Facility: Harris Date of Examination: 7/11/16

Developed by: Written: Facility ☒ NRC ☐ // Operating Facility ☒ NRC ☐

Target Date*		Task Description (Reference)	Chief Examiner's Initials
-180	1.	Examination administration date confirmed (C.1.a; C.2.a and b)	
-150	2.	NRC examiners and facility contact assigned (C.1.d; C.2.e)	
-150	3.	Facility contact briefed on security and other requirements (C.2.c)	
-150	4.	Corporate notification letter sent (C.2.d)	
[-120]	5.	Reference material due (C.1.e; C.3.c; Attachment 3)	
{-90}	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, ES-401-1/2, ES-401N-1/2, ES-401-3, ES-401N-3, ES-401-4, and ES-401N-4, as applicable (C.1.e and f; C.3.d)	
{-85}	7.	Examination outline(s) reviewed by NRC and feedback provided to facility licensee (C.2.h; C.3.e)	
{-60}	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, ES-401N-6, and any Form ES-201-2, ES-201-3, ES-301-1, or ES-301-2 updates), and reference materials due (C.1.e, f, g and h; C.3.d)	
-45	9.	Written exam and operating test reviews completed. (C.3.f)	
-30	10.	Preliminary license applications (NRC Form 398's) due (C.1.l; C.2.g; ES-202)	
-21	11.	Examination approved by NRC supervisor for facility licensee review (C.2.h; C.3.f)	
-21	12.	Examinations reviewed with facility licensee (C.1.j; C.2.f and h; C.3.g)	
-14	13.	Final license applications due and Form ES-201-4 prepared (C.1.l; C.2.i; ES-202)	
-14	14.	Written examinations and operating tests approved by NRC supervisor (C.2.i; C.3.h)	
-7	15.	Facility licensee management queried regarding the licensee's views on the examination. (C.2 j)	
-7	16.	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)	
-7	17.	Proctoring/written exam administration guidelines reviewed with facility licensee (C.3.k)	
-7	18.	Approved scenarios, job performance measures, and questions distributed to NRC examiners (C.3.i)	

* 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.

- WRITTEN EXAM SAMPLE PLAN ONLY -

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

Facility: HARRIS Date of Examination: JULY 2016

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 or ES-401N.	M	N/A	MD
	b. Assess whether the outline was systematically and randomly prepared in accordance with Section D.1 of ES-401 or ES-401N and whether all K/A categories are appropriately sampled.	M	N/A	MD
	c. Assess whether the outline over-emphasizes any systems, evolutions, or generic topics.	M	N/A	MD
	d. Assess whether the justifications for deselected or rejected K/A statements are appropriate.	M	N/A	MD
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. WALK THROUGH	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.	N		A
	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.	M	N/A	MD
	b. Assess whether the 10 CFR 55.41/43 and 55.45 sampling is appropriate.	M	N/A	MD
	c. Ensure that K/A importance ratings (except for plant-specific priorities) are at least 2.5.	M	N/A	MD
	d. Check for duplication and overlap among exam sections.	N/A	N/A	N/A
	e. Check the entire exam for balance of coverage.	M	N/A	MD
	f. Assess whether the exam fits the appropriate job level (RO or SRO).	M	N/A	MD

	Printed Name/Signature	Date
a. Author	MICHAEL MEEKS / Michael Meeks	11/05/2015
b. Facility Reviewer (*)	N/A	N/A
c. NRC Chief Examiner (#)	Michael Drouthan / Michael Drouthan	11/10/15
d. NRC Supervisor	Gerald J. McCoy / Gerald J. McCoy	11/10/2015

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

Facility:		Date of Examination:		
Item	Task Description	Initials a	b*	c#
1. WRITTEN	a. Verify that the outline(s) fit(s) the appropriate model, in accordance with ES-401 or ES-401N.			
	b. Assess whether the outline was systematically and randomly prepared in accordance with Section D.1 of ES-401 or ES-401N and whether all K/A categories are appropriately sampled.	N		A**
	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. WALK THROUGH	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	RICHARD (JR) HORTON /	4/7/2016
b. Facility Reviewer (*)	SCOTT RUA /	4/7/16
c. NRC Chief Examiner (#)	Mike Drayton / Mike Drayton	4/12/16
d. NRC Supervisor	E Guthrie /	4/12/16

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

** WRITTEN EXAM OUTLINE PROVIDED BY THE NRC ON 11/10/2015

1. **Pre-Examination** PAGE 1 OF 4

I acknowledge that I have acquired specialized knowledge about the NRC licensing examinations scheduled for the week(s) of JULY 11/18, 2016 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. Richard Richardson	Nuc Instructor-OPS / Facility Author		11/20/15		7/20/16	
2. James R Gregory	NUC INSTRUCTOR-OPS		11/18/15		7/20/16	
3. Archie Lucky	Ops Instructor EDC	Archie Lucky	11-17-15	Archie Lucky	7/20/16	
4. Scott Rua	NLO-Exam Supervisor		1-14-16		7/28/16	
5. KEN PACE	Sim Support	Ken Pace	1-20-16	Ken Pace	7-20-16	
6. TRUC DUONG	SIM SUPPORT		1-21-16		7/20/16	
7. Aaron Forsha	Fleet Exam Sup Spec		2-16-16			(1)
8. Ron Bright	Sim Support		2-17-16		7/20/16	
9. Jason Lanier	CRS - OPS		3-1-16		7/21/16	
10. MAC McDADE	Sim Support		3-21-16			(1)
11. Chris S. Allen	DPS	Chris S. Allen	3/21/16	Chris S. Allen	7/25/16	
12. Karen Stone Baker	DPS	Karen Stone Baker	3/21/16	Karen Stone Baker	7/20/16	
13. Tricia Dyakon	DPS	Tricia Dyakon	3/21/16	Tricia Dyakon	7/28/16	
14. Richard Vandenberg	Ops		3/28/16		7/20/16	
15. RONALD LEBLOND	SIM SUPPORT		4/5/16		7/20/16	

NOTES: (1) SIGNED OFF VIA email

1. **Pre-Examination** PAGE 2 OF 4

I acknowledge that I have acquired specialized knowledge about the NRC licensing examinations scheduled for the week(s) of 7-11/18-2016 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. Robert Bolin	Brunswick Exam Author	Robert Bolin	4-19-16			①
2. Christopher Nickamser	Robinson Exam Author		4/19/16			①
3. Jamey Strelow	HNP EP / EAL Verify		4/21/16		7/20/16	
4. Becky Smith	Harris Training Section - A Specialist	Becky Smith	4-25-16	Becky Smith	7/20/16	
5. Randal Catalano	CRS / OPS	RJC	4/26/16			①
6. Anthony Griffin	RO / OPS		4-26-16		7-20-16	
7. D McLaughlin	RO / OPS		4-26-16		7-22-16	
8. Mike Spellman	CRS / OPS		4/26/16		7/26/16	
9. Mike Speley	CRS		4/28/16		7/26/16	
10. Kyle Kelly	SM / OPS		5-3-16		7-26-16	
11. Brendan Young	CRS		5/5/16		7/26/16	
12. Ash Brannan	RO / OPS		5/3/16			①
13. Bradley A. Rouse	RO / OPS		5/3/16		7/20/16	
14. Robert Stedman	CRS		5/5/16		7/26/16	
15. Rick Garner	OTM		5/10/16		7/26/16	

1/2

30

NOTES: ① SIGN OFF VIA EMAIL

1. **Pre-Examination** Page 3 of 4

I acknowledge that I have acquired specialized knowledge about the NRC licensing examinations scheduled for the week(s) of 7-11/7-18-2016 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. KEVIN O'BRIEN	CRS		5/12/16		7/20/16	
2. Paul Houseworth	CRS		5/12/16		7/22/16	
3. Eric Blankenmyer	RO		5/31/16			①
4. Mike Spellman	CRS		5/31/16		7/26/16	
5. Mary Clewis	DPS		6-21-16		7-20-16	
6. Ryan Lipsky	INSTRUCTOR		06/21/16		07/26/16	
7. JEFF WILHELM	GSE		6/23/16			①
8. BALAJI KANNAN	GSE		6/23/16			①
9. Shawn Stanton	SRO		6-28-16		7-21-16	
10. JUSTIN R. DEVERS	RO		6-28-16		7-28-16	⊕ ⊙ 7/28/16
11. MYUNG KANG	SRO		6-28-16		7-21-16	
12. TS Williams	RO		6/28/16		7/28/16	⊕ ⊙ 7/28/16
13. COOK, JASON	INSTRUCTOR		7/5/16		7/26/16	
14. VON BARGEN, MICHAEL	INSTRUCTOR		7/5/16		7/26/16	
15. Rick Singer	INSTRUCTOR		7/5/16		7/20/16	

NOTES: ① SIGNED OFF VIA EMAIL

1. **Pre-Examination** Page 4 of 4

I acknowledge that I have acquired specialized knowledge about the NRC licensing examinations scheduled for the week(s) of 7-11 / 7-18 2016 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.	Frank Jackson	Instructor ILC		7/6/16		7/20/16	
2.	J. Larkness	Adm-T		7/11/16		7/22/16	
3.	Michelle Shepherd	Engineer		7/11/16		7/27/16	① 7/27/16
4.	Nick Martinelli	Manager		7/11/16		7/27/16	② 7/27/16
5.	Vinca Paranta	Training Supervisor		7/12/16		7/20/16	
6.	Scotty Scott	OPS Rep		7/12/16		7/20/16	
7.							
8.							
9.							
10.							
11.							
12.							
13.							
14.							
15.							

NOTES: ① SIGNED OFF VIA EMAIL

GO

Horton, J R

From: Forsha, Aaron
Sent: Wednesday, July 20, 2016 8:55 AM
To: Horton, J R
Subject: I did NOT divulge exam related information: 2016 Harris Station NRC Exam Completion

Horton, J R

From: Mac McDade <mcdade54@gmail.com>
Sent: Wednesday, July 20, 2016 2:12 PM
To: Horton, J R
Subject: Re: 2016 Harris Station NRC Exam Completion

*** Exercise caution. This is an EXTERNAL email. DO NOT open attachments or click links from unknown senders or unexpected email. ***

Could not locate a vote button on my phone version of email. I did not reveal any information, assuming I had any. I gave my red badge to Ron when I checked out.

Mac

On Jul 20, 2016 6:54 AM, "Horton, J R" <J.Horton@duke-energy.com> wrote:

To all,

Examination Security has been lifted for the HNP ILC 16-1 NRC Exam. The Operating Exam was administered the week of 7/11/16. The written exam was administered on 7/19/16.

The Exam Security forms are located on my desk in the HEEC building on the instructor office wing (Across from C-109). Please come by and sign off the agreement and return your red exam security

badge. It is preferred that you sign off in person, however if unable to come by my desk, please use the voting option to sign off of the security agreement. By voting you attest to the following

statement:

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 of 7/11/16 and on

7/19/16. 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.

JR Horton

Horton, J R

From: Bolin, Bob
Sent: Monday, July 25, 2016 4:15 AM
To: Horton, J R
Subject: I did NOT divulge exam related information: 2016 Harris Station NRC Exam Completion

Horton, J R

From: McComber, Christopher
Sent: Wednesday, July 20, 2016 10:38 AM
To: Horton, J R
Subject: I did NOT divulge exam related information: 2016 Harris Station NRC Exam Completion

Thanks JR, hope everything went well.

