 / ≥ 1 / ≥ 1
(S)imulator	

FINAL

ES-301 **Operating Test Quality Checklist** **Form ES-301-3**

Facility: CATAWBA Date of Examination: 12/01/08 Operating Test Number:

	1. General Criteria	Initials a	Initials b*	Initials c#
a.	The operating test conforms with the previously approved outline; changes are consistent with sampling requirements (e.g., 10 CFR 55.45, operational importance, safety function distribution).			
b.	There is no day-to-day repetition between this and other operating tests to be administered during this examination.			
c.	The operating test shall not duplicate items from the applicants' audit test(s). (see Section D.1.a.)			
d.	Overlap with the written examination and between different parts of the operating test is within acceptable limits.			
e.	It appears that the operating test will differentiate between competent and less-than-competent applicants at the designated license level.			
	2. Walk-Through Criteria	--	--	--
a.	Each JPM includes the following, as applicable: • initial conditions • initiating cues • references and tools, including associated procedures • reasonable and validated time limits (average time allowed for completion) and specific designation if deemed to be time-critical by the facility licensee • operationally important specific performance criteria that include: – detailed expected actions with exact criteria and nomenclature – system response and other examiner cues – statements describing important observations to be made by the applicant – criteria for successful completion of the task – identification of critical steps and their associated performance standards – restrictions on the sequence of steps, if applicable			
b.	Ensure that any changes from the previously approved systems and administrative walk-through outlines (Forms ES-301-1 and 2) have not caused the test to deviate from any of the acceptance criteria (e.g., item distribution, bank use, repetition from the last 2 NRC examinations) specified on those forms and Form ES-201-2.			
	3. Simulator Criteria	--	--	--
The associated simulator operating tests (scenario sets) have been reviewed in accordance with Form ES-301-4 and a copy is attached.				

	Printed Name / Signature	Date
a. Author	JOHN K SUMNER	11/18/08
b. Facility Reviewer(*)	BRIAN D. MILLER	11/18/08
c. NRC Chief Examiner (#)	GERARD W. LASICK	11/19/2008
d. NRC Supervisor	MALCOLM T. WILLIAMS	11/20/08

NOTE: * The facility signature is not applicable for NRC-developed tests.
Independent NRC reviewer initial items in Column "c"; chief examiner concurrence required.

FINAL

ES-301 **Simulator Scenario Quality Checklist** **Form ES-301-4**

Facilty: CATAWBA Date of Exam: 12/01/08 Scenario Numbers: 2/3/4 Operating Test No.:

QUALITATIVE ATTRIBUTES		Initials a	Initials b*	Initials c#
1.	The initial conditions are realistic, in that some equipment and/or instrumentation may be out of service, but it does not cue the operators into expected events.			
2.	The scenarios consist mostly of related events.			
3.	Each event description consists of • the point in the scenario when it is to be initiated • the malfunction(s) that are entered to initiate the event • the symptoms/cues that will be visible to the crew • the expected operator actions (by shift position) • the event termination point (if applicable)			
4.	No more than one non-mechanistic failure (e.g., pipe break) is incorporated into the scenario without a credible preceding incident such as a seismic event.			
5.	The events are valid with regard to physics and thermodynamics.			
6.	Sequencing and timing of events is reasonable, and allows the examination team to obtain complete evaluation results commensurate with the scenario objectives.			
7.	If time compression techniques are used, the scenario summary clearly so indicates. Operators have sufficient time to carry out expected activities without undue time constraints. Cues are given.			
8.	The simulator modeling is not altered.			
9.	The scenarios have been validated. Pursuant to 10 CFR 55.46(d), any open simulator performance deficiencies or deviations from the referenced plant have been evaluated to ensure that functional fidelity is maintained while running the planned scenarios.			
10.	Every operator will be evaluated using at least one new or significantly modified scenario. All other scenarios have been altered in accordance with Section D.5 of ES-301.			
11.	All individual operator competencies can be evaluated, as verified using Form ES-301-6 (submit the form along with the simulator scenarios).			
12.	Each applicant will be significantly involved in the minimum number of transients and events specified on Form ES-301-5 (submit the form with the simulator scenarios).			
13.	The level of difficulty is appropriate to support licensing decisions for each crew position.			

	Target Quantitative Attributes (Per Scenario; See Section D.5.d)	Actual Attributes (SCENARIOS 2,3,4)	--	--
1.	Total malfunctions (5–8)	7 / 5 / 7		
2.	Malfunctions after EOP entry (1–2)	5 / 2 / 4		
3.	Abnormal events (2–4)	6 / 4 / 6		
4.	Major transients (1–2)	2 / 1 / 2		
5.	EOPs entered/requiring substantive actions (1–2)	2 / 2 / 4		
6.	EOP contingencies requiring substantive actions (0–2)	2 / 0 / 0		
7.	Critical tasks (2–3)	2 / 2 / 2		

FINAL

Facility: CATAWBA NUCLEAR STATION Date of Exam: 12/01/2008 Operating Test No.:

APPLICANT	EVENT TYPE	Scenarios												TOTAL	MINIMUM(*)		
		1			2			3			4						
		CREW POSITION			CREW POSITION			CREW POSITION			CREW POSITION						
		SRO	ATC	BOP	SRO	ATC	BOP	SRO	ATC	BOP	SRO	ATC	BOP		R	I	U
RO ☒ SRO-I ☐ SRO-U ☐	RX		1			4			1					1/2	1	1	0
	NOR									2				0/1	1	1	1
	I/C		46	235		16	235		35	46		126	345	4/5	4	4	2
	MAJ		7	7		7	7		7	7		7	7	2	2	2	1
	TS														0	2	2
RO ☐ SRO-I ☐ SRO-U ☒	RX	1			4			1						1/2	1	1	0
	NOR							2						0/1	1	1	1
	I/C	23456			12356			3456			123456			4/5	4	4	2
	MAJ	7			7			7			7			2	2	2	1
	TS	356			123			46			34			4-6	0	2	2
RO ☐ SRO-I ☒ SRO-U ☐	RX	1	1		4	4		1	1					1/2	1	1	0
	NOR							2						0/1	1	1	1
	I/C	23456	46		12356	16		3456	35		123456	126		4/5	4	4	2
	MAJ	7	7		7	7		7	7		7	7		2	2	2	1
	TS	356			123			46			34			2/3	0	2	2
RO ☐ SRO-I ☐ SRO-U ☐	RX														1	1	0
	NOR														1	1	1
	I/C														4	4	2
	MAJ														2	2	1
	TS														0	2	2

Instructions:

1. Check the applicant level and enter the operating test number and Form ES-D-1 event numbers for each event type; TS are not applicable for RO applicants. ROs must serve in both the "at-the-controls (ATC)" and "balance-of-plant (BOP)" positions; Instant SROs must serve in both the SRO and the ATC positions, including at least two instrument or component (I/C) malfunctions and one major transient, in the ATC position. If an Instant SRO *additionally* serves in the BOP position, one I/C malfunction can be credited toward the two I/C malfunctions required for the ATC position.

2. Reactivity manipulations may be conducted under normal or *controlled* abnormal conditions (refer to Section D.5.d) but must be significant per Section C.2.a of Appendix D. (*) Reactivity and normal evolutions may be replaced with additional instrument or component malfunctions on a 1-for-1 basis.

3. Whenever practical, both instrument and component malfunctions should be included; only those that require verifiable actions that provide insight to the applicant's competence count toward the minimum requirements specified for the applicant's license level in the right-hand columns.

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Facility: Catawba Nuclear Station Date of Examination: 12/01/2008 Operating Test No.:

Competencies	APPLICANTS															
	RO				BOP				SRO-U/I				N/A			
	SCENARIO				SCENARIO				SCENARIO				SCENARIO			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Interpret/Diagnose Events and Conditions	467	1467	357	1267	2357	2357	467	3457	2-7	1-7	3-7	1-7				
Comply With and Use Procedures (1)	1467	1467	1357	1267	2357	2357	2467	3457	1-7	1-7	1-7	1-7				
Operate Control Boards (2)	1467	1467	1357	1267	2357	2357	2467	3457	1-7	1-7	1-7	1-7				
Communicate and Interact	1467	1467	1357	1267	2357	2357	2467	3457	1-7	1-7	1-7	1-7				
Demonstrate Supervisory Ability (3)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	1-7	1-7	1-7	1-7				
Comply With and Use Tech. Specs. (3)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	356	123	46	34				

Notes:
(1)Includes Technical Specification compliance for an RO.
(2)Optional for an SRO-U.
(3)Only applicable to SROs.

Instructions:

Check the applicants' license type and enter one or more event numbers that will allow the examiners to evaluate every applicable competency for every applicant.

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

Facility: CATAWBA Date of Exam: 12/01/08 Exam Level: RO ☑ SRO ☐

Item Description			Initial a	Initial b*	Initial c#
1.	Questions and answers are technically accurate and applicable to the facility.				
2.	a. NRC K/As are referenced for all questions. b. Facility learning objectives are referenced as available.				
3.	SRO questions are appropriate in accordance with Section D.2.d of ES-401		N/A	N/A	
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: __ 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)				
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: 18 / — Modified: 9 / — New: 48 / —			
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: 35 / — C/A: 40 / —			
8.	References/handouts provided do not give away answers or aid in the elimination of distractors.				
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.				
10.	Question psychometric quality and format meet the guidelines in ES Appendix B.				
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.				

	Printed Name / Signature	Date
a. Author	JOHN K. SUTTON	11/18/08
b. Facility Reviewer (*)	BRIAN D. MILLER	11/18/08
c. NRC Chief Examiner (#)	GERALD W. LASKA	11/19/2008
d. NRC Regional Supervisor	MALCOLM T. WIDMANN	11/20/08

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.

FINAL

2008 RO NRC Examination

ES 401, Rev 9 | Combined PWR Written Examination Outline | Form ES-401-2/3

Question	K/A Number / K/A Description	K/A System	Tier/Group	Importance RO/SRO
1 507	EPE007 EK2.03 Knowledge of the interrelations between a reactor trip and the following: (CFR 41.7 / 45.7)	Reactor Trip Reactor trip status panel	T/G 1 / 1	RO 3.5 SRO 3.6
2 508	EPE009 EA2.10 Ability to determine or interpret the following as they apply to a small break LOCA: (CFR 43.5 / 45.13)	Small Break LOCA Airborne activity	T/G 1 / 1	RO 3.1 SRO 3.7
3 509	EPE011 2.4.30 EPE011 GENERIC	Large Break LOCA Knowledge of events related to system operation/status that must be reported to internal organizations or external agencies, such as the State, the NRC, or the transmission system operator. (CFR: 41.10 / 43.5 / 45.11)	T/G 1 / 1	RO 2.7 SRO 4.1
4 510	APE022 AK1.02 Knowledge of the operational implications of the following concepts as they apply to Loss of Reactor Coolant Makeup: (CFR 41.8 / 41.10 / 45.3)	Loss of Reactor Coolant Makeup Relationship of charging flow to pressure differential between charging and RCS	T/G 1 / 1	RO 2.7 SRO 3.1
5 511	APE025 2.4.30 APE025 GENERIC	Loss of Residual Heat Removal System (RHRS) Knowledge of events related to system operation/status that must be reported to internal organizations or external agencies, such as the State, the NRC, or the transmission system operator. (CFR: 41.10 / 43.5 / 45.11)	T/G 1 / 1	RO 2.7 SRO 4.1
6 512	APE026 AA2.03 Ability to determine and interpret the following as they apply to the Loss of Component Cooling Water: (CFR: 43.5 / 45.13)	Loss of Component Cooling Water (CCW) The valve lineups necessary to restart the CCWS while bypassing the portion of the system causing the abnormal condition	T/G 1 / 1	RO 2.6 SRO 2.9
7 513	APE027 AA1.04 Ability to operate and / or monitor the following as they apply to the Pressurizer Pressure Control Malfunctions: (CFR 41.7 / 45.5 / 45.6)	Pressurizer Pressure Control System (PZR PCS) Malfunction Pressure recovery, using emergency-only heaters	T/G 1 / 1	RO 3.9* SRO 3.6*

2008 RO NRC Examination

ES 401, Rev 9 | Combined PWR Written Examination Outline | Form ES-401-2/3

Question	K/A Number / K/A Description	K/A System	Tier/Group	Importance RO/SRO
8 514	**EPE029 2.4.34** EPE029 GENERIC	**Anticipated Transient Without Scram (ATWS)**	T/G 1 / 1	**RO 4.2 SRO 4.1**
		Knowledge of RO tasks performed outside the main control room during an emergency and the resultant operational effects. (CFR: 41.10 / 43.5 / 45.13)		
9 515	**EPE038 EK1.02** Knowledge of the operational implications of the following concepts as they apply to the SGTR: (CFR 41.8 / 41.10 / 45.3)	**Steam Generator Tube Rupture (SGTR)**	T/G 1 / 1	**RO 3.2 SRO 3.5**
		Leak rate vs. pressure drop		
10 516	**APE057 AA2.13** Ability to determine and interpret the following as they apply to the Loss of Vital AC Instrument Bus: (CFR: 43.5 / 45.13)	**Loss of Vital AC Electrical Instrument Bus**	T/G 1 / 1	**RO 3.0 SRO 3.4**
		VCT level and pressure indicators and recorders		
11 517	**APE058 AA1.02** Ability to operate and / or monitor the following as they apply to the Loss of DC Power: (CFR 41.7 / 45.5 / 45.6)	**Loss of DC Power**	T/G 1 / 1	**RO 3.1* SRO 3.1**
		Static inverter dc input breaker, frequency meter, ac output breaker, and ground fault detector		
12 518	**APE062 AK3.03** Knowledge of the reasons for the following responses as they apply to the Loss of Nuclear Service Water: (CFR 41.4, 41.8 / 45.7)	**Loss of Nuclear Service Water**	T/G 1 / 1	**RO 4.0 SRO 4.2**
		Guidance actions contained in EOP for Loss of nuclear service water		
13 519	**APE065 AK3.03** Knowledge of the reasons for the following responses as they apply to the Loss of Instrument Air: (CFR 41.5,41.10 / 45.6 / 45.13)	**Loss of Instrument Air**	T/G 1 / 1	**RO 2.9 SRO 3.4**
		Knowing effects on plant operation of isolating certain equipment from instrument air		