Christopher McComber
Nuc Station Instructor-Ops
HB Robinson Nuclear Plant
(843)857-1721 office
(843)639-1276 cell
(843)917-0455 home

Horton, J R

From: Catalano, Randal J
Sent: Wednesday, July 20, 2016 7:30 PM
To: Horton, J R
Subject: I did NOT divulge exam related information: 2016 Harris Station NRC Exam Completion

Horton, J R

From: Brannan, Ash
Sent: Wednesday, July 27, 2016 2:58 PM
To: Horton, J R
Subject: I did NOT divulge exam related information: 2016 Harris Station NRC Exam Completion

Horton, J R

From: Blankenmyer, Eric
Sent: Wednesday, July 27, 2016 5:16 PM
To: Horton, J R
Subject: I did NOT divulge exam related information: 2016 Harris Station NRC Exam Completion

Horton, J R

From: Jeff Wilhelm <jeff.wilhelm@gses.com>
Sent: Wednesday, July 20, 2016 9:20 AM
To: Horton, J R
Subject: RE: 2016 Harris Station NRC Exam Completion

*** Exercise caution. This is an EXTERNAL email. DO NOT open attachments or click links from unknown senders or unexpected email. ***

JR,

I want to take the voting option.
I agree with the following statements:

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 of 7/11/16 and on 7/19/16. 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.

Thanks,

Jeff Wilhelm
Senior Software Engineer

Direct: +1 410.970.7887
Main: +1 410.970.7800
Mobile: +1 410.274.5022
Jeff.Wilhelm@gses.com

Connect with GSE Online: www.GSES.com

GSE SYSTEMS
Imagine. Empower. Improve.

From: Horton, J R [mailto:J.Horton@duke-energy.com]
Sent: Wednesday, July 20, 2016 8:54 AM
To: Horton, J R <J.Horton@duke-energy.com>; Gregitis, James R <James.Gregitis@duke-energy.com>; Lucky, Archie W <Archie.Lucky@duke-energy.com>; Rua, Scott Matthew <Scott.Rua@duke-energy.com>; Pace, Kenneth Maurice <Kenneth.Pace@duke-energy.com>; Duong, Truc H <Truc.Duong@duke-energy.com>; Forsha, Aaron <Aaron.Forsha@duke-energy.com>; Bright, Ron <Ron.Bright@duke-energy.com>; Lanier, Jason <Jason.Lanier@duke-

Horton, J R

From: Balaji Kannan <Balaji.Kannan@gses.com>
Sent: Wednesday, July 27, 2016 12:09 PM
To: Horton, J R
Subject: RE: 2016 Harris Station NRC Exam Completion

*** Exercise caution. This is an EXTERNAL email. DO NOT open attachments or click links from unknown senders or unexpected email. ***

JR,

I want to take the voting option.

I agree with the following statement.

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 of 7/11/16 and on 7/19/16. 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.

With Best Regards,

Balaji Kannan
Senior Program Manager

Direct: +1 410.970.7845
Main: +1 410.970.7800
Mobile: +1 443.878.5029
Balaji.kannan@gses.com

Connect with GSE Online: www.GSES.com

GSE SYSTEMS
Imagine. Empower. Improve.

From: Horton, J R [mailto:J.Horton@duke-energy.com]
Sent: Wednesday, July 27, 2016 11:58 AM

Facility: Harris Nuclear Plant Date of Examination: July 11, 2016

Examination Level: RO ■ SRO □ Operating Test Number: 05000400/2016301

Administrative Topic (see Note)	Type Code*	Describe activity to be performed
Conduct of Operations	M, R	Perform RCS Average Temperature Data Sheet and Determine Inverse Count Rate Ratio (1/M) (GP-004) (JPM ADM-072-b) *K/A G2.1.43* **2016 NRC RO A1-1**
Conduct of Operations	D, P, R	Determine the amount of RCS inventory that will be drained from RCS during the performance of GP-008, Draining the RCS (GP-008) (JPM ADM-070-a) *K/A G2.1.25* **2016 NRC RO A1-2**
Equipment Control	M, R	Determine the Minimum and Maximum Allowed Indicated Flow for MCR Ventilation (OP-173) (JPM ADM-052-c) **Common** *K/A G2.2.44* **2016 NRC RO / SRO A2**
Radiation Control	M, R	Using Valve Maps And Survey Maps Determine Stay Times For A Clearance (PD-RP-ALL-0001) (JPM ADM-057-a) **Common** *K/A G2.3.4* **2016 NRC RO / SRO A3**
Emergency Procedures/Plan	N/A	NOT SELECTED FOR RO **2016 NRC RO A4**

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	**(4)**
	(D)irect from bank (≤ 3 for ROs; ≤ 4 for SROs & RO retakes)	**(1)**
	(N)ew or (M)odified from bank (≥ 1)	**(3)**
	(P)revious 2 exams (≤ 1; randomly selected)	**(1)**

Facility: Harris Nuclear Plant Date of Examination: July 11, 2016

Examination Level: RO ☐ SRO ■ Operating Test Number: 05000400/2016301

Administrative Topic (see Note)	Type Code*	Describe activity to be performed
Conduct of Operations	M, R	Perform RCS Average Temperature Data Sheet and Determine Inverse Count Rate Ratio (1/M) (GP-004) (JPM ADM-072-c) *K/A G2.1.43* **2016 NRC SRO A1-1**
Conduct of Operations	D, P, R	During a loss of shutdown cooling, determine the time that the RCS will reach core boiling and core boil-off conditions (AOP-020, Curve Book) (JPM ADM-005-c) *K/A G2.1.20* **2016 NRC SRO A1-2**
Equipment Control	M, R	Determine the Minimum and Maximum Allowed Indicated Flow for MCR Ventilation (OP-173) (JPM ADM-052-c) **Common** *K/A G2.2.44* **2016 NRC RO / SRO A2**
Radiation Control	M, R	Using Valve Maps And Survey Maps Determine Stay Times For A Clearance (PD-RP-ALL-0001) (JPM ADM-057-a) **Common** *K/A G2.3.4* **2016 NRC RO / SRO A3**
Emergency Procedures/Plan	N, R	Classify an Event (EP-EAL) (JPM ADM-073-a) *K/A G2.4.41* **2016 NRC SRO A4**

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	**(5)**
	(D)irect from bank (≤ 3 for ROs; ≤ 4 for SROs & RO retakes)	**(1)**
	(N)ew or (M)odified from bank (≥ 1)	**(4)**
	(P)revious 2 exams (≤ 1; randomly selected)	**(1)**

2016 NRC Control Room/In-Plant JPM Revision Summary

ES-301 **Control Room/In-Plant Systems Outline** **Form ES-301-2**

Facility: Harris Nuclear Plant Date of Examination: July 11, 2016

Exam Level: RO ☒ SRO-I ☐ **SRO-U** (bolded) ☒ Operating Test No.: 05000400/2016301

Control Room Systems:* 8 for RO; 7 for SRO-I; 2 or 3 for SRO-U

System / JPM Title	Type Code*	Safety Function
a. Initiate Emergency Boration following a Reactor Trip (AOP-002) (JPM CR-037-d) *K/A APE 024 AA1.17*	A, D, L, S	1
b. Place Excess Letdown in Service (OP-107) (JPM-CR-211-a) **RO Only** *K/A 004 A4.06*	D, S	2
c. **Transfer to Hot Leg Recirculation (EOP ES-1.4) (JPM-CR-066-d)** ***K/A EPE 011 EA1.11***	**A, D, EN, L, S**	**3**
d. Perform Max Rate Cooldown for a SG Tube Rupture (E-3) (JPM-CR-283-c) *K/A 041 A4.08*	A, M, L, S	4S
e. Align the RHR System for ECCS Mode (OP-111) (JPM-CR-290-a) *K/A 005 A4.01*	L, N, S	4P
f. Manually Align Containment Spray (EOP E-0) (JPM CR-106-c) *K/A 026 A4.01*	A, D, EN, S	5
g. **Restoration of Offsite Power to Emergency Buses (EOP ECA-0.0) (JPM-CR-291-a)** ***K/A 055 EA1.07***	**A, N, S**	**6**
h. **Restoring Control Room Area HVAC to Normal After a CRIS (OP-173) (JPM-CR-171-b)** ***K/A APE 067 AA1.05***	**A, D, EN, P, S**	**8**

2016 NRC Control Room/In-Plant JPM Revision Summary

ES-301	Control Room/In-Plant Systems Outline	Form ES-301-2

Facility: Harris Nuclear Plant — Date of Examination: July 11, 2016

Exam Level: RO ☒ SRO-I ☐ **SRO-U** (bolded) ☒ — Operating Test No.: 05000400/2016301

In-Plant Systems* (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)		
i. Shift Auxiliary Feedwater Pump Suction Locally (OP-137) (JPM-IP-004-c) ***K/A 061 A1.04***	**E, L, M, R**	**4S**
j. Align UPS Instrument Bus to Bypass Power Supply (OP-156.02) (JPM-IP-254-b) *K/A 062 A1.03*	D, E	6
k. Start Up A Rod Drive MG Set (OP-104) (JPM-IP-022-a) ***K/A 001 A4.08***	**D, L**	**1**

* All RO and SRO-I control room (and in-plant) systems must be different and serve different safety functions; all five 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	(6 / 0 / **3**)
(C)ontrol room		
(D)irect from bank	≤ 9 / ≤ 8 / ≤ 4	(7 / 0 / **3**)
(E)mergency or abnormal in-plant	≥ 1 / ≥ 1 / ≥ 1	(2 / 0 / **2**)
(EN)gineered safety feature	≥ 1 / ≥ 1 / ≥ 1 (control room system)	(3 / 0 / **2**)
(L)ow-Power / Shutdown	≥ 1 / ≥ 1 / ≥ 1	(6 / 0 / **3**)
(N)ew or (M)odified from bank including 1(A)	≥ 2 / ≥ 2 / ≥ 1	(4 / 0 / **2**)
(P)revious 2 exams	≤ 3 / ≤ 3 / ≤ 2 (randomly selected)	(1 / 0 / **1**)
(R)CA	≥ 1 / ≥ 1 / ≥ 1	(1 / 0 / **1**)
(S)imulator		

The HNP 2016 License class does not have any SRO-I candidates. The count above for SRO-I has been marked "0" since there are no SRO-I's.