2008 RO NRC Examination

ES 401, Rev 9 | Combined PWR Written Examination Outline | Form ES-401-2/3

Question	K/A Number / K/A Description	K/A System	Tier/Group	Importance RO/SRO
14 520	**APE077 AA1.01** Ability to operate and/or monitor the following as they apply to Generator Voltage and Electric Grid Disturbances: (CFR: 41.5 and 41.10 / 45.5, 45.7, and 45.8)	**Generator Voltage and Electric Grid Disturbances** — Grid frequency and voltage.....	T/G 1 / 0	**RO 3.6 SRO 3.7**
15 521	**WE04 EK2.2** Knowledge of the interrelations between the (LOCA Outside Containment) and the following: (CFR: 41.7 / 45.7)	**LOCA Outside Containment** — 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.	T/G 1 / 1	**RO 3.8 SRO 4.0**
16 522	**WE05 EK3.1** Knowledge of the reasons for the following responses as they apply to the (Loss of Secondary Heat Sink) (CFR: 41.5 / 41.10, 45.6, 45.13)	**Loss of Secondary Heat Sink** — 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.	T/G 1 / 1	**RO 3.4 SRO 3.8**
17 523	**WE11 EK2.1** Knowledge of the interrelations between the (Loss of Emergency Coolant Recirculation) and the following: (CFR: 41.7 / 45.7)	**Loss of Emergency Coolant Recirculation** — Components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.	T/G 1 / 1	**RO 3.6 SRO 3.9**
18 524	**WE12 EK1.3** Knowledge of the operational implications of the following concepts as they apply to the (Uncontrolled Depressurization of all Steam Generators) (CFR: 41.8 / 41.10 / 45.3)	**Uncontrolled Depressurization of all Steam Generators** — Annunciators and conditions indicating signals, and remedial actions associated with the (Uncontrolled Depressurization of all Steam Generators).	T/G 1 / 1	**RO 3.4 SRO 3.7**
19 525	**APE001 AA1.06** Ability to operate and / or monitor the following as they apply to the Continuous Rod Withdrawal : (CFR 41.7 / 45.5 / 45.6)	**Continuous Rod Withdrawal** — Rod transfer switches	T/G 1 / 2	**RO 3.0* SRO 2.9***

2008 RO NRC Examination

ES 401, Rev 9 | Combined PWR Written Examination Outline | Form ES-401-2/3

Question	K/A Number K/A Description	K/A System	Tier/Group	Importance RO/SRO
20 526	**APE005 2.4.6** APE005 GENERIC	**Inoperable/Stuck Control Rod** Knowledge of EOP mitigation strategies. (CFR: 41.10 / 43.5 / 45.13)	T/G 1 / 2	**RO 3.7 SRO 4.7**
21 527	**APE024 AK1.04** Knowledge of the operational implications of the following concepts as they apply to Emergency Boration: (CFR 41.8 / 41.10 / 45.3)	**Emergency Boration** Low temperature limits for born concentration	T/G 1 / 2	**RO 2.8 SRO 3.6**
22 528	**APE033 AK1.01** Knowledge of the operational implications of the following concepts as they apply to Loss of Intermediate Range Nuclear Instrumentation: CFR 41.8 / 41.10 / 45.3)	**Loss of Intermediate Range Nuclear Instrumentation** Effects of voltage changes on performance	T/G 1 / 2	**RO 2.7 SRO 3.0**
23 529	**APE037 AA2.03** Ability to determine and interpret the following as they apply to the Steam Generator Tube Leak: (CFR: 43.5 / 45.13)	**Steam Generator (S/G) Tube Leak** That the expected indication on main steam lines from the S/Gs should show increasing radiation levels	T/G 1 / 2	**RO 3.4 SRO 3.9**
24 530	**EPE074 EA1.01** Ability to operate and monitor the following as they apply to a Inadequate Core Cooling: (CFR 41.7 / 45.5 / 45.6)	**Inadequate Core Cooling** RCS water inventory	T/G 1 / 2	**RO 4.2 SRO 4.4**
25 531	**APE036 AK3.03** Knowledge of the reasons for the following responses as they apply to the Fuel Handling Incidents: (CFR 41.5,41.10 / 45.6 / 45.13)	**Fuel Handling Incidents** Guidance contained in EOP for fuel handling incident	T/G 1 / 2	**RO 3.7 SRO 4.1**
26 532	**WE03 EK2.1** Knowledge of the interrelations between the (LOCA Cooldown and Depressurization) and the following: (CFR: 41.7 / 45.7)	**LOCA Cooldown and Depressurization** Components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.	T/G 1 / 2	**RO 3.6 SRO 4.0**

Question	K/A Number / K/A Description	K/A System	Tier/Group	Importance RO/SRO
27 533	**WE09 EK3.3** Knowledge of the reasons for the following responses as they apply to the (Natural Circulation Operations) (CFR: 41.5 / 41.10, 45.6, 45.13)	**Natural Circulation Operations** Manipulation of controls required to obtain desired operating results during abnormal, and emergency situations.	T/G 1 / 2	**RO 3.5 SRO 3.6**
28 534	**SYS003 A2.02** Ability to (a) predict the impacts of the following malfunctions or operations on the RCPS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: (CFR: 41.5 / 43.5/ 45.3 / 45/13)	**Reactor Coolant Pump System (RCPS)** Conditions which exist for an abnormal shutdown of an RCP in comparison to a normal shutdown of an RCP	T/G 2 / 1	**RO 3.7 SRO 3.9**
29 535	**SYS004 A1.01** Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the CVCS controls including: (CFR: 41.5 / 45.5)	**Chemical and Volume Control System** Activity levels in primary system	T/G 2 / 1	**RO 2.9 SRO 3.8**
30 536	**SYS004 K1.34** Knowledge of the physical connections and/or cause-effect relationships between the CVCS and the following systems: (CFR: 41.2 to 41.9 / 45.7 to 45.8)	**Chemical and Volume Control System** Interface between CVCS and reactor coolant drain tank; and PZR PCS	T/G 2 / 1	**RO 2.7 SRO 2.9**
31 537	**SYS005 K4.11** Knowledge of RHRS design feature(s) and/or interlock(s) which provide or the following : (CFR: 41.7)	**Residual Heat Removal System (RHRS)** Lineup for low head recirculation mode (external and internal)	T/G 2 / 1	**RO 3.5* SRO 3.9***
32 538	**SYS006 A1.05** Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the ECCS controls including: (CFR: 41.5 / 45.5)	**Emergency Core Cooling System (ECCS)** CCW flow (establish flow to RHR heat exchanger prior to placing in service	T/G 2 / 1	**RO 2.9 SRO 3.3**

Question	K/A Number K/A Description	K/A System	Tier/Group	Importance RO/SRO
33 539	**SYS007 2.4.6** SYS007 GENERIC	**Pressurizer Relief Tank/Quench Tank System (PRTS)** Knowledge of EOP mitigation strategies. (CFR: 41.10 / 43.5 / 45.13)	T/G 2 / 1	**RO 3.7 SRO 4.7**
34 540	**SYS008 K3.03** Knowledge of the effect that a loss or malfunction of the CCWS will have on the following:	**Component Cooling Water System (CCWS)** RCP	T/G 2 / 1	**RO 4.1 SRO 4.2**
35 541	**SYS008 K4.09** Knowledge of CCWS design feature(s) and/or interlock(s) which provide for the following: (CFR: 41.7)	**Component Cooling Water System (CCWS)** The "standby" feature for the CCW pumps	T/G 2 / 1	**RO 2.7 SRO 2.9**
36 542	**SYS010 2.1.25** SYS010 GENERIC	**Pressurizer Pressure Control System (PZR PCS)** Ability to interpret reference materials, such as graphs, curves, tables, etc. (CFR: 41.10 / 43.5 / 45.12)	T/G 2 / 1	**RO 3.9 SRO 4.2**
37 543	**SYS012 A2.02** Ability to (a) predict the impacts of the following malfunctions or operations on the RPS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: (CFR: 41.5 / 43.5 / 45.3 / 45.5)	**Reactor Protection System (RPS)** Loss of instrument power	T/G 2 / 1	**RO 3.6 SRO 3.9**
38 544	**SYS012 K5.01** Knowledge of the operational implications of the following concepts as the apply to the RPS: (CFR: 41.5 / 45.7)	**Reactor Protection System (RPS)** DNB	T/G 2 / 1	**RO 3.3* SRO 3.8**
39 545	**SYS013 K6.01** Knowledge of the effect of a loss or malfunction on the following will have on the ESFAS: (CFR: 41.7 / 45.5 to 45.8)	**Engineered Safety Features Actuation System (ESFAS)** Sensors and detectors	T/G 2 / 1	**RO 2.7* SRO 3.1***

Question	K/A Number / K/A Description	K/A System	Tier/Group	Importance RO/SRO
40 546	**SYS022 K2.02** Knowledge of power supplies to the following: (CFR: 41.7)	**Containment Cooling System (CCS)** — Chillers	T/G 2 / 1	**RO 2.5* SRO 2.4***
41 547	**SYS025 A4.01** Ability to manually operate and/or monitor in the control room: (CFR: 41.7 / 45.5 to 45.8)	**Ice Condenser System** — Ice condenser isolation valves	T/G 2 / 1	**RO 3.0* SRO 2.7***
42 548	**SYS026 A1.03** Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the CSS controls including: (CFR: 41.5 / 45.5)	**Containment Spray System (CSS)** — Containment sump level	T/G 2 / 1	**RO 3.5 SRO 3.5**
43 549	**SYS026 K1.01** Knowledge of the physical connections and/or cause-effect relationships between the CSS and the following systems: (CFR: 41.2 to 41.9 / 45.7 to 45.8)	**Containment Spray System (CSS)** — ECCS	T/G 2 / 1	**RO 4.2 SRO 4.2**
44 550	**SYS039 K5.01** Knowledge of the operational implications of the following concepts as the apply to the MRSS: (CFR: 441.5 / 45.7)	**Main and Reheat Steam System (MRSS)** — Definition and causes of steam/water hammer	T/G 2 / 1	**RO 2.9 SRO 3.1**
45 551	**SYS059 A4.11** Ability to manually operate and monitor in the control room: (CFR: 41.7 / 45.5 to 45.8)	**Main Feedwater (MFW) System** — Recovery from automatic feedwater isolation	T/G 2 / 1	**RO 3.1 SRO 3.3**
46 552	**SYS061 A3.03** Ability to monitor automatic operation of the AFW, including: (CFR: 41.7 / 45.5)	**Auxiliary / Emergency Feedwater (AFW) System** — AFW S/G level control on automatic start	T/G 2 / 1	**RO 3.9 SRO 3.9**

Question	K/A Number / K/A Description	K/A System	Tier/Group	Importance RO/SRO
47 553	**SYS062 A3.01** Ability to monitor automatic operation of the ac distribution system, including: (CFR: 41.7 / 45.5)	**AC Electrical Distribution System** Vital ac bus amperage	T/G 2 / 1	**RO 3.0 SRO 3.1**
48 554	**SYS063 K2.01** Knowledge of bus power supplies to the following: (CFR: 41.7)	**DC Electrical Distribution System** Major DC loads	T/G 2 / 1	**RO 2.9* SRO 3.1***
49 555	**SYS063 K3.01** Knowledge of the effect that a loss or malfunction of the DC electrical system will have on the following: (CFR: 41.7 / 45.6)	**DC Electrical Distribution System** ED/G	T/G 2 / 1	**RO 3.7* SRO 4.1**
50 556	**SYS064 A3.07** Ability to monitor automatic operation of the ED/G system, including: (CFR: 41.7 / 45.5)	**Emergency Diesel Generator (ED/G) System** Load sequencing	T/G 2 / 1	**RO 3.6* SRO 3.7***
51 557	**SYS064 K6.07** Knowledge of the effect of a loss or malfunction of the following will have on the ED/G system: (CFR: 41.7 / 45.7)	**Emergency Diesel Generator (ED/G) System** Air receivers	T/G 2 / 1	**RO 2.7 SRO 2.9**
52 558	**SYS073 A2.02** Ability to (a) predict the impacts of the following malfunctions or operations on the PRM system; and (b) based on those predictions, use procedures to cor- rect, control, or mitigate the consequences of those malfunctions or operations: (CFR: 41.5 / 43.5 / 45.3 / 45.13)	**Process Radiation Monitoring (PRM) System** Detector failure	T/G 2 / 1	**RO 2.7 SRO 3.2**