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

Facility: Shearon Harris Date of Examination: July 11, 2016 Operating Test Number: 05000400/2016301

	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	Richard (JR) Horton /	6/29/16
b.	Facility Reviewer(*)	Scott Rua /	6/29/16
c.	NRC Chief Examiner (#)	Mike Dorithan / Mike Dorithan	7/1/16
d.	NRC Supervisor	Gerald McCoy /	7/8/2016

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

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

Facility: Shearon Harris Date of Exam: July 11, 2016 Scenario Numbers: 1 / 2 / 3 Operating Test No.: 05000400/2016301

QUALITATIVE ATTRIBUTES	Initials a	b*	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) or conditions 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. The events are valid with regard to physics and thermodynamics.			
5. Sequencing and timing of events is reasonable, and allows the examination team to obtain complete evaluation results commensurate with the scenario objectives.			
6. 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.			
7. The simulator modeling is not altered.			
8. 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.			
9. 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.			
10. All individual operator competencies can be evaluated, as verified using Form ES-301-6 (submit the form along with the simulator scenarios).			
11. The scenario set provides the opportunity for each applicant to be evaluated in each of the applicable rating factors. (Competency Rating factors as described on forms ES-303-1 and ES-303-3.)			
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	–	–	–
1. Malfunctions after EOP entry (1-2)	3 / 3 / 2			
2. Abnormal events (2-4)	2 / 3 / 2			
3. Major transients (1–2)	1 / 1 / 1			
4. EOPs entered/requiring substantive actions (1–2)	1 / 1 / 4			
5. EOP contingencies requiring substantive actions (0-2)	1 / 1 / 1			
6. EOP based Critical tasks (2–3)	2 / 2 / 2			

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

SCENARIO'S 1 AND 2
RO List (4 total)

ES-301 **Transient and Event Checklist** **Form ES-301-5**

Facility: Shearon Harris Date of Exam: July 11, 2016 Operating Test No.: 05000400/2016301

APPLICANT	EVENT TYPE	Scenarios 1 CREW POSITION SRO	1 ATC	1 BOP	2 CREW POSITION SRO	2 ATC	2 BOP	TOTAL	MINIMUM(*) R	I	U
RO - 1 ■ SRO-I ☐ SRO-U ☐	RX		R1					1	1		
	NOR						N1	1	1		
	I/C		I2, I4, C5				C3, C5	5	4		
	MAJ		M7				M6	2	2		
	TS							0	0		
RO - 2 ■ SRO-I ☐ SRO-U ☐	RX					R1		1	1		
	NOR			N1				1	1		
	I/C			I3, C6		I2, C4		4	4		
	MAJ			M7		M6		2	2		
	TS							0	0		
RO - 3 ■ SRO-I ☐ SRO-U ☐	RX		R1					1	1		
	NOR						N1	1	1		
	I/C		I2, I4, C5				C3, C5	5	4		
	MAJ		M7				M6	2	2		
	TS							0	0		
RO - 4 ■ SRO-I ☐ SRO-U ☐	RX					R1		1	1		
	NOR			N1				1	1		
	I/C			I3, C6		I2, C4		4	4		
	MAJ			M7		M6		2	2		
	TS							0	0		

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 (SRO-I) 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 SRO-I *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 one-for-one 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.

4. For licensees that use the ATC operator primarily for monitoring plant parameters, the chief examiner may place SRO-I applicants in either the ATC or BOP position to best evaluate the SRO-I in manipulating plant controls.

SCENARIO'S 1 AND 2
SRO Upgrade List (6 total)

ES-301 Transient and Event Checklist Form ES-301-5

Facility: Shearon Harris Date of Exam: July 11, 2016 Operating Test No.: 05000400/2016301

APPLICANT	EVENT TYPE	Scenarios 1 CREW POSITION SRO	1 ATC	1 BOP	2 CREW POSITION SRO	2 ATC	2 BOP	TOTAL	MINIMUM(*) R	I	U
RO ☐ SRO-I ☐ SRO-U1 ■	RX	R1				R1		2			0
	NOR	N1						1			1
	I/C	I2, I3, I4, C5, C6				I2, C4		7			2
	MAJ	M7				M6		2			1
	TS	T3, T5						2			2
RO ☐ SRO-I ☐ SRO-U2 ■	RX	R1						1			0
	NOR	N1					N1	2			1
	I/C	I2, I3, I4, C5, C6					C3, C5	7			2
	MAJ	M7					M6	2			1
	TS	T3, T5						2			2
RO ☐ SRO-I ☐ SRO-U3 ■	RX		R1		R1			2			0
	NOR				N1			1			1
	I/C		I2, I4, C5		I2, C3 C4, C5			7			2
	MAJ		M7		M6			2			1
	TS				T2, T3, T5			3			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 (SRO-I) 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 SRO-I *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 one-for-one 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.

4. For licensees that use the ATC operator primarily for monitoring plant parameters, the chief examiner may place SRO-I applicants in either the ATC or BOP position to best evaluate the SRO-I in manipulating plant controls.

SCENARIO'S 1 AND 2
SRO Upgrade List (6 total)

ES-301 Transient and Event Checklist Form ES-301-5

Facility: Shearon Harris Date of Exam: July 11, 2016 Operating Test No.: 05000400/2016301

APPLICANT	EVENT TYPE	Scenarios 1 SRO	1 ATC	1 BOP	2 SRO	2 ATC	2 BOP	TOTAL	MINIMUM(*) R	I	U
RO ☐ SRO-I ☐ SRO-U4 ■	RX				R1			1			0
	NOR			N1	N1			2			1
	I/C			I3, C6	I2, C3 C4, C5			6			2
	MAJ			M7	M6			2			1
	TS				T2, T3, T5			3			2
RO ☐ SRO-I ☐ SRO-U5 ■	RX	R1						1			0
	NOR	N1						1			1
	I/C	I2, I3, I4, C5, C6						5			2
	MAJ	M7						1			1
	TS	T3, T5						2			2
RO ☐ SRO-I ☐ SRO-U6 ■	RX				R1			1			0
	NOR				N1			1			1
	I/C				I2, C3 C4, C5			4			2
	MAJ				M6			1			1
	TS				T2, T3, T5			3			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 (SRO-I) 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 SRO-I *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 one-for-one 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.

4. For licensees that use the ATC operator primarily for monitoring plant parameters, the chief examiner may place SRO-I applicants in either the ATC or BOP position to best evaluate the SRO-I in manipulating plant controls.

Facility: Shearon Harris Date of Exam: July 11, 2016 Operating Test No.: 05000400/2016301

APPLICANT	EVENT TYPE	Scenarios 3 CREW POSITION SRO	CREW POSITION ATC	CREW POSITION BOP	TOTAL	MINIMUM(*) R	I	U
RO ☐ SRO-I ☐ SRO-U ■	RX				0	1	1	0
	NOR	N1			1	1	1	1
	I/C	C2 , I3, C4, I5, C6			5	4	4	2
	MAJ	M7			1	2	2	1
	TS	T4, T5			2	0	2	2
RO ■ SRO-I ☐ SRO-U ☐	RX				0	1	1	0
	NOR				1	1	1	1
	I/C		I3, C4, C6		3	4	4	2
	MAJ		M7		1	2	2	1
	TS				0	0	2	2
RO ■ SRO-I ☐ SRO-U ☐	RX				0	1	1	0
	NOR			N1	1	1	1	1
	I/C			C2 , I5	2	4	4	2
	MAJ			M7	1	2	2	1
	TS				0	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 (SRO-I) 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 SRO-I *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 one-for-one 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.

4. For licensees that use the ATC operator primarily for monitoring plant parameters, the chief examiner may place SRO-I applicants in either the ATC or BOP position to best evaluate the SRO-I in manipulating plant controls.

Facility: Shearon Harris Date of Exam: July 11, 2016 Operating Test No.: 05000400/2016301

Competencies	APPLICANTS				
	RO	RO (BOP)	SRO-U		
	SCENARIO	SCENARIO	SCENARIO	SCENARIO	SCENARIO
	1	1	1	1 (RO)	1 (BOP)
Interpret / Diagnose Events and Conditions	2, 4, 5, 7	3, 6, 7, 8, 9, 10	2, 3, 4, 5, 6, 7 8, 9, 10	2, 4, 5, 7	3, 6, 7, 8, 9, 10
Comply With and Use Procedures (1)	1, 2, 4, 5, 7	1, 3, 6, 7, 8 9, 10	1, 2, 3, 4, 5, 6 7, 8, 9, 10	1, 2, 4, 5, 7	1, 3, 6, 7, 8 9, 10
Operate Control Boards (2)	1, 2, 4, 5, 7	1, 3, 6, 7, 8 9, 10	0	1, 2, 4, 5, 7	1, 3, 6, 7, 8 9, 10
Communicate and Interact	1, 2, 4, 5, 7	1, 3, 6, 7, 8 9, 10	1, 2, 3, 4, 5, 6 7, 8, 9, 10	1, 2, 4, 5, 7	1, 3, 6, 7, 8 9, 10
Demonstrate Supervisory Ability (3)	0	0	1, 2, 3, 4, 5, 6 7, 8, 9, 10	0	0
Comply With and Use Tech. Specs. (3)	0	0	3, 4	0	0

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. (This includes all rating factors for each competency.) (Competency Rating factors as described on forms ES-303-1 and ES-303-3.)

Facility: Shearon Harris Date of Exam: July 11, 2016 Operating Test No.: 05000400/2016301

Competencies	APPLICANTS				
	RO	RO (BOP)	SRO-U		
	SCENARIO 2	SCENARIO 2	SCENARIO 2	SCENARIO 2 (RO)	SCENARIO 2 (BOP)
Interpret / Diagnose Events and Conditions	2, 4, 6, 7	3, 5, 6, 8, 9	2, 3, 4, 5, 6, 7 8, 9	2, 4, 6, 7	3, 5, 6, 8, 9
Comply With and Use Procedures (1)	1, 2, 4, 6, 7	1, 3, 5, 6, 8, 9	1, 2, 3, 4, 5, 6 7, 8, 9	1, 2, 4, 6, 7	1, 3, 5, 6, 8, 9
Operate Control Boards (2)	1, 2, 4, 6, 7	1, 3, 5, 6, 8, 9	0	1, 2, 4, 6, 7	1, 3, 5, 6, 8, 9
Communicate and Interact	1, 2, 4, 6, 7	1, 3, 5, 6, 8, 9	1, 2, 3, 4, 5, 6 7, 8, 9	1, 2, 4, 6, 7	1, 3, 5, 6, 8, 9
Demonstrate Supervisory Ability (3)	0	0	1, 2, 3, 4, 5, 6 7, 8, 9	0	0
Comply With and Use Tech. Specs. (3)	0	0	2, 3, 4	0	0

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. (This includes all rating factors for each competency.) (Competency Rating factors as described on forms ES-303-1 and ES-303-3.)

Facility: Shearon Harris Date of Exam: July 11, 2016 Operating Test No.: 05000400/2016301

Competencies	APPLICANTS				
	RO	RO (BOP)	SRO-U		
	SCENARIO 3	SCENARIO 3	SCENARIO 3	SCENARIO 3 (RO)	SCENARIO 3 (BOP)
Interpret / Diagnose Events and Conditions	3, 4, 6, 7, 8	1, 2, 5, 7, 9	1, 2, 3, 4, 5, 6 7, 8, 9	3, 4, 6, 7, 8	1, 2, 5, 7, 9
Comply With and Use Procedures (1)	3, 4, 6, 7, 8	1, 2, 5, 7, 9	1, 2, 3, 4, 5, 6 7, 8, 9	3, 4, 6, 7, 8	1, 2, 5, 7, 9
Operate Control Boards (2)	3, 4, 6, 7, 8	1, 2, 5, 7, 9	0	3, 4, 6, 7, 8	1, 2, 5, 7, 9
Communicate and Interact	3, 4, 6, 7, 8	1, 2, 5, 7, 9	1, 2, 3, 4, 5, 6 7, 8, 9	3, 4, 6, 7, 8	1, 2, 5, 7, 9
Demonstrate Supervisory Ability (3)	0	0	1, 2, 3, 4, 5, 6 7, 8, 9	0	0
Comply With and Use Tech. Specs. (3)	0	0	4, 5	0	0

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

SCENARIO # 3 submitted as a SPARE Scenario

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. (This includes all rating factors for each competency.) (Competency Rating factors as described on forms ES-303-1 and ES-303-3.)