Question	K/A Number K/A Description	K/A System	Tier/Group	Importance RO/SRO
53 559	**SYS076 K2.01** Knowledge of bus power supplies to the following: (CFR: 41.7)	**Service Water System (SWS)** Service water	T/G 2 / 1	**RO 2.7* SRO 2.7**
54 560	**SYS078 K3.02** Knowledge of the effect that a loss or malfunction of the IAS will have on the following: (CFR: 41.7 / 45.6)	**Instrument Air System (IAS)** Systems having pneumatic valves and controls	T/G 2 / 1	**RO 3.4 SRO 3.6**
55 561	**SYS103 K1.07** Knowledge of the physical connections and/or cause-effect relationships between the containment system and the following systems: (CFR: 41.2 to 41.9 / 45.7 to 45.8)	**Containment System** Containment vacuum system	T/G 2 / 1	**RO 3.5* SRO 3.7***
56 562	**SYS001 K2.02** Knowledge of bus power supplies to the following: (CFR: 41.7)	**Control Rod Drive System** One-line diagram of power supply to trip breakers	T/G 2 / 2	**RO 3.6 SRO 3.7**
57 563	**SYS011 A1.02** Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the PZR LCS controls including: (CFR: 41.5 / 45.5)	**Pressurizer Level Control System (PZR LCS)** Charging and letdown flows	T/G 2 / 2	**RO 3.3 SRO 3.5**
58 564	**SYS016 K1.12** Knowledge of the physical connections and/or cause-effect relationships between the NNIS and the following systems: (CFR: 41.2 to 41.9 / 45.7 to 45.8)	**Non-Nuclear Instrumentation System (NNIS)** S/G	T/G 2 / 2	**RO 3.5* SRO 3.5***
59 565	**SYS017 K3.01** Knowledge of the effect that a loss or malfunction of the ITM system will have on the following: (CFR: 41.7 / 45.6)	**In-Core Temperature Monitor (ITM) System** Natural circulation indications	T/G 2 / 2	**RO 3.5* SRO 3.7***

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Question	K/A Number K/A Description	K/A System	Tier/Group	Importance RO/SRO
60 566	**SYS027 K5.01** Knowledge of the operational implications of the following concepts as they apply to the CIRS: (CFR: 41.7 / 45.7)	**Containment Iodine Removal System (CIRS)** Purpose of charcoal filters	T/G 2 / 2	**RO 3.1* SRO 3.4***
61 567	**SYS035 2.2.40** SYS035 GENERIC	**Steam Generator System (S/GS)** Ability to apply Technical Specifications for a system. (CFR: 41.10 / 43.2 / 43.5 / 45.3)	T/G 2 / 2	**RO 3.4 SRO 4.7**
62 568	**SYS045 A3.05** Ability to monitor automatic operation of the MT/G system, including: (CFR: 41/7 / 45.5)	**Main Turbine Generator (MT/G) System** Electrohydraulic control	T/G 2 / 2	**RO 2.6 SRO 2.9**
63 569	**SYS071 K4.01** Knowledge of design feature(s) and/or interlock(s) which provide for the following: (CFR: 41.7)	**Waste Gas Disposal System (WGDS)** Pressure capability of the waste gas decay tank	T/G 2 / 2	**RO 2.6 SRO 3.0**
64 570	**SYS079 A4.01** Ability to manually operate and/or monitor in the control room: (CFR: 41.7 / 45.5 to 45.8)	**Station Air System (SAS)** Cross-tie valves with IAS	T/G 2 / 2	**RO 2.7 SRO 2.7**
65 571	**SYS086 K6.04** Knowledge of the effect of a loss or malfunction on the Fire Protection System following will have on the : (CFR: 41.7 / 45.7)	**Fire Protection System (FPS)** Fire, smoke, and heat detectors	T/G 2 / 2	**RO 2.6 SRO 2.9**
66 572	**GEN2.1 2.1.45** Conduct of Operations	**GENERIC - Conduct of Operations** Ability to identify and interpret diverse indications to validate the response of another indication. (CFR: 41.7 / 43.5 / 45.4)	T/G 3 / 0	**RO 4.3 SRO 4.3**

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Question	K/A Number K/A Description	K/A System	Tier/Group	Importance RO/SRO
67 573	**GEN2.1 2.1.8** Conduct of Operations	**GENERIC - Conduct of Operations** Ability to coordinate personnel activities outside the control room. (CFR: 41.10 / 45.5 / 45.12 / 45.13)	T/G 3 / 0	**RO 3.4 SRO 4.1**
68 574	**GEN2.2 2.2.2** Equipment Control	**GENERIC - Equipment Control** Ability to manipulate the console controls as required to operate the facility between shutdown and designated power levels. (CFR: 41.6 / 41.7 / 45.2)	T/G 3 / 0	**RO 4.6 SRO 4.1**
69 575	**GEN2.2 2.2.39** Equipment Control	**GENERIC - Equipment Control** Knowledge of less than or equal to one hour Technical Specification action statements for systems. (CFR: 41.7 / 41.10 / 43.2 / 45.13)	T/G 3 / 0	**RO 3.9 SRO 4.5**
70 576	**GEN2.3 2.3.11** Radiation Control	**GENERIC - Radiation Control** Ability to control radiation releases. (CFR: 41.11 / 43.4 / 45.10)	T/G 3 / 0	**RO 3.8 SRO 4.3**
71 577	**GEN2.3 2.3.4** Radiation Control	**GENERIC - Radiation Control** Knowledge of radiation exposure limits under normal or emergency conditions. (CFR: 41.12 / 43.4 / 45.10)	T/G 3 / 0	**RO 3.2 SRO 3.7**
72 578	**GEN2.3 2.3.7** Radiation Control	**GENERIC - Radiation Control** Ability to comply with radiation work permit requirements during normal orabnormal conditions. (CFR: 41.12 / 45.10)	T/G 3 / 0	**RO 3.5 SRO 3.6**
73 579	**GEN2.4 2.4.13** Emergency Procedures / Plan	**GENERIC - Emergency Procedures / Plan** Knowledge of crew roles and responsibilities during EOP usage. (CFR: 41.10 / 45.12)	T/G 3 / 0	**RO 4.0 SRO 4.6**
74 580	**GEN2.4 2.4.22** Emergency Procedures / Plan	**GENERIC - Emergency Procedures / Plan** Knowledge of the bases for prioritizing safety functions during abnormal/emergency operations. (CFR: 41.7 / 41.10 / 43.5 / 45.12)	T/G 3 / 0	**RO 3.6 SRO 4.4**

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Question	K/A Number K/A Description	K/A System	Tier/Group	Importance RO/SRO
75 581	**GEN2.4 2.4.42** Emergency Procedures / Plan	**GENERIC - Emergency Procedures / Plan** Knowledge of emergency response facilities. (CFR: 41.10 / 45.11)	T/G 3 / 0	**RO 2.6 SRO 3.8**

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Question	K/A Number / K/A Description	K/A System	Tier/Group	Importance RO/SRO
1 507	**EPE007 EK2.03** Knowledge of the interrelations between a reactor trip and the following: (CFR 41.7 / 45.7)	**Reactor Trip** Reactor trip status panel	T/G 1 / 1	**RO 3.5 SRO 3.6**
2 508	**EPE009 EA2.10** Ability to determine or interpret the following as they apply to a small break LOCA: (CFR 43.5 / 45.13)	**Small Break LOCA** Airborne activity	T/G 1 / 1	**RO 3.1 SRO 3.7**
3 509	**EPE011 2.4.30** EPE011 GENERIC	**Large Break LOCA** Knowledge of events related to system operation/status that must be reported to internal organizations or external agencies, such as the State, the NRC, or the transmission system operator. (CFR: 41.10 / 43.5 / 45.11)	T/G 1 / 1	**RO 2.7 SRO 4.1**
4 510	**APE022 AK1.02** Knowledge of the operational implications of the following concepts as they apply to Loss of Reactor Coolant Makeup: (CFR 41.8 / 41.10 / 45.3)	**Loss of Reactor Coolant Makeup** Relationship of charging flow to pressure differential between charging and RCS	T/G 1 / 1	**RO 2.7 SRO 3.1**
5 511	**APE025 2.4.30** APE025 GENERIC	**Loss of Residual Heat Removal System (RHRS)** Knowledge of events related to system operation/status that must be reported to internal organizations or external agencies, such as the State, the NRC, or the transmission system operator. (CFR: 41.10 / 43.5 / 45.11)	T/G 1 / 1	**RO 2.7 SRO 4.1**
6 512	**APE026 AA2.03** Ability to determine and interpret the following as they apply to the Loss of Component Cooling Water: (CFR: 43.5 / 45.13)	**Loss of Component Cooling Water (CCW)** The valve lineups necessary to restart the CCWS while bypassing the portion of the system causing the abnormal condition	T/G 1 / 1	**RO 2.6 SRO 2.9**
7 513	**APE027 AA1.04** Ability to operate and / or monitor the following as they apply to the Pressurizer Pressure Control Malfunctions: (CFR 41.7 / 45.5 / 45.6)	**Pressurizer Pressure Control System (PZR PCS) Malfunction** Pressure recovery, using emergency-only heaters	T/G 1 / 1	**RO 3.9* SRO 3.6***

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Question	K/A Number / K/A Description	K/A System	Tier/Group	Importance RO/SRO
8 514	**EPE029 2.4.34** EPE029 GENERIC	**Anticipated Transient Without Scram (ATWS)** Knowledge of RO tasks performed outside the main control room during an emergency and the resultant operational effects. (CFR: 41.10 / 43.5 / 45.13)	T/G 1 / 1	**RO 4.2 SRO 4.1**
9 515	**EPE038 EK1.02** Knowledge of the operational implications of the following concepts as they apply to the SGTR: (CFR 41.8 / 41.10 / 45.3)	**Steam Generator Tube Rupture (SGTR)** Leak rate vs. pressure drop	T/G 1 / 1	**RO 3.2 SRO 3.5**
10 516	**APE057 AA2.13** Ability to determine and interpret the following as they apply to the Loss of Vital AC Instrument Bus: (CFR: 43.5 / 45.13)	**Loss of Vital AC Electrical Instrument Bus** VCT level and pressure indicators and recorders	T/G 1 / 1	**RO 3.0 SRO 3.4**
11 517	**APE058 AA1.02** Ability to operate and / or monitor the following as they apply to the Loss of DC Power: (CFR 41.7 / 45.5 / 45.6)	**Loss of DC Power** Static inverter dc input breaker, frequency meter, ac output breaker, and ground fault detector	T/G 1 / 1	**RO 3.1* SRO 3.1**
12 518	**APE062 AK3.03** Knowledge of the reasons for the following responses as they apply to the Loss of Nuclear Service Water: (CFR 41.4, 41.8 / 45.7)	**Loss of Nuclear Service Water** Guidance actions contained in EOP for Loss of nuclear service water	T/G 1 / 1	**RO 4.0 SRO 4.2**
13 519	**APE065 AK3.03** Knowledge of the reasons for the following responses as they apply to the Loss of Instrument Air: (CFR 41.5,41.10 / 45.6 / 45.13)	**Loss of Instrument Air** Knowing effects on plant operation of isolating certain equipment from instrument air	T/G 1 / 1	**RO 2.9 SRO 3.4**

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Question	K/A Number / K/A Description	K/A System	Tier/Group	Importance RO/SRO
14 520	**APE077 AA1.01** Ability to operate and/or monitor the following as they apply to Generator Voltage and Electric Grid Disturbances: (CFR: 41.5 and 41.10 / 45.5, 45.7, and 45.8)	**Generator Voltage and Electric Grid Disturbances** — Grid frequency and voltage.....	T/G 1 / 0	**RO 3.6 SRO 3.7**
15 521	**WE04 EK2.2** Knowledge of the interrelations between the (LOCA Outside Containment) and the following: (CFR: 41.7 / 45.7)	**LOCA Outside Containment** — 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.	T/G 1 / 1	**RO 3.8 SRO 4.0**
16 522	**WE05 EK3.1** Knowledge of the reasons for the following responses as they apply to the (Loss of Secondary Heat Sink) (CFR: 41.5 / 41.10, 45.6, 45.13)	**Loss of Secondary Heat Sink** — 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.	T/G 1 / 1	**RO 3.4 SRO 3.8**
17 523	**WE11 EK2.1** Knowledge of the interrelations between the (Loss of Emergency Coolant Recirculation) and the following: (CFR: 41.7 / 45.7)	**Loss of Emergency Coolant Recirculation** — Components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.	T/G 1 / 1	**RO 3.6 SRO 3.9**
18 524	**WE12 EK1.3** Knowledge of the operational implications of the following concepts as they apply to the (Uncontrolled Depressurization of all Steam Generators) (CFR: 41.8 / 41.10 / 45.3)	**Uncontrolled Depressurization of all Steam Generators** — Annunciators and conditions indicating signals, and remedial actions associated with the (Uncontrolled Depressurization of all Steam Generators).	T/G 1 / 1	**RO 3.4 SRO 3.7**
19 525	**APE001 AA1.06** Ability to operate and / or monitor the following as they apply to the Continuous Rod Withdrawal : (CFR 41.7 / 45.5 / 45.6)	**Continuous Rod Withdrawal** — Rod transfer switches	T/G 1 / 2	**RO 3.0* SRO 2.9***

Question	K/A Number K/A Description	K/A System	Tier/Group	Importance RO/SRO
20 526	**APE005 2.4.6** APE005 GENERIC	**Inoperable/Stuck Control Rod** Knowledge of EOP mitigation strategies. (CFR: 41.10 / 43.5 / 45.13)	T/G 1 / 2	**RO 3.7 SRO 4.7**
21 527	**APE024 AK1.04** Knowledge of the operational implications of the following concepts as they apply to Emergency Boration: (CFR 41.8 / 41.10 / 45.3)	**Emergency Boration** Low temperature limits for born concentration	T/G 1 / 2	**RO 2.8 SRO 3.6**
22 528	**APE033 AK1.01** Knowledge of the operational implications of the following concepts as they apply to Loss of Intermediate Range Nuclear Instrumentation: CFR 41.8 / 41.10 / 45.3)	**Loss of Intermediate Range Nuclear Instrumentation** Effects of voltage changes on performance	T/G 1 / 2	**RO 2.7 SRO 3.0**
23 529	**APE037 AA2.03** Ability to determine and interpret the following as they apply to the Steam Generator Tube Leak: (CFR: 43.5 / 45.13)	**Steam Generator (S/G) Tube Leak** That the expected indication on main steam lines from the S/Gs should show increasing radiation levels	T/G 1 / 2	**RO 3.4 SRO 3.9**
24 530	**EPE074 EA1.01** Ability to operate and monitor the following as they apply to a Inadequate Core Cooling: (CFR 41.7 / 45.5 / 45.6)	**Inadequate Core Cooling** RCS water inventory	T/G 1 / 2	**RO 4.2 SRO 4.4**
25 531	**APE036 AK3.03** Knowledge of the reasons for the following responses as they apply to the Fuel Handling Incidents: (CFR 41.5,41.10 / 45.6 / 45.13)	**Fuel Handling Incidents** Guidance contained in EOP for fuel handling incident	T/G 1 / 2	**RO 3.7 SRO 4.1**
26 532	**WE03 EK2.1** Knowledge of the interrelations between the (LOCA Cooldown and Depressurization) and the following: (CFR: 41.7 / 45.7)	**LOCA Cooldown and Depressurization** Components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.	T/G 1 / 2	**RO 3.6 SRO 4.0**

Question	K/A Number / K/A Description	K/A System	Tier/Group	Importance RO/SRO
27 533	**WE09 EK3.3** Knowledge of the reasons for the following responses as they apply to the (Natural Circulation Operations) (CFR: 41.5 / 41.10, 45.6, 45.13)	**Natural Circulation Operations** Manipulation of controls required to obtain desired operating results during abnormal, and emergency situations.	T/G 1 / 2	**RO 3.5 SRO 3.6**
28 534	**SYS003 A2.02** Ability to (a) predict the impacts of the following malfunctions or operations on the RCPS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: (CFR: 41.5 / 43.5/ 45.3 / 45/13)	**Reactor Coolant Pump System (RCPS)** Conditions which exist for an abnormal shutdown of an RCP in comparison to a normal shutdown of an RCP	T/G 2 / 1	**RO 3.7 SRO 3.9**
29 535	**SYS004 A1.01** Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the CVCS controls including: (CFR: 41.5 / 45.5)	**Chemical and Volume Control System** Activity levels in primary system	T/G 2 / 1	**RO 2.9 SRO 3.8**
30 536	**SYS004 K1.34** Knowledge of the physical connections and/or cause-effect relationships between the CVCS and the following systems: (CFR: 41.2 to 41.9 / 45.7 to 45.8)	**Chemical and Volume Control System** Interface between CVCS and reactor coolant drain tank; and PZR PCS	T/G 2 / 1	**RO 2.7 SRO 2.9**
31 537	**SYS005 K4.11** Knowledge of RHRS design feature(s) and/or interlock(s) which provide or the following : (CFR: 41.7)	**Residual Heat Removal System (RHRS)** Lineup for low head recirculation mode (external and internal)	T/G 2 / 1	**RO 3.5* SRO 3.9***
32 538	**SYS006 A1.05** Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the ECCS controls including: (CFR: 41.5 / 45.5)	**Emergency Core Cooling System (ECCS)** CCW flow (establish flow to RHR heat exchanger prior to placing in service	T/G 2 / 1	**RO 2.9 SRO 3.3**

Question	K/A Number K/A Description	K/A System	Tier/Group	Importance RO/SRO
33 539	**SYS007 2.4.6** SYS007 GENERIC	**Pressurizer Relief Tank/Quench Tank System (PRTS)** Knowledge of EOP mitigation strategies. (CFR: 41.10 / 43.5 / 45.13)	T/G 2 / 1	**RO 3.7 SRO 4.7**
34 540	**SYS008 K3.03** Knowledge of the effect that a loss or malfunction of the CCWS will have on the following:	**Component Cooling Water System (CCWS)** RCP	T/G 2 / 1	**RO 4.1 SRO 4.2**
35 541	**SYS008 K4.09** Knowledge of CCWS design feature(s) and/or interlock(s) which provide for the following: (CFR: 41.7)	**Component Cooling Water System (CCWS)** The "standby" feature for the CCW pumps	T/G 2 / 1	**RO 2.7 SRO 2.9**
36 542	**SYS010 2.1.25** SYS010 GENERIC	**Pressurizer Pressure Control System (PZR PCS)** Ability to interpret reference materials, such as graphs, curves, tables, etc. (CFR: 41.10 / 43.5 / 45.12)	T/G 2 / 1	**RO 3.9 SRO 4.2**
37 543	**SYS012 A2.02** Ability to (a) predict the impacts of the following malfunctions or operations on the RPS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: (CFR: 41.5 / 43.5 / 45.3 / 45.5)	**Reactor Protection System (RPS)** Loss of instrument power	T/G 2 / 1	**RO 3.6 SRO 3.9**
38 544	**SYS012 K5.01** Knowledge of the operational implications of the following concepts as the apply to the RPS: (CFR: 41.5 / 45.7)	**Reactor Protection System (RPS)** DNB	T/G 2 / 1	**RO 3.3* SRO 3.8**
39 545	**SYS013 K6.01** Knowledge of the effect of a loss or malfunction on the following will have on the ESFAS: (CFR: 41.7 / 45.5 to 45.8)	**Engineered Safety Features Actuation System (ESFAS)** Sensors and detectors	T/G 2 / 1	**RO 2.7* SRO 3.1***

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40 546	**SYS022 K2.02** Knowledge of power supplies to the following: (CFR: 41.7)	**Containment Cooling System (CCS)** — Chillers	T/G 2 / 1	**RO 2.5* SRO 2.4***
41 547	**SYS025 A4.01** Ability to manually operate and/or monitor in the control room: (CFR: 41.7 / 45.5 to 45.8)	**Ice Condenser System** — Ice condenser isolation valves	T/G 2 / 1	**RO 3.0* SRO 2.7***
42 548	**SYS026 A1.03** Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the CSS controls including: (CFR: 41.5 / 45.5)	**Containment Spray System (CSS)** — Containment sump level	T/G 2 / 1	**RO 3.5 SRO 3.5**
43 549	**SYS026 K1.01** Knowledge of the physical connections and/or cause-effect relationships between the CSS and the following systems: (CFR: 41.2 to 41.9 / 45.7 to 45.8)	**Containment Spray System (CSS)** — ECCS	T/G 2 / 1	**RO 4.2 SRO 4.2**
44 550	**SYS039 K5.01** Knowledge of the operational implications of the following concepts as the apply to the MRSS: (CFR: 441.5 / 45.7)	**Main and Reheat Steam System (MRSS)** — Definition and causes of steam/water hammer	T/G 2 / 1	**RO 2.9 SRO 3.1**
45 551	**SYS059 A4.11** Ability to manually operate and monitor in the control room: (CFR: 41.7 / 45.5 to 45.8)	**Main Feedwater (MFW) System** — Recovery from automatic feedwater isolation	T/G 2 / 1	**RO 3.1 SRO 3.3**
46 552	**SYS061 A3.03** Ability to monitor automatic operation of the AFW, including: (CFR: 41.7 / 45.5)	**Auxiliary / Emergency Feedwater (AFW) System** — AFW S/G level control on automatic start	T/G 2 / 1	**RO 3.9 SRO 3.9**

Question	K/A Number / K/A Description	K/A System	Tier/Group	Importance RO/SRO
47 553	**SYS062 A3.01** Ability to monitor automatic operation of the ac distribution system, including: (CFR: 41.7 / 45.5)	**AC Electrical Distribution System** — Vital ac bus amperage	T/G 2 / 1	**RO 3.0 SRO 3.1**
48 554	**SYS063 K2.01** Knowledge of bus power supplies to the following: (CFR: 41.7)	**DC Electrical Distribution System** — Major DC loads	T/G 2 / 1	**RO 2.9* SRO 3.1***
49 555	**SYS063 K3.01** Knowledge of the effect that a loss or malfunction of the DC electrical system will have on the following: (CFR: 41.7 / 45.6)	**DC Electrical Distribution System** — ED/G	T/G 2 / 1	**RO 3.7* SRO 4.1**
50 556	**SYS064 A3.07** Ability to monitor automatic operation of the ED/G system, including: (CFR: 41.7 / 45.5)	**Emergency Diesel Generator (ED/G) System** — Load sequencing	T/G 2 / 1	**RO 3.6* SRO 3.7***
51 557	**SYS064 K6.07** Knowledge of the effect of a loss or malfunction of the following will have on the ED/G system: (CFR: 41.7 / 45.7)	**Emergency Diesel Generator (ED/G) System** — Air receivers	T/G 2 / 1	**RO 2.7 SRO 2.9**
52 558	**SYS073 A2.02** Ability to (a) predict the impacts of the following malfunctions or operations on the PRM system; and (b) based on those predictions, use procedures to cor- rect, control, or mitigate the consequences of those malfunctions or operations: (CFR: 41.5 / 43.5 / 45.3 / 45.13)	**Process Radiation Monitoring (PRM) System** — Detector failure	T/G 2 / 1	**RO 2.7 SRO 3.2**

Question	K/A Number K/A Description	K/A System	Tier/Group	Importance RO/SRO
53 559	**SYS076 K2.01** Knowledge of bus power supplies to the following: (CFR: 41.7)	**Service Water System (SWS)** Service water	T/G 2 / 1	**RO 2.7* SRO 2.7**
54 560	**SYS078 K3.02** Knowledge of the effect that a loss or malfunction of the IAS will have on the following: (CFR: 41.7 / 45.6)	**Instrument Air System (IAS)** Systems having pneumatic valves and controls	T/G 2 / 1	**RO 3.4 SRO 3.6**
55 561	**SYS103 K1.07** Knowledge of the physical connections and/or cause-effect relationships between the containment system and the following systems: (CFR: 41.2 to 41.9 / 45.7 to 45.8)	**Containment System** Containment vacuum system	T/G 2 / 1	**RO 3.5* SRO 3.7***
56 562	**SYS001 K2.02** Knowledge of bus power supplies to the following: (CFR: 41.7)	**Control Rod Drive System** One-line diagram of power supply to trip breakers	T/G 2 / 2	**RO 3.6 SRO 3.7**
57 563	**SYS011 A1.02** Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the PZR LCS controls including: (CFR: 41.5 / 45.5)	**Pressurizer Level Control System (PZR LCS)** Charging and letdown flows	T/G 2 / 2	**RO 3.3 SRO 3.5**
58 564	**SYS016 K1.12** Knowledge of the physical connections and/or cause-effect relationships between the NNIS and the following systems: (CFR: 41.2 to 41.9 / 45.7 to 45.8)	**Non-Nuclear Instrumentation System (NNIS)** S/G	T/G 2 / 2	**RO 3.5* SRO 3.5***
59 565	**SYS017 K3.01** Knowledge of the effect that a loss or malfunction of the ITM system will have on the following: (CFR: 41.7 / 45.6)	**In-Core Temperature Monitor (ITM) System** Natural circulation indications	T/G 2 / 2	**RO 3.5* SRO 3.7***

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Question	K/A Number K/A Description	K/A System	Tier/Group	Importance RO/SRO
60 566	**SYS027 K5.01** Knowledge of the operational implications of the following concepts as they apply to the CIRS: (CFR: 41.7 / 45.7)	**Containment Iodine Removal System (CIRS)** Purpose of charcoal filters	T/G 2 / 2	**RO 3.1* SRO 3.4***
61 567	**SYS035 2.2.40** SYS035 GENERIC	**Steam Generator System (S/GS)** Ability to apply Technical Specifications for a system. (CFR: 41.10 / 43.2 / 43.5 / 45.3)	T/G 2 / 2	**RO 3.4 SRO 4.7**
62 568	**SYS045 A3.05** Ability to monitor automatic operation of the MT/G system, including: (CFR: 41/7 / 45.5)	**Main Turbine Generator (MT/G) System** Electrohydraulic control	T/G 2 / 2	**RO 2.6 SRO 2.9**
63 569	**SYS071 K4.01** Knowledge of design feature(s) and/or interlock(s) which provide for the following: (CFR: 41.7)	**Waste Gas Disposal System (WGDS)** Pressure capability of the waste gas decay tank	T/G 2 / 2	**RO 2.6 SRO 3.0**
64 570	**SYS079 A4.01** Ability to manually operate and/or monitor in the control room: (CFR: 41.7 / 45.5 to 45.8)	**Station Air System (SAS)** Cross-tie valves with IAS	T/G 2 / 2	**RO 2.7 SRO 2.7**
65 571	**SYS086 K6.04** Knowledge of the effect of a loss or malfunction on the Fire Protection System following will have on the : (CFR: 41.7 / 45.7)	**Fire Protection System (FPS)** Fire, smoke, and heat detectors	T/G 2 / 2	**RO 2.6 SRO 2.9**
66 572	**GEN2.1 2.1.45** Conduct of Operations	**GENERIC - Conduct of Operations** Ability to identify and interpret diverse indications to validate the response of another indication. (CFR: 41.7 / 43.5 / 45.4)	T/G 3 / 0	**RO 4.3 SRO 4.3**