Master as of ~~3/28/16~~ 5/3/16 ~~5/3/16~~ 6/10/16
6/10/16

Facility: HARRIS Date of Exam: JULY 2016

Tier	Group	RO K/A Category Points												SRO-Only Points		
		K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G *	Total	A2	G*	Total
1 Emergency & Abnormal Plant Evolutions	1	3	3	3	N/A			3	3	N/A		3	18	3	3	6
	2	1	1	2				2	1			2	9	2	2	4
	Tier Totals	4	4	5				5	4			5	27	5	5	10
2. Plant Systems	1	3	2	~~3~~ 2	~~3~~ 2	~~2~~ 3	2	3	~~3~~ 3	3	~~2~~ 3	~~3~~ 2	28	2	3	5
	2	1	1	1	1	1	1	1	1	1	1	1	10	1	2	3
	Tier Totals	4	3	~~4~~ 3	~~4~~ 3	~~3~~ 4	3	4	2	4	4	~~3~~ 4	38		5	8

3. Generic Knowledge and Abilities Categories	1	2	3	4	10	1	2	3	4	7
	3	3	2	2		2	2	2	1	

1. Ensure that at least two topics from every applicable K/A category are sampled within each tier of the RO and SRO-only outlines (i.e., except for one category in Tier 3 of the SRO-only, the "Tier Totals" in each K/A category shall not be less than two). (One Tier 3 Radiation Control K/A is allowed if the K/A is replaced by a K/A from another Tier 3 Category).
2. The point total for each group and tier in the proposed outline must match that specified in the table. The final point total for each group and tier may deviate by ±1 from that specified in the table based on NRC revisions. The final RO exam must total 75 points and the SRO-only exam must total 25 points.
3. Systems/evolutions within each group are identified on the associated outline; systems or evolutions that do not apply at the facility should be deleted and justified; operationally important, site-specific systems that are not included on the outline should be added. Refer to section D.1.b of ES-401 for guidance regarding the elimination of inappropriate K/A statements.
4. Select topics from as many systems and evolutions as possible; sample every system or evolution in the group before selecting a second topic for any system or evolution.
5. Absent a plant-specific priority, only those K/As having an importance rating (IR) of 2.5 or higher shall be selected. Use the RO and SRO ratings for the RO and SRO-only portions, respectively.
6. Select SRO topics for Tiers 1 and 2 from the shaded systems and K/A categories.
7. *The generic (G) K/As in Tiers 1 and 2 shall be selected from Section 2 of the K/A Catalog, but the topics must be relevant to the applicable evolution or system. Refer to section D.1.b of ES-401 for the applicable KAs.
8. On the following pages, enter the K/A numbers, a brief description of each topic, the topics' importance ratings (IRs) for the applicable license level, and the point totals (#) for each system and category. Enter the group and tier totals for each category in the table above; if fuel handling equipment is sampled in other than Category A2 or G* on the SRO-only exam, enter it on the left side of Column A2 for Tier 2, Group 2 (Note # 1 does not apply). Use duplicate pages for RO and SRO-only exams.
9. For Tier 3, select topics from Section 2 of the K/A catalog, and enter the K/A numbers, descriptions, IRs, and point totals (#) on Form ES-401-3. Limit SRO selections to K/As that are linked to 10 CFR 55.43.

	KA	NAME / SAFETY FUNCTION:	IR RO	IR SRO	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
1	007EK3.01	Reactor Trip - Stabilization - Recovery / 1	4	4.6			✔									Actions contained in EOP for reactor trip
	008AK2.01	Pressurizer Vapor Space Accident / 3	2.7	2.7		✔										Valves
	009EK1.02	Small Break LOCA / 3	3.5	4.2	✔											Use of steam tables
	011EG2.4.46	Large Break LOCA / 3	4.2	4.2											✔	Ability to verify that the alarms are consistent with the plant conditions.
5	022AK3~~.05~~ .02	Loss of Rx Coolant Makeup / 2	~~3.2~~ 3.5	~~3.4~~ 3.8			✔									~~Need to avoid plant transients~~ Actions contained in SOPs and EOPs for RCPs, loss of makeup, loss of charging, and abnormal charging.
	025AK2.05	Loss of RHR System / 4	2.6	2.6		✔										Reactor building sump
	027AA1.01	Pressurizer Pressure Control System Malfunction / 3	4	3.9							✔					PZR heaters, sprays, and PORVs
	029EA1.13	ATWS / 1	4.1	3.9							✔					Manual trip of main turbine
	038EK3.09	Steam Gen. Tube Rupture / 3	4.1	4.5			✔									Criteria for securing/throttling ECCS
10	054AK1.02	Loss of Main Feedwater / 4	3.6	4.2	✔											Effects of feedwater introduction on dry S/G
	055EG2.4.21	Station Blackout / 6	4.0	4.6											✔	Knowledge of the parameters and logic used to assess the status of safety functions

	KA	NAME / SAFETY FUNCTION:	IR RO	IR SRO	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
12	056AA1.18	Loss of Off-site Power / 6	3.2	3.2							✔					Control room normal ventilation supply fan
	057AA2.20	Loss of Vital AC Inst. Bus / 6	3.6	3.9								✔				Interlocks in effect on loss of ac vital electrical instrument bus that must be bypassed to restore normal equipment operation
	058AK1.01	Loss of DC Power / 6	2.8	3.1	✔											Battery charger equipment and instrumentation
15	WE04EK2.2	LOCA Outside Containment / 3	3.8	4.0		✔										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.
	we05EG2.2.36 MD 3/28/16	Inadequate Heat Transfer - Loss of Secondary Heat Sink / 4	3.1	4.2											✔	Ability to analyze the effect of maintenance activities, such as degraded power sources, on the status of limiting conditions of operations
	~~WE11EA2.1~~	~~Loss of Emergency Coolant Recirc. / 4~~	~~3.4~~	~~4.2~~								✔				~~Facility conditions and selection of appropriate procedures during abnormal and emergency operations.~~
	APE 026 AA2.06 Loss of ~~RHR~~ CCW: time before a component may be damaged. MD 5/3/16															
18	WE12EA2.2	Steam Line Rupture - Excessive Heat Transfer / 4	3.4	3.9								✔				Adherence to appropriate procedures and operation within the limitations in the facility's license and amendments.

	KA	NAME / SAFETY FUNCTION:	IR RO	IR SRO	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
19	005AA1.01	Inoperable/Stuck Control Rod / 1	3.6	3.4							✔					CRDS
20	032AG2.2.25	Loss of Source Range NI / 7	3.2	4.2											✔	Knowledge of the bases in Technical Specifications for limiting conditions for operations and safety limits.
	033AK1.01	Loss of Intermediate Range NI / 7	2.7	3	✔											Effects of voltage changes on performance
	061AK3.02	ARM System Alarms / 7	3.4	3.6			✔									Guidance contained in alarm response for ARM system
	074EK3.06	Inad. Core Cooling / 4	3.9	4.2			✔									Confirming that the PORV cycles open at the specified setpoint
	we02EG2.4.11	SI Termination / 3	4.0	4.2											✔	Knowledge of abnormal condition procedures.
25	WE03EA2.2	LOCA Cooldown - Depress. / 4	3.5	4.1								✔				Adherence to appropriate procedures and operation within the limitations in the facility's license and amendments.
	WE14EA1.2	Loss of CTMT Integrity / 5	3.3	3.4							✔					Operating behavior characteristics of the facility.
	WE15EK2.2	Containment Flooding / 5	2.7	2.9		✔										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.

	KA	NAME / SAFETY FUNCTION:	IR RO	IR SRO	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
28	003K6.02	Reactor Coolant Pump	2.7	3.1						✔						RCP seals and seal water supply
	004K3.06	Chemical and Volume Control	3.4	3.6			✔									RCS temperature and pressure
30	004K5.31	Chemical and Volume Control	3.0	3.4					✔							Purpose of flow path around boric acid storage tank
Replaced. MD 4/15/16	~~005K5.01~~	Residual Heat Removal ~~Residual Heat Removal~~	~~2.6~~	~~2.9~~					✔							~~Nil ductility transition temperature (brittle fracture)~~
	005K5.05 - Plant response during "solid plant"															
	006K1.02	Emergency Core Cooling	4.3	4.6	✔											ESFAS
	007A1.03	Pressurizer Relief/Quench Tank	2.6	2.7							✔					Monitoring quench tank temperature
Suppressed. MD 11/9/15	~~007K5.02~~	~~Pressurizer Relief/Quench Tank~~	3.1	3.4			✓		✔ MD 11/9/15							~~Method of forming a steam bubble in the PZR~~ MD 11/9/15
	New K/A: 064K3.01 - EDGs: Systems controlled by automatic loader.															
35	008A2.05	Component Cooling Water	3.3	3.5								✔				Effect of loss of instrument and control air on the position of the CCW valves that are air operated
	010K1.06	Pressurizer Pressure Control	2.9	3.1	✔											CVCS
	010K1.08	Pressurizer Pressure Control	3.2	3.5	✔											PZR LCS
	012A3.04	Reactor Protection	2.8	2.9									✔			Circuit breaker

	KA	NAME / SAFETY FUNCTION:	IR RO	IR SRO	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
	013K2.01	Engineered Safety Features Actuation	3.6	3.8		✔										ESFAS/safeguards equipment control
40	013K6.01	Engineered Safety Features Actuation	2.7	3.1						✔						Sensors and detectors
	022K2.01	Containment Cooling	3.0	3.1		✔										Containment cooling fans
	026A4.01	Containment Spray	4.5	4.3										✔		CSS controls
	026G2.4.20	Containment Spray	3.8	4.3											✔	Knowledge of operational implications of EOP warnings, cautions and notes.
	039A3.02	Main and Reheat Steam	3.1	3.5									✔			Isolation of the MRSS
45	039A4.04	Main and Reheat Steam	3.8	3.9										✔		Emergency feedwater pump turbines
	059A3.03	Main Feedwater	2.5	2.6									✔			Feedwater pump suction flow pressure
	061A2.05	Auxiliary/Emergency Feedwater	3.1	3.4								✔				Automatic control malfunction
	062K3.02	AC Electrical Distribution	4.1	4.4			✔									ED/G
49P	063A1.01	DC Electrical Distribution	2.5	3.3							✔					Battery capacity as it is affected by discharge rate

KA	NAME / SAFETY FUNCTION:	IR RO	IR SRO	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
50 063G2.1.20	DC Electrical Distribution	4.6	4.6											✔	Ability to execute procedure steps.
064A1.04	Emergency Diesel Generator	2.8	2.9							✔					Crankcase temperature and pressure
073A4.02	Process Radiation Monitoring	3.7	3.7										✔		Radiation monitoring system control panel
076K4.01	Service Water	2.5	2.9				✔								Conditions initiating automatic closure of closed cooling water auxiliary building header supply and return valves
~~078G2.2.4~~ 11/01/15 New K/A: 078K4.01 ~~New K4: 078K4.03 – IA: Securing of SAS upon loss of cooling water.~~ 4/14/16	Instrument Air	3.6	3.6				✓							✔ 11/01/15	(multi-unit) ~~Ability to explain the variations in control board layouts, systems, instrumentation and procedural actions between units at a facility.~~ 11/01/15
55 103K4.04	Containment	2.5	3.2				✔								Personnel access hatch and emergency access hatch