2008 SRO NRC Examination

ES 401, Rev 9 | Combined PWR Written Examination Outline | Form ES-401-2/3

Question	K/A Number K/A Description	K/A System	Tier/Group	Importance RO/SRO
67 573	**GEN2.1 2.1.8** Conduct of Operations	**GENERIC - Conduct of Operations** Ability to coordinate personnel activities outside the control room. (CFR: 41.10 / 45.5 / 45.12 / 45.13)	T/G 3 / 0	**RO 3.4 SRO 4.1**
68 574	**GEN2.2 2.2.2** Equipment Control	**GENERIC - Equipment Control** Ability to manipulate the console controls as required to operate the facility between shutdown and designated power levels. (CFR: 41.6 / 41.7 / 45.2)	T/G 3 / 0	**RO 4.6 SRO 4.1**
69 575	**GEN2.2 2.2.39** Equipment Control	**GENERIC - Equipment Control** Knowledge of less than or equal to one hour Technical Specification action statements for systems. (CFR: 41.7 / 41.10 / 43.2 / 45.13)	T/G 3 / 0	**RO 3.9 SRO 4.5**
70 576	**GEN2.3 2.3.11** Radiation Control	**GENERIC - Radiation Control** Ability to control radiation releases. (CFR: 41.11 / 43.4 / 45.10)	T/G 3 / 0	**RO 3.8 SRO 4.3**
71 577	**GEN2.3 2.3.4** Radiation Control	**GENERIC - Radiation Control** Knowledge of radiation exposure limits under normal or emergency conditions. (CFR: 41.12 / 43.4 / 45.10)	T/G 3 / 0	**RO 3.2 SRO 3.7**
72 578	**GEN2.3 2.3.7** Radiation Control	**GENERIC - Radiation Control** Ability to comply with radiation work permit requirements during normal orabnormal conditions. (CFR: 41.12 / 45.10)	T/G 3 / 0	**RO 3.5 SRO 3.6**
73 579	**GEN2.4 2.4.13** Emergency Procedures / Plan	**GENERIC - Emergency Procedures / Plan** Knowledge of crew roles and responsibilities during EOP usage. (CFR: 41.10 / 45.12)	T/G 3 / 0	**RO 4.0 SRO 4.6**
74 580	**GEN2.4 2.4.22** Emergency Procedures / Plan	**GENERIC - Emergency Procedures / Plan** Knowledge of the bases for prioritizing safety functions during abnormal/emergency operations. (CFR: 41.7 / 41.10 / 43.5 / 45.12)	T/G 3 / 0	**RO 3.6 SRO 4.4**

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Question	K/A Number K/A Description	K/A System	Tier/Group	Importance RO/SRO
75 581	**GEN2.4 2.4.42** Emergency Procedures / Plan	**GENERIC - Emergency Procedures / Plan** Knowledge of emergency response facilities. (CFR: 41.10 / 45.11)	T/G 3 / 0	**RO 2.6 SRO 3.8**
76 582	**EPE009 2.2.25** EPE009 GENERIC	**Small Break LOCA** Knowledge of the bases in Technical Specifications for limiting conditions for operations and safety limits. (CFR: 41.5 / 41.7 / 43.2)	T/G 1 / 1	**RO 3.2 SRO 4.2**
77 583	**EPE011 2.2.36** EPE011 GENERIC	**Large Break LOCA** Ability to analyze the effect of maintenance activities, such as degraded power sources, on the status of limiting conditions for operations. (CFR: 41.10 / 43.2 / 45.13)	T/G 1 / 1	**RO 3.1 SRO 4.2**
78 584	**APE026 AA2.05** Ability to determine and interpret the following as they apply to the Loss of Component Cooling Water: (CFR: 43.5 / 45.13)	**Loss of Component Cooling Water (CCW)** The normal values for CCW-header flow rate and the flow rates to the components cooled by the CCWS	T/G 1 / 1	**RO 2.4* SRO 2.5***
79 585	**APE057 2.4.21** APE057 GENERIC	**Loss of Vital AC Electrical Instrument Bus** Knowledge of the parameters and logic used to assess the status of safety functions, such as reactivity control, core cooling and heat removal, reactor coolant system integrity, containment conditions, radioactivity release control, etc. (CFR: 41.7 / 43.5 / 45.12)	T/G 1 / 1	**RO 4.0 SRO 4.6**
80 586	**APE058 AA2.03** Ability to determine and interpret the following as they apply to the Loss of DC Power: (CFR: 43.5 / 45.13)	**Loss of DC Power** DC loads lost; impact on ability to operate and monitor plant systems	T/G 1 / 1	**RO 3.5 SRO 3.9**
81 587	**APE077 AA2.09** Ability to determine and interpret the following as they apply to Generator Voltage and Electric Grid Disturbances: (CFR: 41.5 and 43.5 / 45.5, 45.7, and 45.8)	**Generator Voltage and Electric Grid Disturbances** Operational status of emergency diesel generators.....	T/G 1 / 0	**RO 3.9 SRO 4.3**

Question	K/A Number K/A Description	K/A System	Tier/Group	Importance RO/SRO
82 588	**APE024 2.2.39** APE024 GENERIC	**Emergency Boration** Knowledge of less than or equal to one hour Technical Specification action statements for systems. (CFR: 41.7 / 41.10 / 43.2 / 45.13)	T/G 1 / 2	**RO 3.9 SRO 4.5**
83 589	**APE068 2.4.21** APE068 GENERIC	**Control Room Evacuation** Knowledge of the parameters and logic used to assess the status of safety functions, such as reactivity control, core cooling and heat removal, reactor coolant system integrity, containment conditions, radioactivity release control, etc. (CFR: 41.7 / 43.5 / 45.12)	T/G 1 / 2	**RO 4.0 SRO 4.6**
84 590	**APE069 AA2.01** Ability to determine and interpret the following as they apply to the Loss of Containment Integrity: (CFR: 43.5 / 45.13)	**Loss of Containment Integrity** Loss of containment integrity	T/G 1 / 2	**RO 3.7 SRO 4.3**
85 591	**WE16 EA2.1** Ability to determine and interpret the following as they apply to the (High Containment Radiation) (CFR: 43.5 / 45.13)	**High Containment Radiation** Facility conditions and selection of appropriate procedures during abnormal and emergency operations.	T/G 1 / 2	**RO 2.9 SRO 3.3**
86 592	**SYS003 A2.01** Ability to (a) predict the impacts of the following malfunctions or operations on the RCPS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: (CFR: 41.5 / 43.5/ 45.3 / 45/13)	**Reactor Coolant Pump System (RCPS)** Problems with RCP seals, especially rates of seal leak-off	T/G 2 / 1	**RO 3.5 SRO .39**
87 593	**SYS026 2.4.47** SYS026 GENERIC	**Containment Spray System (CSS)** Ability to diagnose and recognize trends in an accurate and timely manner utilizing the appropriate control room reference material. (CFR: 41.10 / 43.5 / 45.12)	T/G 2 / 1	**RO 4.2 SRO 4.2**

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Question	K/A Number K/A Description	K/A System	Tier/Group	Importance RO/SRO
88 594	**SYS039 A2.02** Ability to (a) predict the impacts of the following malfunctions or operations on the MRSS; and (b) based on predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: (CFR: 41.5 / 43.5 / 45.3 / 45.13)	**Main and Reheat Steam System (MRSS)** Decrease in turbine load as it relates to steam escaping from relief valves .	T/G 2 / 1	**RO 2.4 SRO 2.7***
89 595	**SYS062 2.1.20** SYS062 GENERIC	**AC Electrical Distribution System** Ability to interpret and execute procedure steps. (CFR: 41.10 / 43.5 / 45.12)	T/G 2 / 1	**RO 4.6 SRO 4.6**
90 596	**SYS076 A2.02** Ability to (a) predict the impacts of the following malfunctions or operations on the SWS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: (CFR: 41.5 / 43.5 / 45/3 / 45/13)	**Service Water System (SWS)** Service water header pressure	T/G 2 / 1	**RO 2.7 SRO 3.1**
91 597	**SYS033 2.2.22** SYS033 GENERIC	**Spent Fuel Pool Cooling System (SFPCS)** Knowledge of limiting conditions for operations and safety limits. (CFR: 41.5 / 43.2 / 45.2)	T/G 2 / 2	**RO 4.0 SRO 4.7**
92 598	**SYS072 A2.02** Ability to (a) predict the impacts of the following malfunctions or operations on the ARM system- and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: (CFR: 41.5 / 43.5 / 43.3 / 45.13)	**Area Radiation Monitoring (ARM) System** Detector failure	T/G 2 / 2	**RO 2.8 SRO 2.9**

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ES 401, Rev 9 | Combined PWR Written Examination Outline | Form ES-401-2/3

Question	K/A Number K/A Description	K/A System	Tier/Group	Importance RO/SRO
93 599	**SYS086 A2.01** Ability to (a) predict the impacts of the following malfunctions or operations on the Fire Protection System; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: (CFR: 41.5 / 43.5 / 45.3 / 45.13)	**Fire Protection System (FPS)** Manual shutdown of the FPS	T/G 2 / 2	**RO 2.9 SRO 3.1**
94 600	**GEN2.1 2.1.14** Conduct of Operations	**GENERIC - Conduct of Operations** Knowledge of criteria or conditions that require plant-wide announcements, such as pump starts, reactor trips, mode changes, etc. (CFR: 41.10 / 43.5 / 45.12)	T/G 3 / 0	**RO 3.1 SRO 3.1**
95 601	**GEN2.1 2.1.36** Conduct of Operations	**GENERIC - Conduct of Operations** Knowledge of procedures and limitations involved in core alterations. (CFR: 41.10 / 43.6 / 45.7)	T/G 3 / 0	**RO 3.0 SRO 4.1**
96 602	**GEN2.2 2.2.15** Equipment Control	**GENERIC - Equipment Control** Ability to determine the expected plant configuration using design and configuration control documentation, such as drawings, line-ups, tag-outs, etc. (CFR: 41.10 / 43.3 / 45.13)	T/G 3 / 0	**RO 3.9 SRO 4.3**
97 603	**GEN2.2 2.2.3** Equipment Control	**GENERIC - Equipment Control** (multi-unit license) Knowledge of the design, procedural, and operational differences between units. (CFR: 41.5 / 41.6 / 41.7 / 41.10 / 45.12)	T/G 3 / 0	**RO 3.8 SRO 3.9**
98 604	**GEN2.3 2.3.13** Radiation Control	**GENERIC - Radiation Control** Knowledge of radiological safety procedures pertaining to licensed operator duties, such as response to radiation monitor alarms, containment entry requirements, fuel handling responsibilities, access to locked high-radiation areas, aligning filters, etc. (CFR: 41.12 / 43.4 / 45.9 / 45.10)	T/G 3 / 0	**RO 3.4 SRO 3.8**

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Question	K/A Number K/A Description	K/A System	Tier/Group	Importance RO/SRO
99 605	**GEN2.3 2.3.14** Radiation Control	**GENERIC - Radiation Control** Knowledge of radiation or contamination hazards that may arise during normal, abnormal, or emergency conditions or activities. (CFR: 41.12 / 43.4 / 45.10)	T/G 3 / 0	**RO 3.4 SRO 3.8**
100 606	**GEN2.4 2.4.3** Emergency Procedures / Plan	**GENERIC - Emergency Procedures / Plan** Ability to identify post-accident instrumentation. (CFR: 41.6 / 45.4)	T/G 3 / 0	**RO 3.7 SRO 3.9**

FINAL

Tier / Group	Randomly Selected KA	Reason for Rejection
1 / 2	APE076 AK3.06	(Q25) There is a question that was used on the 2006R (exam bank #148) which would meet this but within 2 years. It deals with demineralizers which is the only real action in AP/18. Replaced with K/A APE036 AK3.03
2 / 1	SYS008 K4.07	Q(35) No such component at CNS. K/A replacements originally provided 4.04 and 4.08 are not high enough value (2.1 and 2.3) Replaced with K/A SYS008 K4.09
1 / 0	APE077 AA2.04	Q(81) Duplicate KA of RO exam #14. Replaced with K/A APE077 AA2.09
1 / 1	APE025 2.2.39	Q(82) Cannot write an SRO question. Replaced with K/A APE024 G2.2.22
1 / 2	APE069 AA2.02	Q(84) Cannot write an SRO question. Replaced with K/A APE069 AA2.01
2 / 2	SYS086 A2.01	Q(93) Cannot write an SRO question. Replaced with K/A SYS086 A2.04

FINAL

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

Facility: CATAWBA Date of Exam: 12/01/08 Exam Level: RO ☐ SRO ☑

Item Description				Initial a	Initial b*	Initial c#
1.	Questions and answers are technically accurate and applicable to the facility.					
2.	a. NRC K/As are referenced for all questions. b. Facility learning objectives are referenced as available.					
3.	SRO questions are appropriate in accordance with Section D.2.d of ES-401					
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: __ 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)					
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: 18 / 1	Modified: 9 / 1	New: 48 / 23		
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: 35 / 5	C/A: 40 / 20			
8.	References/handouts provided do not give away answers or aid in the elimination of distractors.					
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.					
10.	Question psychometric quality and format meet the guidelines in ES Appendix B.					
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.					

	Printed Name / Signature	Date
a. Author	JOHN K. SUTTER	11/18/08
b. Facility Reviewer (*)	BRIAN D. MILLER	11/18/08
c. NRC Chief Examiner (#)	GERARD W. LASKA	11/19/2008
d. NRC Regional Supervisor	MALCOLM T. WIDMANN	11/20/08

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.

FINAL

ES-401, Rev. 9 Catawba 2008-301 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.	7.
			Stem Focus	Cues	T/F	Cred. Dist.	Partial	Job-Link	Minutia	#/ units	Back-ward	Q= K/A	SRO Only	U/E/ S	Explanation

Instructions

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

1. Enter the level of knowledge (LOK) of each question as either (F)undamental or (H)igher cognitive level.
2. 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).
3. 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).
4. 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.
5. 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).
6. 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?
7. At a minimum, explain any "U" ratings (e.g., how the Appendix B psychometric attributes are not being met).

															007 EK2.03 Borderline K/A match. Did not see

Q#	1. LOK (F/H)	2. LOD (1-5)	3. Psychometric Flaws					4. Job Content Flaws				5. Other		6.	7.
			Stem Focus	Cues	T/F	Cred. Dist.	Partial	Job-Link	Minutia	#/ units	Back-ward	Q= K/A	SRO Only	U/E/S	Explanation
1	H	2				X						X		U	where the reactor trip status panel was addressed. Distractors B and C are not plausible. If an ATWS had occurred the reactor would be tripped. If a failure of the Reactor Protection system occurred, and normal shutdown would be conducted. **Modified** ***Licensee changed the bus that was lost from 1EDC to 1 EDA, Added DRPI at 215 steps on bank D. Also added a bullet stating that both RX trip BRKR 1A and 1B red closed lights are lit. The Licensee added a statement that the RO turns the reactor trip handles and notes that the control rod indications have not changed, and then asks Was the initial RO action correct based on plant conditions? How many additional attempts to manually trip the reactor should be made prior to manually inserting control rods?*** **This has totally changed the question from the previous version. Why was the electrical bus changed? The previous question could have been made sat by just adding the reactor trip breaker indications. Why do you tell the applicant that the RED closed lights are lit. Simply state the reactor trip BKR red lights are lit. Will Discuss again. 11/03/2008.**

Q#	1. LOK (F/H)	2. LOD (1-5)	3. Psychometric Flaws					4. Job Content Flaws				5. Other		6.	7.
			Stem Focus	Cues	T/F	Cred. Dist.	Partial	Job-Link	Minutia	#/ units	Back-ward	Q= K/A	SRO Only	U/E/S	Explanation
2	H	2				X								E S	009EA2.1 Question appears to match K/A. Distractors A and B may not be plausible. Is there any time that Safety Injection Actuated light is lit that the operators would not go to E-0 besides a loss of all AC? **NEW** **Licensee stated that there are times that the SI light would be lit, and the operators would go to another procedure besides E-0. (accumulators isolated) The licensee added an RCS Pressure, and temperature to allow the applicant to decide which procedure was applicable. SAT 11/03/2008.**
3	F	2												S	011EG2.4.30 SAT **BANK - 2005 NRC exam.**
4	H	2												S	022AK1.02 Question kind of matches K/A. SAT. This question could be easily modified. **BANK - 2005 NRC exam.**
5	H	2				X								E S	025AG2.4.30 Question appears to match K/A. I think this was also on the 2007 exam will check to ensure. OMP 1-7 states two are required without a procedure. This action will be outside the procedure, therefore someone could argue D is also correct (more conservative. **NEW?** **Licensee changed stem to have the question deal in accordance with the sites procedure OMP-1-7. (Changed all distractors) SAT 11/03/2008.**

Q#	1. LOK (F/H)	2. LOD (1-5)	3. Psychometric Flaws					4. Job Content Flaws				5. Other		6.	7.
			Stem Focus	Cues	T/F	Cred. Dist.	Partial	Job-Link	Minutia	#/ units	Back-ward	Q= K/A	SRO Only	U/E/S	Explanation
6	H	2												S	026AA2.03 Question appears to match K/A. SAT **NEW**
7	F	2												S	027AA1.04 Question appears to match K/A. SAT NEW
8	F	2												E S	029EG2.4.34 Question appears to match the K/A. Question needs some enhancements. The operator need only know that the motor generator out put breaker needs to be opened and D is the answer. Change the distractors to be 1 and 2 only, 1, 2, and 3 only 1, 2, and 4 only and 1, 2, 3, and 4. **NEW** **Licensee made changes as requested. SAT 11/03/2008.**
9	H	2												S	038EK1.02 Question kind of matches K/A. **BANK - 2005 NRC exam** **Please change the answers so that the Correct answer is different than C.**
10	F	2												S	057AA2.13 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.	7.
			Stem Focus	Cues	T/F	Cred. Dist.	Partial	Job-Link	Minutia	#/ units	Back-ward	Q= K/A	SRO Only	U/E/ S	Explanation
11	F	2												E	058AA1.02 Question appears to match K/A. SAT **(Is the time limit in accordance with a procedure? If so, this should be stated).** **NEW**
														S	**Licensee added IAW OP/1/A/6350/008. SAT 11/03/2008.**
12	H	2										X		U	062AK3.03 Question does not meet K/A. The K/A asks for reasons for the following responses… The question as written does not address any reasons. Add reasons for actions to make question SAT. **NEW**
														S	**Licensee added reasons for the time delay to take action. Is this in accordance with a procedure? The procedure should be listed. Otherwise SAT 11/03/2008.**
13	H	2												S	065AK3.03 Question appears to match K/A. I assume the crew entered AP/0/A/5500/022 due to an air leak? You might need to say this. **NEW** **Licensee Made NO changes. SAT 11/03/2008.**

Q#	1. LOK (F/H)	2. LOD (1-5)	3. Psychometric Flaws					4. Job Content Flaws				5. Other		6.	7.
			Stem Focus	Cues	T/F	Cred. Dist.	Partial	Job-Link	Minutia	#/ units	Back-ward	Q= K/A	SRO Only	U/E/S	Explanation
14	H	2												E S	077AA1.01 Question appears to match K/A. This may be considered a direct look up. I will have another examiner review and comment. **NEW** **Licensee has blacked out the information on the referenced graph that would make the question a direct lookup. SAT 11/03/2008.**
15	H	2												S	W/E04EK2.2 Question appears to match K/A. Modified from 2004 NRC exam. SAT **Modified.** **SAT 11/03/2008.**
16	F	2												S	W/E05EK3.1 Question matches K/A. SAT **NEW** **SAT 11/03/2008.**
17	F	2												S	W/E11EK2.1 Question appears to match K/A. Are the defeat buttons in distractor C labeled correctly? Otherwise question appears to be SAT. **NEW** **Added FWST to C distractor now labeled correctly. SAT 11/03/2008.**
18	F	2												E S	W/E12EK1.3 Question Kind of matches K/A. Is an annunciator received when the MSIVs are closed or a MSLI is received? Using one of these indications would match the K/A better. **NEW** **Changes made as requested. SAT 11/03/2008.**

Q#	1. LOK (F/H)	2. LOD (1-5)	3. Psychometric Flaws					4. Job Content Flaws				5. Other		6.	7.
			Stem Focus	Cues	T/F	Cred. Dist.	Partial	Job-Link	Minutia	#/ units	Back-ward	Q= K/A	SRO Only	U/E/S	Explanation
19	H	2												E S	001AA1.06 Question does not really meet the K/A, however it is a good attempt, and the switch involved does transfer some control of the rods. The stem should state IAW whatever procedure is applicable for example IAW AP-15. **NEW** **Licensee added IAW AP-15. SAT 11/03/2008.**
20	F	2												S	005AG2.4.6 Based on a previous discussion AP actions were determined to be acceptable to satisfy this K/A. Is there any occurrence of Mode 2 with Keff $\geq$ 1.0? If not this may not be acceptable. Will Discuss. **NEW** **Licensee stated that TS3.1.6 does have actions that refer to the above. No other changes made. SAT 11/03/2008.**
21	H	2												S	O24AK1.04 Question appears to match K/A. SAT **NEW** **SAT 11/03/2008.**
22	F	2												S	033AK1.01 Question appears to match K/A. SAT **NEW** **SAT 11/03/2008.**

Q#	1. LOK (F/H)	2. LOD (1-5)	3. Psychometric Flaws					4. Job Content Flaws				5. Other		6.	7.
			Stem Focus	Cues	T/F	Cred. Dist.	Partial	Job-Link	Minutia	#/ units	Back-ward	Q= K/A	SRO Only	U/E/ S	Explanation
23	H	2												E S	037AA2.03 Question appears to match K/A. Need to add a specific power level for the Unit. 60% or so, some one could make the assumption that power had been reduced to a level where the N-16 monitors may not be the first indication. Otherwise SAT. **Modified from a 2003 NRC exam.** **Added the crew has stabilized the plant at the runback target per A/1/5500/003 (Load Rejection) SAT 11/03/2008.**
24	H	4												S	074EA1.01 Question kind of matches K/A. Change #2. to read: Why are these conditions more restrictive than earlier transition conditions Otherwise SAT. (Is this RO knowledge?) **NEW** **Licensee made changes as requested. SAT 11/03/2008.**

Q#	1. LOK (F/H)	2. LOD (1-5)	3. Psychometric Flaws					4. Job Content Flaws				5. Other		6.	7.
			Stem Focus	Cues	T/F	Cred. Dist.	Partial	Job-Link	Minutia	#/ units	Back-ward	Q= K/A	SRO Only	U/E/ S	Explanation
25	F	2										X		U	036AK3.03 Question does not match K/A. The K/A asks for reasons, none are included in the question. **Modified from 2004 NRC exam.** **Licensee made some changes but these changes make the question very difficult to read.** **Please make these changes:** **1) Remove step 7 of AP...(teaching in stem)** **2) Based on the above conditions what is the status of the VP system** **3) What is the basis for establishing containment closure prior to VP being secured?** **4) Distractor A should read: the VP system is running, then the second part should be to prevent an unmonitored release.** **5) Distractor B should read: VP system is running, then the second part should state to prevent an excessive negative pressure in containment** **6) Distractor C should read: the VP system has tripped then the reason like above.** **7) Distractor D should read: the VP system has tripped... and then reason like above.** **Changes still need to be made. SAT 11/03/2008.**
26	H	2												E	WE03EK2.1 Question appears to match K/A. Need to add RCS temperature. Used on the **2004 NRC exam under K/A 005K4.02** **BANK** **Made changes as requested. SAT 11/03/2008.**

Q#	1. LOK (F/H)	2. LOD (1-5)	3. Psychometric Flaws					4. Job Content Flaws				5. Other		6.	7.
			Stem Focus	Cues	T/F	Cred. Dist.	Partial	Job-Link	Minutia	#/ units	Back-ward	Q= K/A	SRO Only	U/E/S	Explanation
27	H	2										X		U S	WE09EK3.3 Question does not meet K/A. The K/A asks for reasons. Why do they stop depressurization when RVLIS is less than 73%? **From 2006 NRC exam. Modified** **Added a basis for stopping the depressurization. SAT 11/03/2008.**
28	H	2	X											S	003A2.02 Question appears to match K/A. Very similar to question # 86 (SRO). The only difference is the initiating event. What procedure directs these actions? It seems to me that there is not a correct answer. AP-4 does direct the actions listed in choice C, but you would have to go to the procedure to perform them. Question symmetry does not look right. One of these needs to be changed**. 2004 NRC exam BANK** **Discussed with Licensee. Determined based on discussion that question as written is SAT. Shuffled distractors. SAT 11/03/2008.**

Q#	1. LOK (F/H)	2. LOD (1-5)	3. Psychometric Flaws					4. Job Content Flaws				5. Other		6.	7.
			Stem Focus	Cues	T/F	Cred. Dist.	Partial	Job-Link	Minutia	#/ units	Back-ward	Q= K/A	SRO Only	U/E/ S	Explanation
29	H	2										X		U	004A1.01 Question does not appear to match K/A, unless you are implying that the increase in letdown heat exchanger temperature is due to the increase activity in the RCS. (I do not believe that this would cause temperature to rise). The K/A is looking for the ability to predict and or monitor changes in parameters to prevent exceeding design limits associated with operating CVCS controls including activity levels in the primary system. It would be more in line with the K/A to state that activity was high, what should be placed in service to deal with it and monitor parameters then. **NEW** **Licensee changed all distractors to address K/A issue. Placed actions first then mode applicability. May need to change distractor D? Will discuss. 11/03/2008.**
30	H	2	X											E S	004K1.34 Question appears to match K/A. Need to place in the stem Excess letdown is in service and aligned to the VCT, or someone could make the assumption that excess letdown was aligned to the NCDT to begin with. Otherwise okay. **NEW** **Licensee made changes as requested. SAT 11/03/2008.**
31	F	2												S	005K4.11 Question appears to match K/A. SAT this is a fundamental level question. **NEW** **SAT 11/03/2008.**

Q#	1. LOK (F/H)	2. LOD (1-5)	3. Psychometric Flaws					4. Job Content Flaws				5. Other		6.	7.
			Stem Focus	Cues	T/F	Cred. Dist.	Partial	Job-Link	Minutia	#/ units	Back-ward	Q= K/A	SRO Only	U/E/ S	Explanation
32	H	2												E S	006A1.05Question appears to match K/A. Please add automatically to the stem. "What is the earliest time that KC flow is **automatically** aligned to the ND heat exchanger?" **NEW** **Licensee made changes as requested. SAT 11/03/2008.**
33	H	2										X		U S	007G2.4.6 Question Does not match K/A. The K/A system is Pressurizer Relief Tank and how EOP mitigating strategies relate. This question is an H.1 question describing what constitutes a bleed and feed. **NEW** **Licensee replaced question. Chief Examiner allowed AOP actions to satisfy the K/A. (Normally EOPs do not address this). Otherwise the K/A appears to match. SAT 11/03/2008.**
34	H	2												E S	008K3.03 Question appears to match the K/A. Change Distractor C to read … Open the #1 seal bypass valve to restore seal cooling. Change distractor D to read All seal cooling to NCP1C is lost. Secure NCP 1C to prevent further seal damage. SAT **2004 NRC exam.** **BANK** **Made changes as requested. Shuffled distractors. SAT 11/03/2008.**