	KA	NAME / SAFETY FUNCTION:	IR RO	IR SRO	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
56	001K5.10	Control Rod Drive	3.9	4.1					✔							Effect of rod motion on core power distribution and RCS temperatures
	015K6.02	Nuclear Instrumentation	2.6	2.9						✔						Discriminator/compensation circuits
	016K3.10	Non-nuclear Instrumentation	3.0	3.2			✔									CCS
	027K2.01	Containment Iodine Removal	3.1	3.4		✔										Fans
60	028A1.01	Hydrogen Recombiner and Purge Control	3.4	3.8							✔					Hydrogen concentration
	041G2.1.27	Steam Dump/Turbine Bypass Control	3.9	4											✔	Knowledge of system purpose and or function.
	071K4.05	Waste Gas Disposal	2.7	3.0				✔								Point of release
	072K1.04	Area Radiation Monitoring	3.3	3.5	✔											Control room ventilation
	075A~~4.01~~ 2.02 3/28/16	Circulating Water	3.2	3.2								✔ 3/28/16	✔			~~Emergency/essential SWS pumps~~ Loss of circulating water pumps.
65	086A3.01	Fire Protection	2.9	3.3								✔				Starting mechanisms of fire water pumps

	KA	NAME / SAFETY FUNCTION:	IR RO	IR SRO	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
66	G2.1.14	Conduct of operations	3.1	3.1											✔	Knowledge of criteria or conditions that require plant-wide announcements, such as pump starts, reactor trip, mode changes, etc.
	G2.1.18	Conduct of operations	3.6	3.8											✔	Ability to make accurate, clear and concise logs, records, status boards and reports.
Substitute:	G2.1.~~9~~ 8	Conduct of operations	~~2.9~~ 3.4	~~4.5~~ 4.1											✔	Ability to ~~direct~~ coordinate personnel activities ~~inside~~ outside the control room.
	G2.2.21	Equipment Control	2.9	4.1											✔	Knowledge of pre- and post-maintenance operability requirements.
70	G2.2.35	Equipment Control	3.6	4.5											✔	Ability to determine Technical Specification Mode of Operation
	G2.2.41	Equipment Control	3.5	3.9											✔	Ability to obtain and interpret station electrical and mechanical drawings
	G2.3.14	Radiation Control	3.4	3.8											✔	Knowledge of radiation or contamination hazards that may arise during normal, abnormal, or emergency conditions or activities
	G2.3.15	Radiation Control	2.9	3.1											✔	Knowledge of radiation monitoring systems
	G2.4.17	Emergency Procedures/Plans	3.9	4.3											✔	Knowledge of EOP terms and definitions.
75	G2.4.50	Emergency Procedures/Plans	4.2	4.0											✔	Ability to verify system alarm setpoints and operate controls identified in the alarm response manual.

From SRO section, more applicable to RO.

	KA	NAME / SAFETY FUNCTION:	IR RO	IR SRO	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
76	011EG2.1.25	Large Break LOCA / 3	3.9	4.2											✔	Ability to interpret reference materials such as graphs, monographs and tables which contain performance data.
	025AG2.2.25	Loss of RHR System / 4	3.2	4.2											✔	Knowledge of the bases in Technical Specifications for limiting conditions for operations and safety limits.
78P	026AA2.02	Loss of Component Cooling Water / 8	2.9	3.6								✔				The cause of possible CCW loss
	056AA2.76	Loss of Off-site Power / 6	2.6	2.6								✔				Reactor makeup water pump (running)
80P	065AG2.4.8	Loss of Instrument Air / 8	3.8	4.5											✔	Knowledge of how abnormal operating procedures are used in conjunction with EOPs.
	WE04EA2.1	LOCA Outside Containment / 3	3.4	4.3								✔				Facility conditions and selection of appropriate procedures during abnormal and emergency operations.

KA	NAME / SAFETY FUNCTION	IR RO	IR SRO	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC
82 028AG2 ~~1.34~~ 1.32 MD 3/23/16	Pressurizer Level Malfunction / 2	4.2	4.1											✓	~~Knowledge of RO tasks performed outside the main control room during an emergency and the resultant operational effects~~ Ability to explain + apply system limits + precautions.
068AA2.06	Control Room Evac / 8	4.1	4.3								✓				RCS pressure
076AG2 4.~~2~~ .47 MD 4/15/16	High Reactor Coolant Activity / 9	4.5	4.6											✓	~~Knowledge of system set points, interlocks and automatic actions associated with EOP entry conditions~~ MD 4/15/16 Ability to diagnose and recognize trends in an accurate and timely manner utilizing the appropriate CR reference material
85 WE10EA2.1	Natural Circ. With Seam Void / 4	3.2	3.9								✓				Facility conditions and selection of appropriate procedures during abnormal and emergency operations

	KA	NAME / SAFETY FUNCTION:	IR RO	IR SRO	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
86P	005A2.02	Residual Heat Removal	3.5	3.7								✔				Pressure transient protection during cold shutdown
	~~007G2.4.4~~ 006G2.2.44	~~Pressurizer Relief/Quench Tank~~ ECCS	4.5	4.7											✔	~~Ability to recognize abnormal indications for system operating parameters which are entry level conditions for emergency and abnormal operating procedures.~~ Ability to interpret CR indications to verify status + operation of a system, and understand how operator actions + directives affect plant + system conditions.
	008G2.2.44	Component Cooling Water	4.2	4.4											✔	Ability to interpret control room indications to verify the status and operation of a system, and understand how operator actions and directives affect plant and system conditions
	010A2.01	Pressurizer Pressure Control	3.3	3.6								✔				Heater failures
90	026G2.4.9	Containment Spray	3.8	4.2											✔	Knowledge of low power / shutdown implications in accident (e.g. LOCA or loss of RHR) mitigation strategies.

	KA	NAME / SAFETY FUNCTION:	IR RO	IR SRO	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
91	001G2.1.25	Control Rod Drive	3.9	4.2											✔	Ability to interpret reference materials such as graphs, monographs and tables which contain performance data.
92	034A4.02	Fuel Handling Equipment	3.5	3.9												Neutron levels
93	~~075G2.4.1~~ 071G2.2.42	~~Circulating Water~~ Waste Gas Disposal	4.6	4.8											✔	~~Knowledge of EOP entry conditions and immediate action steps.~~ Ability to recognize system parameters that are entry-level conditions for Technical specifications.

KA	NAME / SAFETY FUNCTION:	IR RO	IR SRO	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
94P G2.1.3	Conduct of operations	3.7	3.9											✔	Knowledge of shift or short term relief turnover practices.
Substitute: 95 G2.1.8 ~~10~~ 9 11/01/15	Conduct of operations	~~3.4~~ 2.9	~~4.1~~ 4.5											✔	Ability to ~~coordinate~~ direct personnel activities ~~outside~~ inside the control room. ~~10~~ 11/01/15
↳ From RO section, more applicable to SRO.															
G2.2.1	Equipment Control	4.5	4.4											✔	Ability to perform pre-startup procedures for the facility, including operating those controls associated with plant equipment that could affect reactivity.
G2.2.15	Equipment Control	3.9	4.3											✔	Ability to determine the expected plant configuration using design and configuration control documentaion
G2.3.4	Radiation Control	3.2	3.7											✔	Knowledge of radiation exposure limits under normal and emergency conditions
G2.3.7	Radiation Control	3.5	3.6											✔	Ability to comply with radiation work permit requirements during normal or abnormal conditions
100P G2.4.35	Emergency Procedures/Plans	3.8	4.0											✔	Knowledge of local auxiliary operator tasks during emergency and the resultant operational effects

Tier / Group	Randomly Selected K/A	Reason for Rejection
1/1	RO WE05EG2.2.3 3/23/16	Licensee noted that the words in the Topic don't match this K/A, but they **do** match WE05EG2.2.3**6**. It appears that this long K/A got truncated in the printout from the sample plan generator. HNP directed to use WE05G2.2.36.
1/1	RO WE11EA2.1 5/3/16	Difficult to write an RO question to: "Facility conditions and selection of appropriate procedures during abnormal and emergency operations." Randomly selected a new K/A from one of the five not-sampled T1G1 topics, and staying in A2 so as not to unbalance the counts across the categories. Replaced with APE026AA2.06.
1/1	RO 022AK3.05 6/10/16	Question submitted on 5/19 was Unsat on K/A match because there wasn't a plant transient. Suggested they look at Sequoyah 2013 Q6 & North Anna 2006 Q22, but they were unable to make either of those ideas work because Harris doesn't have the same procedural support as those questions required. Randomly selected a new K/A from the same APE and K3: Replaced with 023AK3.02
2/1	RO 005K5.01 4/15/16	Unable to write an operationally-valid question to "nil ductility transition temperature (brittle fracture) of RHR. Randomly selected a new K/A from the same system and K5: Replaced with 005K5.05
2/1	RO 007K5.02 11/10/15	This KA was replaced on the 2014 Harris exam because they were unable to write an operationally valid question that was significantly different than 007A1.03, which is also on this sample plan. (Note that K5.02 is the only one of the six K5's in system 007 that has an RO Importance Rating ≥ 2.5, which is why this situation keeps arising.) Replaced with 064K3.01
2/1	RO 078G2.2.4 11/10/15 & 4/14/16	Multi-unit KA and Harris is a single-unit plant. Replaced with 078K4.03 This KA couldn't be written to because Harris does not have a Station Air Compressor, so the Service Air System isn't affected by loss of cooling water. Randomly chose a new KA from the same system and K4: New KA 078K4.01
2/2	RO 075A4.01 3/23/16	This K/A is Circulating Water System, but asks about Emergency SW pumps. There is no functional tie between those systems at HNP. We found past examples where it was written to, but they seem to have forgotten about the "Circ Water" part of the K/A. No other 075A4 has IR >2.5, so couldn't stay in A.4. RO T2G2 area A2 was not sampled, so randomly chose from there: New K/A 075A2.02
3	RO G2.1.9 11/10/15	"Ability to direct personnel activities *inside* the control room" is not really an RO function. The SRO section samples G 2.1.8, "Ability to coordinate personnel activities *outside* the control room," which is something ROs do. Instead of replacing this KA, decided to swap 2.1.8 & 2.1.9 between the two sections of the exam. This has the advantage of keeping these two Generic abilities on the exam for the SROs, while making it easier to write an RO question to one of them. Swapped with G2.1.8 from SRO section.
1/2	SRO 028AG2.4.34 3/23/16	K/A very difficult to write to (PZR level malfunction, tasks performed outside the control room, during an emergency). Kept the system 028 piece, and randomly selected a new generic topic from the 43 items in ES-401 D.1.b. New K/A 028AG2.1.32
1/2	SRO 076AG2.4.2 4/15/16	Unable to write an SRO question to "High RCS Activity – Knowledge of system set points, interlocks, and automatic actions associated with EOP entry conditions" because no EOPs have RCS activity as an entry condition. Kept the system 076 piece, stayed in the G2.4 series, and randomly selected from the other 49 topics. New K/A 076G2.4.47

2/1	SRO 007G2.4.4 3/23/16	The generic part of this K/A includes entry conditions for EOPs/AOPs, which is RO-level knowledge. System 007 is the PRT, which isn't very important to safety, so randomly selected a new system from T2G1 and a new generic topic from D.1.b. New K/A 006G2.2.44
2/2	SRO 075G2.4.1 3/23/16	K/A can't be written to because Circ Water is not in EOP entry conditions, and doesn't have immediate action steps associated with it. G2.4.1, "Knowledge of EOP entry conditions and immediate action steps," does not lend itself to an SRO question because those two things are both RO-level knowledge. And given that Circ Water isn't important to safety, randomly generated a completely new T2G2 K/A: New K/A 071G2.2.42
3	SRO G2.1.8 11/10/15	See discussion above for G2.1.9. Swapped with G2.1.9 from RO section.