Q#	1. LOK (F/H)	2. LOD (1-5)	3. Psychometric Flaws					4. Job Content Flaws				5. Other		6.	7.
			Stem Focus	Cues	T/F	Cred. Dist.	Partial	Job-Link	Minutia	#/ units	Back-ward	Q= K/A	SRO Only	U/E/S	Explanation
35	H	2												S	008K4.09 Question appears to match the K/A. SAT **2007 NRC Exam Modified.** **SAT 11/03/2008.**
36	H	2												S	010G2.1.25 Question appears to match the K/A. SAT **NEW** **SAT 11/03/2008.**
37	H	2	X				X							E S	012A2.02 Question appears to match K/A. **NEW** Will the OTDT bistables be in if just the lower detector on N-42 failed low? If not, and the bistables have not been placed in a tripped condition, the reactor may not trip, and C would be correct. Please explain. **NEW** **Ran on simulator at BOL and EOL conditions and confirmed that with only the lower detector failing low the OTDT bistable would still come in. SAT 11/03/2008.**
38	F	2												S	012K5.01 Question appears to match K/A. SAT **BANK** 2007 Audit Exam #2. **ADD /Protection to stem please to match the lower portion of the question. Otherwise SAT 11/03/2008. completed**

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		
39	H	2												S	013K6.01 Question appears to match K/A. SAT. 2005 NRC Exam. **BANK** **SAT 11/03/2008.**
40	F	2										X		U	022K2.02 Question does not meet K/A. All of the power supplies listed appears to be correct, and the answer is that there is not a swap. So what power supply to the chillers are we testing? **NEW** **Licensee replaced question appears to match K/A. Low discriminatory value will evaluate using another Examiner.** **11/03/2008.**
41	F	2												S	025A4.01 Question appears to match K/A. Appears to be SAT. **NEW** **SAT 11/03/2008.**
42	F	2												S	026A1.03 Question appears to match K/A. SAT **NEW** **SAT 11/03/2008.**

Q#	1. LOK (F/H)	2. LOD (1-5)	3. Psychometric Flaws					4. Job Content Flaws				5. Other		6.	7.
			Stem Focus	Cues	T/F	Cred. Dist.	Partial	Job-Link	Minutia	#/ units	Back-ward	Q= K/A	SRO Only	U/E/S	Explanation
43	H	2	X											E	026K1.01 Question appears to match K/A. Very wordy. Attempt to get rid of most of the BOP reports. Actual stem needs some modification Which one of the following describes the status of the 1A NS pump at 1245, and the earliest time that ND Aux spray can be placed in service? **NEW** **Licensee made changes as requested. SAT 11/03/2008.**
														S	
44	**H?**	1										X		U	039K5.01 borderline K/A match. Definition of steam/water hammer is not really tested. Very wordy question. This question actually test the consequences of a steam generator overfill event. Very little discriminating value. **NEW** **Will discuss with another EXAMINER when available. Get FRANK and CRAIG to look at during prep week.**
45	F	2												S	059A4.11 Question appears to meets K/A. SAT. 2003 NRC exam question. **BANK** **Licensee shuffled distractors as requested. SAT 11/03/2008.**
46	F	2												S	061A3.03 Question appears to meets K/A. SAT. **NEW** **SAT 11/03/2008.**

Q#	1. LOK (F/H)	2. LOD (1-5)	3. Psychometric Flaws					4. Job Content Flaws				5. Other		6.	7.
			Stem Focus	Cues	T/F	Cred. Dist.	Partial	Job-Link	Minutia	#/ units	Back-ward	Q= K/A	SRO Only	U/E/S	Explanation
47	H	2												E S	062A3.01 Question appears to meet K/A. Change 2B Amps to 2B output amps. (field amps will decrease as voltage is lowered. **NEW** **Added output to 2B amps. SAT 11/03/2008.**
48	F	1				X								U S	063K2.01 Question appears to meets K/A. There are no plausible distractors. Only one power supply is DC @125 volts, and the correct answer (250V). Almost all emergency lube oil pumps in the industry are DC. Need to have more plausible distractors. As written very little discriminatory value. **NEW** **Replaced question. Very simple. Appears to match K/A. SAT 11/03/2008.**
49	F	2				X								E S	063K3.01 Question appears to match K/A. Distractor B does not appear to be plausible. 2004 NRC exam. **BANK** **Licensee changed distractor B to be more plausible. SAT 11/03/2008.**
50	H	2												S	064A3.07 Question appears to match K/A.SAT **NEW** **SAT 11/03/2008.**

Q#	1. LOK (F/H)	2. LOD (1-5)	3. Psychometric Flaws					4. Job Content Flaws				5. Other		6.	7.
			Stem Focus	Cues	T/F	Cred. Dist.	Partial	Job-Link	Minutia	#/ units	Back-ward	Q= K/A	SRO Only	U/E/ S	Explanation
51	F	2												E S	064K6.07 Question appears to match K/A. SAT 2003 NRC exam question. Add automatically and manually started to D. **BANK** **Licensee made changes as requested. SAT 11/03/2008.**
52	H	2	X									?		E S	073A2.02 Question kind of matches K/A. What procedure is used to mitigate the failure? The actions should be IAW a procedure. It appears that Ctmt. ventilation is isolated and must be restored. **NEW** **Licensee made changes, SAT 11/03/2008. underlined <u>not</u>**
53	F	1												S	076K2.01 Question appears to match K/A. Do any of these busses supply 1ETA? If so it is also a correct answer. **NEW** **SAT 11/03/2008.**
54	F	2												S	078K3.02 Question appears to match K/A. Some of the information in the stem is window dressing. SAT **NEW** **SAT 11/03/2008.**
55	F	2												E	103K1.07 Question kind of matches K/A. What is the significance of the second part of the question? Do you have a containment vacuum system? Which one of the following describes a condition that

Q#	1. LOK (F/H)	2. LOD (1-5)	3. Psychometric Flaws					4. Job Content Flaws				5. Other		6.	7.
			Stem Focus	Cues	T/F	Cred. Dist.	Partial	Job-Link	Minutia	#/ units	Back-ward	Q= K/A	SRO Only	U/E/ S	Explanation
														S	would automatically close 1VQ-10, and what would the consequence be if the valve failed to close? **NEW** **Licensee changed all distractors and stem. SAT 11/03/2008.**
56	F	2										X		U S	001K2.02 Does not match the K/A. This question really asks what happens if both bypass breaker are closed, not power supplies. **NEW** Replaced Question with a new question. Appears to match the K/A. **SAT 11/03/2008.**
57	H	2												E S	011A1.02 Question kind of matches K/A. The question should be at approximately what time does charging/letdown have to be returned to service to prevent exceeding a T/S limit. 2005 NRC exam **Modified.** **After discussion with licensee, OK leave as is. SAT 11/03/2008.**
58	H	1.5												E S	016K1.12 Question appears to match K/A. Not sure if all of these are plausible. Will discuss. **BANK** **Licensee shuffled all distractors, discussed question and distractor plausibility. SAT 11/03/2008.**
59	H	2												S	017K3.01 Question appears to match K/A. SAT. 2003 NRC exam.

Q#	1. LOK (F/H)	2. LOD (1-5)	3. Psychometric Flaws					4. Job Content Flaws				5. Other		6.	7.
			Stem Focus	Cues	T/F	Cred. Dist.	Partial	Job-Link	Minutia	#/ units	Back-ward	Q= K/A	SRO Only	U/E/ S	Explanation
															BANK Shuffled distractors. **SAT 11/03/2008.**
60	F	2												E	027K5.01 Question appears to match K/A. Stem Focus – Radiation monitoring teams would measure actual dose not projected dose. Could we change distractor D to read heaters are de-energized? 2003 NRC exam. **BANK** **Licensee changed distractor D. Shuffled distractors, removed projected from stem. SAT 11/03/2008.**
61	F	2												S	035G2.2.40 Questions appears to match K/A. 2005 NRC exam. SAT **BANK** **Shuffled distractors as requested. SAT 11/03/2008.**
62	H	2	X			X								S	045A3.05 Question appears to match K/A. Distractors C and D are not plausible. Is there such a thing as a manual runback? Are you talking about manually ramping load off of the turbine? This question needs some work. **NEW** **Stem was changed by eliminating the concerns of the chief examiner. SAT 11/03/2008.**

Q#	1. LOK (F/H)	2. LOD (1-5)	3. Psychometric Flaws					4. Job Content Flaws				5. Other		6.	7.
			Stem Focus	Cues	T/F	Cred. Dist.	Partial	Job-Link	Minutia	#/ units	Back-ward	Q= K/A	SRO Only	U/E/S	Explanation
63	F	2										X		U	071K4.01 Question does not really meet the K/A. At what pressure do the relief valves lift? I did not see this in your lesson plan. Add a statement to the end of each choice "to allow room for pressure relief when the tank pressure reaches .... **NEW** Will have another EXAMINER look at on Prep Week.
64	H	2												E S	079A4.01 Question kind of matches K/A. There is no sequence in the distractors, they are all in the same order. At what pressure do the valves perform the swap? How can an operator monitor them with out knowing the pressure that should operate? Not very discriminating. 2003 NRC exam question. **BANK** **Made changes as requested. Need to shuffle distractors around. SAT 11/03/2008.**
65	F	2												S	086K6.04 Question appears to match K/A. SAT. **NEW** **SAT 11/03/2008.**
66	H	2												E S	G2.1.45 Question appears to match K/A. Do you have a % steam flow indicator? I don't think so? Need another name for #1. Otherwise it is not plausible. **NEW** **Licensee informs NRC that they do indeed have a % steam flow meter. SAT 11/03/2008.**

Q#	1. LOK (F/H)	2. LOD (1-5)	3. Psychometric Flaws					4. Job Content Flaws				5. Other		6.	7.
			Stem Focus	Cues	T/F	Cred. Dist.	Partial	Job-Link	Minutia	#/ units	Back-ward	Q= K/A	SRO Only	U/E/S	Explanation
67	F	2												S	G2.1.8 Question appears to match K/A. SAT **NEW** **SAT 11/03/2008.**
68	F	2												S	G2.2.2 Question appears to match K/A. SAT **NEW** **SAT 11/03/2008.**
69	F	2												S	G2.2.39 Question appears to match K/A. SAT 2003 NRC Exam. **Modified** **SAT 11/03/2008.**
70	F	2												S	G2.3.11 Question appears to match K/A. SAT 2003 NRC Exam **BANK** **SAT 11/03/2008.**
71	F	3												S	G2.3.4 Question appears to match K/A. SAT 2004 NRC exam. **BANK** **SAT 11/03/2008.**
72	H	2												E	G2.3.7 Question appears to match K/A. 2003 NRC exam. BANK This question can be easily modified to be some what different than the bank question. **BANK** **Licensee shuffled distractors but did not change the basic question. SAT 11/03/2008.**

Q#	1. LOK (F/H)	2. LOD (1-5)	3. Psychometric Flaws					4. Job Content Flaws				5. Other		6.	7.
			Stem Focus	Cues	T/F	Cred. Dist.	Partial	Job-Link	Minutia	#/ units	Back-ward	Q= K/A	SRO Only	U/E/S	Explanation
73	F	2					X							S	G2.4.13 Question appears to match K/A. Distractors B and D are not plausible. Everyone with a license is responsible for CSFs. So why would a procedure not allow someone else with a license to be given the task of monitoring CSFs. Need better distractors. **NEW** **Revised question appears to be acceptable. SAT 11/03/2008.**
74	H	2												S	G2.4.22 Question appears to match K/A. SAT **NEW** **SAT 11/03/2008.**
75	F	2												S	G2.4.42 Question appears to match K/A. SAT **NEW** **SAT 11/03/2008.**

39 Sats, 10 Unsats, and 26 Enhancements

Generic Comments: Need all originals of modified questions.
All bank questions should have the answers rotated from original (i.e. if the answer was originally A, swap the correct answer to B, C, or D.

FINAL

ES-401, Rev. 9 Catawba 2008-301 SRO **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.	7.
			Stem Focus	Cues	T/F	Cred. Dist.	Partial	Job-Link	Minutia	#/ units	Back-ward	Q= K/A	SRO Only	U/E/ S	Explanation

Instructions

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

1. Enter the level of knowledge (LOK) of each question as either (F)undamental or (H)igher cognitive level.
2. 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).
3. 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).
4. 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.
5. 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).
6. 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?
7. At a minimum, explain any "U" ratings (e.g., how the Appendix B psychometric attributes are not being met).