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

Facility: Shearon Harris Test No. 05000400/2016301 Date of Exam: July 19, 2016 Exam Level: RO ■ SRO ■

	Item Description	Initial a	Initial b*	Initial c*#
1.	Questions and answers are technically accurate and applicable to the facility.	✓	JR	MD
2.	a. NRC K/As are referenced for all questions. b. Facility learning objectives are referenced as available.	✓	JR	MD
3.	SRO questions are appropriate in accordance with Section D.2.d of ES-401	✓	JR	MD
4	The sampling process was random and systematic (If more than 4 RO or 2 SRO questions were repeated from the last two NRC licensing exams, consult the NRR/NRO OL program office).	✓	JR	MD
5.	Question duplication from the licensee 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 X the licensee certifies that there is no duplication; or __ other (explain)	✓	JR	MD
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: 47 / 7; Modified: 1 / 2; New: 27 / 16	✓	JR	MD
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 / 7; C/A: 40 / 18	✓	JR	MD
8.	References/handouts provided do not give away answers or aid in the elimination of distractors.	✓	JR	MD
9.	Question content conforms to specific K/A statements in the previously approved examination outline and is appropriate for the tier to which they are assigned; deviations are justified.	✓	JR	MD
10.	Question psychometric quality and format meet the guidelines in ES Appendix B.	✓	JR	MD
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.	✓	JR	MD

		Printed Name / Signature	Date
a.	Author	Richard (JR) Horton /	7/8/2016
b.	Facility Reviewer (*)	Scott Rua /	7/8/2016
c.	NRC Chief Examiner (#)	Michael Dwithan	7/8/16
d.	NRC Regional Supervisor	Eugene Guthrie /	7/11/16

Note: * The facility reviewer's initials or signature are not applicable for NRC-developed examinations.
Independent NRC reviewer initials items in Column "c"; chief examiner concurrence required.

ES-401 **Written Examination Review Worksheet** **Form ES-401-9**

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 a 1(easy) to 5 (difficult); (questions with a difficulty between 2 and 4 are acceptable)
3. Check the appropriate box if a psychometric flaw is identified:
   - "Stem Focus": The stem lacks sufficient focus to elicit the correct answer (e.g., unclear intent, more information is needed, or too much needless information).
   - "Cues": The stem or distractors contain cues (i.e., clues, specific determiners, phrasing, length, etc.).
   - "T/F": The answer choices are a collection of unrelated true/false statements.
   - "Cred. Dist": The distractors are not credible; single implausible distractors should be repaired, more than one is unacceptable.
   - "Partial": 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:
   - "Job Link": 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).
   - "Minutia": 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).
   - "# / Units": The question contains data with an unrealistic level of accuracy or inconsistent units (e.g., panel meter in percent with question in gallons).
   - "Backward": 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 K/As that are *designated SRO-only* (K/A and license level mismatches are unacceptable)
6. Enter question's source: (B)ank, (M)odified, or (N)ew. Verify that (M)odified questions meet the criteria of ES-401 Section D.2.f.
7. 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?
8. At a minimum, explain any "U" Status 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. Source B/M/N	7. Status U/E/S	8. Explanation
			Stem Focus	Cues	T/F	Cred. Dist.	Partial	Job Link	Minutia	# / units	Back-ward	Q= K/A	SRO Only			
	Generic/global comments: "D/A" in the following comments = Distractor Analysis "P" after a question number denotes a pre-submittal question.															

Q	LOK	LOD	Stem Focus	Cues	T/F	Cred. Dist.	Partial	Job-Link	Minutia	# / units	Back-ward	Q= K/A	Source B/M/N	Status U/E/S	Explanation
1	H	3											B	S	**007EK3.01** Reactor Trip - Knowledge of the reasons for actions contained in EOP for reactor trip I'm troubled by the similarity of the concepts "check for natural circ" and "ensure heat removal is occurring," especially when the D/A for natural circ says, "since this is a *goal of the procedure*." Part 2 of the Q asks why you use Tcold and not Tavg, but the answer choices are really for why you check temperature at all. But we can't really have, "Because RCPs are off," plus a distractor, because that gives away the answer and hurts plausibility of Tavg. I want to change the natural circ distractor, but don't have any good ideas. Maybe something about c/d rate? Replaced the natural circ distractor with "…SG Safety Relief valves do not lift" RCWH 6/3 Excellent. mgd 6/8 The LO is EOP-LP-3.1 Obj. 3.e: 1) That LP looks like it's for E-1 & ES-1.1, not for ES-0.1, and 2) there's no objective 3.e in it, just 3 with no lettered bullets. mgd 5/24/16 Updated objective with EOP-LP-3.0 #6. This was the closest obj I could match with this question RCWH 6/3 Agree, I can't find a better LO. That one concerns me though because it says, "Given the Step Deviation Document and WOG ERG background document…" But by you submitting it for the test you're telling me you expect ROs to know it, and the KA expects them to know it. mgd 6/7/16 **Q is SAT**
2	H	2											B	S	**008AK2.01** PZR Vapor Space Accident - Knowledge of interrelations between this and valves No comments. mgd 5/24 **Q is SAT**

Q	LOK	LOD	Stem Focus	Cues	T/F	Cred. Dist.	Partial	Job-Link	Minutia	# / units	Back-ward	Q= K/A	Source B/M/N	Status U/E/S	Explanation
3	H	4											N	S	**009EK1.02** SBLOCA - Knowledge of operational implications of the use of steam tables as it applies to SBLOCA Good Q that tests a number of relevant ideas. The correct answer analysis and D/A C are written to the case that ERFIS is available; in the stem I'd like to remove the piece about ERFIS not being available. No need to make it harder than it already is. mgd 5/23 Removed bullet. RCWH 5/31 Thanks. mgd 6/7 **Q is SAT**
4	H	2											N	S	**011EG2.4.46** Large Break LOCA - Ability to verify that alarms are consistent with plant conditions In stem, delete "alarms" after ALB-004-2-4; redundant with "alarm annunciates" above it. Reworded. RCWH 5/31 Consider adding LO ST-CSS-6.d, which deals with RWST Low-Low Level. mgd 5/23 Added LO. RCWH 5/31 Requested changes were made. mgd 6/7 **Q is SAT**
5	F	2											N	S	**022AK3.05** Loss of Rx Coolant M/U - Knowledge of the reasons for the need to avoid plant transients A decent Q, but doesn't hit the K/A because what's the plant transient? The fact that you have to stop moving fuel doesn't affect the plant, just the schedule. Temperature is being controlled by RHR, and while you might argue a level transient, it would be very slow. Examples of questions written to this K/A: Sequoyah 2013 Q6, N. Anna 2006-302 Q22. mgd 5/23 I understand you're trying to make the Sequoyah 2013 question work. mgd 6/7 Provided new K/A: 022AK3.02. mgd 6/10 Reviewed new Q in-office, K/A not matched. mgd 6/14 Reviewed new Q provided during prep week, appears to be satisfactory. 1CS-1 & 1CS-2 close on low PRZ level at 17%, is that correct? Would you add that to the D/A just to bolster plausibility? mgd 6/24 Revised D/A A(1): "…1CS-1 and 1CS-2 automatically isolate the inlet of the Regenerative HX when PRZ level on the associated level transmitter LT-460 or LT-459 reaches 17%..." RCWH 6/27 Thanks. mgd 6/27 **Q is SAT**
6	F	3											B	S	**025AK2.05** Loss of RHR - Knowledge of the interrelations between Loss of RHR and the reactor building sump Are ROs expected to know the 142" number from memory? Yes, RO's are expected to know the indications when the CNMT sump performance is degraded. 7 of 7 validators correctly answered this question. RCWH 5/31 Okay. mgd 6/7 Can CNMT WR Sump level be read to one decimal place? It's digital, not a meter? mgd 5/24 The MCB is a meter, but the SPDS module on ERFIS indicates CNMT WR Sump Level to two decimal places. RCWH 5/31 Thanks. mgd 6/7 **Q is SAT**
7	F	3											B	S	**027AA1.01** PZR Pressure Control System Malfunction - Ability to operate heaters, sprays, and PORVs No comments. mgd 5/24 **Q is SAT**
8	F	2											B	S	**029EA1.13** ATWS - Ability to operate and monitor: manual trip of main turbine No comments. mgd 5/24 **Q is SAT**
9	F	2											B	S	**038EK3.09** SGTR - Knowledge of the reasons for criteria for securing/throttling ECCS D/A D: To bolster plausibility can you change "maintained <125F" to something like "at ambient temperature," or give an average range from the logs? TS limit is 125, but I doubt it ever goes over 100F. mgd 5/24 Revised to read "…maintained greater than 40°F but less than 125°F…" RCWH 5/31 Thanks. mgd 6/7 **Q is SAT**
10	F	3											B	S	**054AK1.02** Loss of Main Feedwater: Effects of feedwater introduction on dry S/G No comments. mgd 5/24 **Q is SAT**
11	H	3											B	S	**055EG2.4.21** Station Blackout: Knowledge of the parameters and logic used to assess status of safety functions I understand that monitoring status trees "for information only" has a very specific meaning in the EOPs, but one could argue that you're essentially always monitoring CSFSTs because they're displayed on one or more computer screens in the MCR, screens that you're either going to see a CSFST change, or are looking at for some other reason. I even saw one plant that got a computer alarm if a CSFST went Orange or Red; HNP isn't like that, is it? HNP does not have an alarm to indicate a CSFST is Red or Orange RCWH 5/31 Okay. mgd 6/7 When I first read the Q I missed the "information only" and read it as "status trees ARE/ARE NOT being monitored." What do you think of changing it to that? I am opposed to making that change based on your discussion above. The candidates are familiar with the terms and requirements of the EOP network and should understand in this situation the only success path is the current EOP. Revised the first WOOTF statement to read "INFORMATION ONLY" to add emphasis that the term is specific for the current EOP. RCWH 5/31 Agree with that change. mgd 6/7 **Q is SAT**
12	H	3											N	S	**056AA1.18** LOOP - Ability to operate and/or monitor control room normal ventilation supply fan You must've changed the 2nd-part answer choices to something else, because the Answer Analysis and D/As all talk about dampers. I can't review the Q as-is, so resubmit when the answer & distractor analyses match the 2nd-part choices. (I don't care which way you go wrt changing the answers or the analyses.) mgd 5/23 Reviewed revised question, no further comments. mgd 5/25 **Q is SAT**

Harris Nuclear Station July 2016 ILO Exam

Q	LOK	LOD	Stem Focus	Cues	T/F	Cred. Dist.	Partial	Job-Link	Minutia	# / units	Back-ward	Q= K/A	Source B/M/N	Status U/E/S	Explanation
13P	F	2											B	S	**057AA2.20** Loss of IB - Ability to determine and interpret interlocks that must be bypassed to restore normal equipment operation In the stem: "Instrument Bus SI has *failed*." Suggest saying it "has *deenergized*." Minor, but then no one could argue it's failed in such a way that the rod stop bistable isn't in the position we want it. Replaced failed with de-energized in bullet #2. RCWH 4/1 Plausibility of QPTR in both parts of the question is very weak. Granted, 102 is a number that's close to 103, and indeed the alarm is 1.02, but that really isn't "102% of rated thermal power." Furthermore, there's no "# out of 3 or 4" 'coincidence' for QPTR. The discussion in D/A D about the High Power Trip being normally 2 of 4, and 2 of 3 in a case like this is good. What do you think about using the High Power Trip as the first-part distractor? Is it 108%? I think it's plausible enough that someone could confuse the two setpoints. Replaced distractors A1/B1 102% with 108%, and updated D/As. RCWH 4/1 **Q is SAT**
14	F	3											B	S	**058AK1.01** Loss of DC - Knowledge of operational implications of battery charger equipment & instrumentation No comments. mgd 5/24 **Q is SAT**
15	H	3											B	S	**WE04EK2.2** LOCA Outside Containment - Knowledge of interrelations between LOCA and the 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 No comments. mgd 5/24 **Q is SAT**
16	H	3											N	S	**WE05EG2.2.36** Loss of Secondary Heat Sink - Ability to analyze the effect of maintenance activities, such as degraded power sources, on the status of limiting conditions of operations First wondered why 'A' MDAFWP was plausible, then understood when I read the D/A. It's not terribly plausible if you read the words associated with the annunciator (because why would you then think 'A' MD was available?), but if you just see an AFW alarm and gloss over it, <u>and</u> it comes in all the time normally, I can see it. Good hit on the K/A. mgd 5/23 **Q is SAT**
17	F	3											B	S	**APE026AA2.06** Loss of CCW - Ability to determine and interpret the length of time after loss of CCW flow to a component before that component may be damaged. Bank Q, no comments. mgd 5/24 **Q is SAT**
18	F	3											B	S	**WE12EA2.2** Uncontrolled depressurization of all S/Gs – Ability to determine and interpret adherence to appropriate procedures and operation within the limitations in the facility's license and amendments No comments. mgd 5/24 **Q is SAT**
19	H	4											N	S	**005AA1.01** Inoperable/Stuck Control Rod - Ability to operate and/or monitor CRDS I like the Q, and think it might be hard for ROs (detailed knowledge of Att. 1), so I'm calling it LOD=4. (I think they'll discount B & C, but might jump on the 9% in D.) However, a tilt of 7.5% is HUGE, right? So if you know anything, then that's going to stand out. Can we knock that down to 1.03 or so? That would align it better with how close the other ones are to their limits. Reduced the QPTR value from 1.075 to 1.03. RCWH 5/31 Thanks. mgd 6/7 D/As B & C use 1.5-3.0F from Rod Control as plausibility arguments; I don't understand how those can be compared to PR instrument deltas and AFD. I wouldn't mind if you just said they're close to their respective limits and therefore plausible because you have to know what the limits are. Or there may be channel checks/logs/ surveillances from which you could pull numbers for plausibility. mgd 5/23 Revised D/As B & C to say they're close to their respective limits and therefore plausible because you have to know what the limits are. RCWH 5/31 Looks good. mgd 6/14 **Q is SAT**

Q	LOK	LOD	Stem Focus	Cues	T/F	Cred. Dist.	Partial	Job-Link	Minutia	# / units	Back-ward	Q= K/A	Source B/M/N	Status U/E/S	Explanation
20	H	4											N	S	**032AG2.2.25** Loss of SRNI - Knowledge of the bases in TS for LCOs and safety limits I wish I would've thought of this when I gave you the sample plan, but is this Basis question fair for ROs? Would we be able to defend an appeal? The learning objectives in ST-NIS don't inspire confidence, particularly LO 13, which is marked "SRO only." Assuming you want to keep the Q, I'm struggling with the plausibility of rod *drop*. I see where you got it from the PR negative rate trip, but this is essentially just a level trip, so a rod drop means lower counts/amps so why would I expect a trip? I'd like to see that be a single rod ejection accident, which is clearly wrong because it's not a stated basis, but I don't know that it's different enough from a bank withdrawal to withstand appeal. Help me understand how rod drop is plausible mgd 5/23 Added more information for discussion of the RO/SRO aspect of the question in LXRTest but plausibility of rod drop is that a competent operator needs to know that $\frac{1}{0}$N Flux distribution does not challenge core safety in the source range and so the reactor does not need protection from a rod drop accident and the associated flux perturbations. RCWH 6/3 Alright, I'm convinced. mgd 6/7 **Q is SAT**
21	H	3											B	S	**033AK1.01** Loss of IRNI - Knowledge of operational implications of voltage changes on performance Listed as a Bank Q, but where did it come from? If there's precedent I can maybe be persuaded. I found a very similar Q on the 2009A HNP exam, Q22. I didn't think this Q matched the K/A very well (granted though, "loss of voltage" is a "voltage change"), but I talked myself into it. Until I read the 2009 Q, which nails it. I can't convince myself that NI-31 automatically energizing is plausible. I can see NI-32 because while the 2 SRs & 2 IRs aren't train-related (as you state), they probably have the same Channel power supply? And are probably physically above/below one another? Note that the exact same words are used for both D/As; for Choice B you could say what I just said, but I don't see how you word it for Choice B. All that was to say that if you wanted to go with the 2009 Q I'd be good with that. mgd 5/24 Replaced with 2009A HNP exam Q22. RCWH 6/3 Verified Q is technically the same, just asked in the opposite order. Previous 401-9 comments (Q was New then) were incorporated, putting the Q in its present form. No post-exam comments on it. mgd 6/8 **Q is SAT**
22P	F	3											B	S	**061AK3.02** ARM Alarms - Knowledge of the reasons for guidance contained in alarm response for ARM system Choice B: this distractor is somewhat weak. It's certainly a valid reason, but are you REQUIRED to do it? Is there a Conduct of Ops or something that requires you to silence nuisance alarms? If we keep it, then to tighten it up and bring it more in-line with its D/A, can you add in the stem that evacuation has not been ordered by the SSO? Basically to get them cleanly past Step 3 of AOP-005 Att. 4. Revised stem to add statement for decision to remain in MCR. Improved D/A B to discuss the nuisance alarm guidance in AD-OP-ALL-1000. RCWH 4/4 There are some similarities between this question and Common Admin JPM A2. Keeping in mind that the candidates will see the JPM before the question, and that OP-OP-173 refers you to AOP-005, please discuss whether this is acceptable overlap. Overlap is acceptable because this JPM does NOT require candidate to refer to AOP-005 in order to complete the task. Candidate is directed to complete steps 9.a through 9.d. Candidate is provided all the pertinent data to perform the calculations as part of the JPM initial conditions RCWH 4/22 Agree with overlap analysis, and all modifications were made as requested. mgd 4/19 **Q is SAT**
23	F	3											N	S	**074EK3.06** Inad. Core Cooling - Knowledge of reasons for confirming PORV cycles open at specified setpoint No comments. mgd 5/23 **Q is SAT**
24	F	4											N	S	**WE02EG2.4.11** SI Termination - Knowledge of abnormal condition procedures Good Q, nails the K/A. I agree there is only one answer which is a Major Action Category as defined in the front of the procedure, however it troubles me that Step 3RNO will essentially "Check if a ~~Small Break~~ LOCA is in progress" and "Check if a LOCA has occurred outside Containment." The Q is tight though because it asks specifically about Major Action Categories, but those are two other things that it essentially checks for. I don't want to trick anybody. How did it validate? mgd 5/23 6 of 7 validators correctly answered this question. RCWH 6/1 Okay. mgd 6/8 **Q is SAT**

Q	LOK	LOD	Stem Focus	Cues	T/F	Cred. Dist.	Partial	Job-Link	Minutia	# / units	Back-ward	Q= K/A	Source B/M/N	Status U/E/S	Explanation
25	F	3											N	S	**WE03EA2.2** LOCA Cooldown and Depressurization - Ability to determine and interpret adherence to appropriate procedures and operation within the limitations in the facility's license and amendments **Overlap:** the 1st part of this Q is the same as the 2nd part of Q3, but with the other answer being correct. Double-jeopardy for the candidates, but I'm more concerned with them getting to this question, remembering Q3, then going back to look at it and seeing that the only real difference between the Qs is containment P, and that might give away the answer to Q3. D/As for A & B have this incorrect sentence: "Plausible since the SG PORVs will be used for the cooldown because the condenser is not available." The condenser IS available in this Q (but not in Q3). Suggested fix: "Plausible because the SG PORVs are used for c/d when the condenser is not available." mgd 5/24 D/A D 1st sentence is incorrect: "Condenser steam dumps are not available because at 3# in Containment a MSLI actuated to shut all MSIVs." That was Q3; condenser is available in this Q. mgd 5/25 Revised D/A. RCWH 6/3 Two of two veteran Chiefs agreed that there's unacceptable overlap with Q3. The question the Qs essentially ask is, "How is cooldown different if containment pressure is above or below 3psig?" The 1st part of this Q will have to be changed, or the 2nd part of Q3. mgd 6/8 Revised 1st part of Q to determine if the TDAFW pump is used to supplement the RCW cooldown and separated the 2nd part in to a separate statement. RCWH 6/10 Agree with change. mgd 6/13 **Q is SAT**
26	F	3											B	S	**WE14EA1.2** High Containment P - Ability to operate and/or monitor operating behavior characteristics of facility No comments. mgd 5/25 **Q is SAT**
27	H	3												S	**WE15EK2.2** Containment Flooding - Knowledge of the interrelations between containment flooding and the 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 Plausibility of ES-1.3: When reading the Q I thought it was going to put us at the RWST level that requires transition to ES-1.3, which would be an interesting predicament. The ES-1.3 Caution about timeliness and not implementing FRPs should make ES-1.3 the correct choice then. Q would be harder if you put them exactly at that point, 23.4% and slowly lowering, along with the Orange path, but I don't want to do that because that isn't very likely to happen. But I'm struggling with the plausibility of ES-1.3. If you know the setpoint it's easy, maybe LOD 1 for the 1st half. I hate to say what I'm about to say, because I don't like being tricky, but what if we put the RWST at 24.3%, then maybe a guy juxtaposes 24.3 with 23.4 and chooses ES-1.3. Thoughts? mgd 5/25 Playing off the misapplication of the set point I lowered the RWST value to 24.2% which would have the student transition to ES-1.3 if they were to juxtapose the 23.4 with the 24.3 value. RCWH 5/31 That's even better. mgd 6/8 **Q is SAT**
28	H	2											B	S	**003K6.02** RCPs - Knowledge of the effect a loss or malfunction of seals and seal water supply will have on RCPs I like the question (I jumped on "Failed" until I read Note 2), but for the record I'm not keen on the plausibility of C, since given the reference and total #1 seal flow it's pretty much a direct lookup; and "Blocked" sounds like no flow, not 7.4 gpm. Cueing: we tell them in the stem that temperatures are rising; let's just give the data and let them interpret. Removed "rising". RCWH 5/31 Partial: the Q hinges on the distinction between STEADILY RISING and STABLE, which can be rising, but at a lowering rate (which we have) and "well below 230F" (which it is), but what concerns me is the 190° in the last sentence of Note 2. With the trend given, the radial bearing temp should stabilize around 185ish, but that's awfully close to 190 and I don't think we'd win that argument. So, can we shift the temps down 5° or more? Note 2 says that normal 100% power values for these two points are 140-150°, so shifting the starting points toward that would give us some margin. Reduced starting temps by 10°. RCWH 5/31 Thanks. mgd 6/8 **Q is SAT**