Q#	1. LOK (F/H)	2. LOD (1-5)	3. Psychometric Flaws					4. Job Content Flaws				5. Other		6.	7.
			Stem Focus	Cues	T/F	Cred. Dist.	Partial	Job-Link	Minutia	#/ units	Back-ward	Q= K/A	SRO Only	U/E/S	Explanation
76	F	2	X										X	U	009EG2.2.25 Question appears to match the K/A. Does not appear to be SRO only. While the question does address some items from the T/S basis, the ECCS acceptance criteria and what pumps are required during an event are RO knowledge. Stem Focus is also somewhat confusing. (Large small break LOCA) (Which ECCS pumps are **credited** for this event) The question appears to be asking "what are the ECCS acceptance criteria for fuel clad temperature?" 4700 degrees F is not a plausible distractor. To make it SRO try using a value of leakage so that the applicant can decide what type of LOCA is in progress. Unsatisfactory as written. **NEW** **Licensee replaced question will review again on prep week. (new question appears to match K/A.)**
77	H	3	X											E	011EG2.2.36 Question appears to match the K/A. Reference for question 77 could help answer question 76. Appears to be SRO only. Stem Focus is also confusing. Try "assuming that components remain inoperable." Second question discussing ECCS Criteria. Enhancements needed. **NEW** **Licensee made enhancements as requested, changed question 76. SAT 11.05/2008**

Q#	1. LOK (F/H)	2. LOD (1-5)	3. Psychometric Flaws					4. Job Content Flaws				5. Other		6.	7.
			Stem Focus	Cues	T/F	Cred. Dist.	Partial	Job-Link	Minutia	#/ units	Back-ward	Q= K/A	SRO Only	U/E/S	Explanation
78	H	2	X											E	026AA2.05 Question Kind of matches K/A. There is not really a loss of the CCW system, but it is a loss of a control function of the system that effects CCW flow to the ND system. Stem Focus, second part of stem should read and what system is required to be declared inoperable? **NEW** **Licensee made changes as requested.** **SAT 11/05/2008**
79	F	2				X							X	U	057AG2.4.21 Question Kind of matches K/A. Not SRO knowledge. This questions tests whether the containment spray bistables are energize to actuate, or de-energize to actuate and why. Both of these are systems knowledge. Distractors A and C are not plausible. Why would a Bistable lit prevent actuation of a safety system? **NEW** **Licensee replaced question. Results of the lost electrical bus, gives some different CSF indications. Licensee stated that question needs some more work. Question appears to match K/A. Will look at on prep week. 11/05/2008**

Q#	1. LOK (F/H)	2. LOD (1-5)	3. Psychometric Flaws					4. Job Content Flaws				5. Other		6.	7.
			Stem Focus	Cues	T/F	Cred. Dist.	Partial	Job-Link	Minutia	#/ units	Back-ward	Q= K/A	SRO Only	U/E/ S	Explanation
80	F?	2										X		S	058AA2.03 Question does not really meet the K/A. What DC loads were lost? I am sure that if the unit trips that some loads were lost. I also realize that the entering of E-0 implies that the loss of dc (impact) caused the reactor to trip. Question was also marked as a memory level question. A reference is also provided. If this is a memory level question then a reference should not be required. **NEW** **Monitoring Voltage is what the licensee considered as the impact on ability to operate and monitor plant systems. OK. (Reference removed)** **Question is SAT 11/05/2008**
81	H	2											?	E	077AA2.09 Question appears to match K/A. May not be SRO only. Determining if the D/Gs will be running based on voltage is RO knowledge. T/S entry conditions are also RO knowledge. This question is somewhat convoluted. Need to understand why this is SRO knowledge at CNS. **NEW** **Still pretty convoluted. The changes made make the question more SRO only. Will review again on Prep Week.**

Q#	1. LOK (F/H)	2. LOD (1-5)	3. Psychometric Flaws					4. Job Content Flaws				5. Other		6.	7.
			Stem Focus	Cues	T/F	Cred. Dist.	Partial	Job-Link	Minutia	#/ units	Back-ward	Q= K/A	SRO Only	U/E/ S	Explanation
82	F	2										X	X	U	024AG2.2.39 Does not really meet K/A. Not SRO only, this is system knowledge for ROs. There does not appear to be a need for an emergency boration, this meets the generic application, but the not the emergency boration abnormal? Question as written is Unsat. **NEW** **Licensee replaced Question. Still needs some work. Question does meet the K/A. Will look at again on Prep week.**
83	F	2											X	U	068AG2.4.21 Question appears to meet the K/A. Not SRO only. The question has two parts, how is primary side inventory assured from the ASP, and will the ASP combat a Design Basis Accident. Both of these items are basic system functions (what is the ASP designed to do) and are RO knowledge. **NEW** **I believe from what you have told me the correct answer is D not C. Instead of mode 5 conditions, use words cold shutdown, unless these are different. Will look at again on prep week.**

Q#	1. LOK (F/H)	2. LOD (1-5)	3. Psychometric Flaws					4. Job Content Flaws				5. Other		6.	7.
			Stem Focus	Cues	T/F	Cred. Dist.	Partial	Job-Link	Minutia	#/ units	Back-ward	Q= K/A	SRO Only	U/E/S	Explanation
84	H	2										X	X	U	069AA2.01 Question does not meet K/A. This question is written for WE14 High Containment Pressure EA2.1. The APE for containment integrity in concerned with integrity as is applies to normal at power operation. What would be considered a loss of containment integrity at 100% power etc. The question as written is also not SRO only. CSF entry conditions and major notes and cautions in procedure are RO knowledge. **NEW** **Licensee replaced question. New question deals with containment integrity, and appears to match K/A. Not sure if distractors b and d are plausible. After looking in the T/S for containment the annulus is not mentioned. Will Discuss during prep week. 11/05/2008**
85	F	2										X	X	U	WE16EA2.1 Question does not totally meet the K/A. There is no procedure selection. The applicant is given what procedure is to be implemented in the Stem. However, there is some value in the setpoint that requires entry into the procedure, this is RO knowledge. The basis statements are really the function of a charcoal filter. This is also RO (radiation worker knowledge). Therefore the question is not SRO only. **NEW** **Licensee rewrote question, changed setpoints to be more realistic, and added actions to perform that would mitigate the event. Appears to match K/A. Appears to be SRO only. SAT 11/05/2008**

Q#	1. LOK (F/H)	2. LOD (1-5)	3. Psychometric Flaws					4. Job Content Flaws				5. Other		6.	7.
			Stem Focus	Cues	T/F	Cred. Dist.	Partial	Job-Link	Minutia	#/ units	Back-ward	Q= K/A	SRO Only	U/E/ S	Explanation
86	H	2												E S	003A2.01 Question appears to match K/A. Appears to be SRO only. What makes the procedure selection in C plausible? **NEW** **Licensee changed distractor C. SAT 11/05/2008**
87	H	2												S	026G2.4.47 Question appears to match K/A. Appears to SRO only. SAT **NEW** **SAT 11/05/2008**
88	H	2	X			X								E	039A2.02 Question appears to match K/A. Stem Focus-stem is confusing. Not sure that this is SRO only knowledge. This may be procedure entry requirements. Will Discuss. Not sure that distractor A or B is plausible. Trip the reactor for an 8 MW. Change? **NEW** **Discuss on Prep Week. SAT 11/05/2008**
89	H	2	X											U	062G2.1.20 Question appears to match K/A. As written all answers are correct, all of these procedures will isolate the S/G. Stem is not focused properly. A is also not totally correct. If level is greater than 11%, the S/G will be isolated. This question needs some rewording. **NEW** **Licensee made changes based on 401-9 comments, more changes may be required. Will discuss on prep week. 11/05/2008**

Q#	1. LOK (F/H)	2. LOD (1-5)	3. Psychometric Flaws					4. Job Content Flaws				5. Other		6.	7.
			Stem Focus	Cues	T/F	Cred. Dist.	Partial	Job-Link	Minutia	#/ units	Back-ward	Q= K/A	SRO Only	U/E/S	Explanation
90	H	2												S	076A2.02 Question appears to match K/A. Appears to be SRO knowledge. SAT. **NEW** **SAT 11/05/2008**
91	H	2				X								U	033G2.2.22 Question appears to match K/A. General discussion does not make sense. It talks about boron, and the basis for boron, however boron is not mentioned in the question. Distractors B and D do not appear to be credible. **NEW** **Made changes to distractor B and D. Will review again on prep week to ensure that question is SRO only knowledge. 11/05/2008**
92	H	2										X	X	U	072A2.02 Not sure the question meets the K/A. The K/A refers to a failed detector, and there is nothing in the question that tests this. The question does state that the OSM believes the EMF indication to be false. I am not sure that this means the same thing. What procedure directs the operator to have RP frisk the cation columns? Not sure it is SRO only (procedure entry requirements) **NEW** **Question appears to match K/A with the inclusion of the trouble alarm. Remove the word immediately from distractors b and d. Will review again during prep week. 11/05/2008.**

Q#	1. LOK (F/H)	2. LOD (1-5)	3. Psychometric Flaws					4. Job Content Flaws				5. Other		6.	7.
			Stem Focus	Cues	T/F	Cred. Dist.	Partial	Job-Link	Minutia	#/ units	Back-ward	Q= K/A	SRO Only	U/E/S	Explanation
93	H	2										?		E	086A2.01 Kind of matches K/A. What procedure was used to correct control or mitigate the consequences of manual operation? I realize that the classification is an attempt to make it SRO only. Distractor analysis not correct. **NEW** **Licensee changed question to include the procedure that would be used to mitigate the event. However, I am not sure that the procedure listed in distractors A and C are plausible. Will Review on prep week. 11/05/2008**
94	H	3				X								E S	G2.1.14 Question appears to match K/A. Do not see how this is a general emergency. If a site evacuation is always precluded by a site assembly, why would anyone choose B or D. There is not a release etc. Question needs some work. **Modified** **Licensee changed distractors b and d (added non-essential personnel) SAT 11/05/2008**

Q#	1. LOK (F/H)	2. LOD (1-5)	3. Psychometric Flaws					4. Job Content Flaws				5. Other		6.	7.
			Stem Focus	Cues	T/F	Cred. Dist.	Partial	Job-Link	Minutia	#/ units	Back-ward	Q= K/A	SRO Only	U/E/ S	Explanation
95	F	2										X	X	U	G2.1.36 If these are precautions and limitations, then the question appears to match the K/A. This appears to be just T/S requirements while refueling. Does not appear to be SRO only. All of these items are RO knowledge. **NEW** **Licensee made changes but the original question may have had better distractors and was closer to SRO knowledge. Will review again on prep week. 11/05/2008.**
96	F	1											X	U	G2.2.15 Question appears to match K/A. Is there a block for the WCCSRO to sign the BCNF? Is the WCCSRO a required Technical Specification position? Is all this done without the Control Room Supervisors knowledge/permission? Not sure this is SRO only. Any individual responsible for hanging Red Tags would require this knowledge to ensure the boundary change was approved. **NEW** **Licensee Replaced Question. New Question (BANK) appears to be SRO only and matches K/A. Need to understand what reference is to be provided. Otherwise question appears to be SAT 11/05/2008**

Q#	1. LOK (F/H)	2. LOD (1-5)	3. Psychometric Flaws					4. Job Content Flaws				5. Other		6.	7.
			Stem Focus	Cues	T/F	Cred. Dist.	Partial	Job-Link	Minutia	#/ units	Back-ward	Q= K/A	SRO Only	U/E/ S	Explanation
97	F	1				X							?	U	G2.2.3 Question appears to match K/A. Not sure it is SRO only. An RO is required to know the S/G high level trips, and what they are based on. I did not find it in any of your lesson plans. C and D are not credible with the reason as stated. **NEW** **Discussed with Licensee, and they strongly believe that the topic is SRO only. Distractors C and D basis statements are not plausible. This still needs to be fixed. 11/05/2008**
98	F	2				X							X	U	G2.3.13 Borderline K/A match. May not be SRO only. This question is more of a containment integrity question. ROs should know whose permission to get, and this is a T/S entry knowledge. Distractors B and D do not appear to be credible (Station Manager)? Memory level question. **NEW** **Changed to group that controlled the keys for entry and then operability. Still needs more discussion. SAT 11/05/2008**
99	F	2												E S	G2.3.14 Question appears to match K/A. Appears to be SRO only. Both of the Notifications are required. Need to change to soonest required notification, or something similar. **NEW** **Licensee added first to stem. SAT 11/05/2008**

Q#	1. LOK (F/H)	2. LOD (1-5)	3. Psychometric Flaws					4. Job Content Flaws				5. Other		6.	7.
			Stem Focus	Cues	T/F	Cred. Dist.	Partial	Job-Link	Minutia	#/ units	Back-ward	Q= K/A	SRO Only	U/E/S	Explanation
100	F	1				X								U	G2.4.3 Question appears to match K/A. Not SRO only knowledge. All operators are required to know PAM indicators and the why is obvious. **Discussed changing the basis statements for C and D will look at again on prep week. 11/04/2008.**

2 Sats, 15 Unsats, and 8 Enhancement = 60 % unsatisfactory.

Overall 29% of questions were deemed to be unsatisfactory before discussing with licensee. (SRO and RO combined.)

ES-403, Rev. 9 | **Written Examination Grading Quality Checklist** | Form ES-403-1

Facility: Catawba 2008-301 Date of Exam: 12/10/2008 Exam Level: **RO/SRO**

Item Description	Initials a	Initials b	Initials c
1. Clean answer sheets copied before grading	MKM	N/A	
2. Answer key changes and question deletions justified and documented	MKM		
3. Applicants' scores checked for addition errors (reviewers spot check > 25% of examinations)	MKM		
4. Grading for all borderline cases (80 ±2% overall and 70 or 80, as applicable, ±4% on the SRO-only) reviewed in detail	MKM		
5. All other failing examinations checked to ensure that grades are justified	MKM		
6. Performance on missed questions checked for training deficiencies and wording problems; evaluate validity of questions missed by half or more of the applicants	MKM		

	Printed Name/Signature	Date
a. Grader	MICHAEL MEEKS / Michael K. Meeks	01/28/2009
b. Facility Reviewer(*)	N/A	
c. NRC Chief Examiner (*)	GERALD W LASKA / Gerald W Laska	01/28/2009
d. NRC Supervisor (*)	LAURENT T. MICHALAK / Laurent T. Michalak	01/28/09

(*) The facility reviewer's signature is not applicable for examinations graded by the NRC; two independent NRC reviews are required.

Facility: CATAWBA Date of Exam: 12/10/08 Exam Level: RO [X] SRO [X]

Item Description		Initials a	b	c
1.	Clean answer sheets copied before grading	HCD		
2.	Answer key changes and question deletions justified and documented	HCD		
3.	Applicants' scores checked for addition errors (reviewers spot check > 25% of examinations)	HCD		
4.	Grading for all borderline cases (80 ±2% overall and 70 or 80, as applicable, ±4% on the SRO-only) reviewed in detail	HCD		
5.	All other failing examinations checked to ensure that grades are justified	HCD		
6.	Performance on missed questions checked for training deficiencies and wording problems; evaluate validity of questions missed by half or more of the applicants	HCD		

	Printed Name/Signature	Date
a. Grader	Heidi C Camer	12/11/08
b. Facility Reviewer(*)		
c. NRC Chief Examiner (*)		
d. NRC Supervisor (*)		

(*) The facility reviewer's signature is not applicable for examinations graded by the NRC; two independent NRC reviews are required.

Performed by Licensee Prior to Post exam Comment Resolution.