Q	LOK	LOD	Stem Focus	Cues	T/F	Cred. Dist.	Partial	Job-Link	Minutia	# / units	Back-ward	Q= K/A	Source B/M/N	Status U/E/S	Explanation
29	H	2											B	S	**004K3.06** CVCS - Knowledge of the effect that a loss or malfunction of CVCS will have on RCS temp & pressure Partial/No Correct Answer: Stem, 4th bullet about CS-120, instead of "AND fails to reposition" how about "BUT fails to reposition"? And maybe add, "and was not noticed by the operator" or "Unbeknownst to the operator, when CS-120 was placed in the RHT position it failed to reposition." Just something to make it clear that it wasn't noticed, otherwise why have you proceeded? (There IS indication on the board, right?) Revised to read "in the RHT position BUT fails to reposition and was NOT noticed by the operator". RCWH 5/31 That's good. mgd 6/8 Answer Analysis, 2nd sentence: "RCS Tavg will rise due to an increase in Reactor power" isn't really a correct statement and should be removed. The idea of temperature and power rising is already captured in the last sentence. Removed. RCWH 5/31 Thanks. mgd 6/8 **Q is SAT**
30	H	3											N	S	**004K5.31** CVCS - Knowledge of the operational implications of the flowpath around the BASTs Since we're using the low VCT level as plausibility for the 2nd part distractor, we should probably give a trend ("and lowering"), and maybe even state that Auto Makeup is not in progress. mgd 5/10 New version puts VCT at 21% and lowering, which addressed the change I asked for. Do we want to say "slowly" lowering? Can I assume the VCT is just doing its normal thing, or is there something else going on? Added 'slowly lowering'. RCWH 6/2 **Q is SAT**
31	H	3											B	S	**005K5.05** RHR - Knowledge of the operational implications of plant response during "solid plant" operation Distractor 'A', "'A' CSIP trips" is weak. D/A says plausible because it's in the flowpath, but wrong because tripping would cause pressure to lower. Well yeah. Even at-power, charging is the goes-in and letdown is the goes-out, so why would I *ever* think that tripping a charging pump would cause pressure to rise? The D/A needs to get at why someone would think a tripped CSIP would "raise RCS pressure." I'm not sure that's possible to write, so we might need a different distractor. mgd 5/3 A 5/9 revision replaced the CSIP trip with raising CCW flow to the RHR HX. That's better, but the possibility of confusing CCW flow for RHR flow seems pretty low. What if we raised RHR flow? What does that do to RCS P? In the short term does it raise it? But in the long term it should lower T and thus P, maybe? I don't want to get into time-based effects, but think about it please. If we can't make that work, I could accept CCW flow if we obfuscated it a little by saying that you operate a certain valve or controller. mgd 5/10 I like the change you made to the CCW flow distractor, manipulating CC-146, but I don't think we need to teach them that that raises flow. Delete "raising flow to the HX." I bumped up the LOD to 3. mgd 5/25 Removed "raising flow to the Hx" and reordered the responses from shortest to longest. RCWH 6/2 Looks good. mgd 6/8 **Q is SAT**
32	F	2											B	S	**006K1.02** ECCS - Knowledge of physical connections and cause-effect relationships between ECCS & ESFAS To bolster the plausibility argument for D, can we add that the APP requires you to stop pumps at that point? If you remembered that, then maybe you'd think that's when the swapover should occur also. mgd 5/25 Revised D/A D to add wording about auto swapover. RCWH 5/31 Thanks. mgd 6/8 **Q is SAT**
33	F	2											**P** 2014-302 Q35	S	**007A1.03** PRT - Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating PRT controls, including monitoring quench tank temperature Verified Q is exactly the same. No comments on prior 401-9, and no post-exam comments. mgd 5/25 **Q is SAT**
34	F	3											B	S	**064K3.01** EDGs - Knowledge of effect a loss or malfunction will have on systems controlled by automatic loader No comments. mgd 5/25 **Q is SAT**

Q	LOK	LOD	Stem Focus	Cues	T/F	Cred. Dist.	Partial	Job-Link	Minutia	# / units	Back-ward	Q= K/A	Source B/M/N	Status U/E/S	Explanation
35P	H	3											N	S	**008A2.05** CCW - Ability to (a) predict the impact of loss of instrument and control air on the position of CCW valves, and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences I like this question, and agree you'd get a slow dilution so power would gradually trend up and you'd have to lower back to or below 100%, but **what procedure directs you to do that?** The (b) part of the K/A is "*use procedures* to correct, control, or mitigate…." Besides the K/A match issue, we have to be able to defend "the correct answer." **Unless we can find concrete procedural direction for this situation, we won't be able to use this Q.** Reviewed HNP site and Fleet procedures and determined fleet procedure AD-OP-ALL-0203, Reactivity Management provides guidance for the expectation to lower power below 100% once it is determined that actual power has exceeded 100%. This reference was added to the list of question references. RCWH 4/1 Agree that AD-OP-0203 is sufficient procedural guidance for lowering power. mgd 4/19 Need to re-work what you're REQUIRED to do. Marked Unsat on Credible Distractors because when is an operator ever REQUIRED to RAISE power, back to 100% in this case? That might be as simple as changing the word "required" in the fill-in-the-blank sentence. Reworded the second part of the questions statement to remove the word 'required' and incorporate AD-OP-ALL-0203 for procedural guidance as follows: "in accordance with AD-OP-ALL-0203, Reactivity Management the crew will __(2)__ to mitigate the effects of this malfunction". RCWH 4/1 After reading AD-OP-0203 5.2.6, Abnormal Operations, I could make a pretty good argument that "raise reactor power to 100%" isn't the right thing to do per that procedure, and therefore there are **still two non-plausible distractors**. I think we to need to get at the "procedural direction" piece of this a different way. mgd 4/21 Reworded the second part of the question statement to read "in accordance with AD-OP-ALL-0203, Reactivity Management the crew will __(2)__ once control of 1CC-337 is re-established." This bounds the effects of the transient and will allow the candidate to comply with the AD-OP-ALL-0203 5.2.6.i guidance to "stabilize plant conditions less than or equal to the pre-transient power level" and also address the requirements identified above in step 5.2.6.c and h. See the replacement B2 and D2 distractor. RCWH 4/22 1st part plausibility of "fails SHUT" is marginal; if I simply asked myself how I'd want TCV-144 to fail I could nuke it out. And all we're basing the plausibility of SHUT on is the CCW isolations RHR *sample cooler* heat exchangers; how much has a student learned/studied THAT flowpath? But I'm amenable to allowing it IF we **beef up the D/A**. From the Student Text it looks like CC-304 & 305 to the Gross Failed Fuel Detector also fail closed, as well as DW-15, Makeup to the Surge Tank, though while not technically a CCW valve, is sort of in the system. Also, sometimes a TCV is a bypass around a HX (like the typical arrangement for cooling RHR flow), so some words in the D/A like that would improve it. Revised D/A A1. RCWH 4/1 Concur with this change. mgd 4/21 **Q is SAT**
36	H	3											B	S	**010K1.06** PZR Pressure Control - Knowledge of connections and/or cause-effect relationships with CVCS Stem Focus: Questions are usually like this, "While doing something normal, something bad happens." With that mindset from 35 prior questions, one could read this Q as, "While establishing a bubble, CS-38 modulates open *for some unknown reason*." Or, "*and it wasn't supposed to*." I hope you see my point; I just don't want candidates reading too much into it and claiming not enough information. The fix is simple: put "in Automatic" at the end, or similar. Or to eliminate the redundancy of "modulates open" in the stem and WOOTF: "The plant is drawing a bubble IAW GP-002. WOOTF describes why CS-38 modulates open in Automatic?" mgd 5/25 Reworded stem to read "The plant is establishing a bubble in the PRZ …" and the question to read "Which ONE of the following describes why 1CS-38, PK-145.1 LTDN Pressure modulates open in Automatic?" RCWH 5/31 That's great, thanks. mgd 6/8 **Q is SAT**
37	H	3											N	S	**010K1.08** PZR Pressure Control - Knowledge of connections and/or cause-effect relationships with PZR LCS Very nice how you linked level and pressure control systems. mgd 5/26 **Q is SAT**
38	H	3											B	S	**012A3.04** RPS - Ability to monitor automatic operation of the RPS, including: circuit breaker Is the idea here that you lose 'C' RCP but don't trip because you're less than P-8? The Answer Analysis implies that 'C' RCP is gone, but doesn't come right out and say it. Updated the answer analysis to read "'C' RCP is normally powered from the 1C 6.9 kV bus which is normally cross tied to the 1A 6.9 kV Bus via Breaker 109. With Breaker 109 open the 'C' RCP will coast down due to losing power." RCWH 5/31 Excellent, thanks. mgd 6/8 **Q is SAT**

Q	LOK	LOD	Stem Focus	Cues	T/F	Cred. Dist.	Partial	Job-Link	Minutia	# / units	Back-ward	Q= K/A	Source B/M/N	Status U/E/S	Explanation
39	F	2											**P** 2013-301 Q40	S	**013K2.01** ESFAS - Knowledge of bus power supplies to ESFAS/safeguards equipment control Can we change which answer choice the correct answer is? It's at C now, but I think it fits at B or D. Swapped answer choices from C being correct to B being the correct choice. RCWH 5/31 Thanks. mgd 6/8 Verified Q is exactly the same as before. One comment on the prior 401-9 was addressed. No post-exam comments. mgd 5/26 **Q is SAT**
40	H	3											B	S	**013K6.01** ESFAS - Knowledge of the effect of loss or malfunction of sensors and detectors No technical comments. One typo in the stem was repaired. mgd 5/26 **Q is SAT**
41	F	2											B	S	**022K2.01** Containment Cooling - Knowledge of power supplies to containment cooling fans No comments. mgd 5/26 **Q is SAT**
42	F	2											B	S	**026A4.01** Containment Spray - Ability to manually operate and/or monitor CSS controls in the control room A little concerned a candidate might argue B is correct if you got the right two switches. But since there are 4 combinations of two switches that DON'T actuate spray (1&3, 1&4, 2&3, 2&4) and only 2 that ARE successful, I think it's defensible. Just noting this, no action required. mgd 5/26 **Q is SAT**
43	F	3											B	S	**026G2.4.20** Containment Spray: Knowledge of operational implications of EOP warnings, cautions & notes No comments. mgd 5/26 **Q is SAT**
44	H	3											**P** 2014-301 Q45	S	**039A3.02** Main & Reheat Steam System - Ability to monitor automatic operation, including isolation of MRSS Would you rearrange the answer choices? Move C & D to A & B, and vice versa. Reordered answer choices such that the correct answer is now B. RCWH 5/31 Thanks. mgd 6/8 No comments on the earlier 401-9 (Q was New then), and no post-exam comments. Q is substantially the same as that version. mgd 5/26 **Q is SAT**
45	H	4											B	S	**039A4.04** Main & Reheat Steam - Ability to operate and/or monitor in the MCR EFW pump turbines Cueing: 3rd bullet, "SG parameters <u>have lowered to</u>…" Just give the current parameters. Revised to read 'Current Steam Generator parameters are the following values:" RCWH 5/31 The statement, "Assume NO operator actions…" is good, but let's delete "Assume". It's a minor point, but we never want them to *assume* anything, so just state it. Removed "Assume" from student note. RCWH 5/31 The Answer Analysis talks about FCV-2071B; is that right? Yes, this is the system valve number for 1AF-130, the 'B' S/G TDAFW Pump FCV. Added nomenclature for 1AF-130 and 1AF-143 to the answer analysis. RCWH 5/31 And in the 2nd sentence would you add the valve number it's talking about? mgd 5/26 Added 1MS-70 and 1MS-72 to the answer analysis RCWH 5/31 Thanks for those 3 mods. mgd 6/8 **Q is SAT**
46	H	3											B	S	**059A3.03** MFW - Ability to monitor automatic operation, including feedwater pump suction flow pressure Great Q. I would've answered 'B' because I hadn't seen that design before. **Q is SAT**
47	H	3											N	S	**061A2.05** AFW – Ability to predict impacts of automatic control malfunction, and use procedures to correct, control, or mitigate the consequences. No comments. mgd 5/26 **Q is SAT**
48	F	3											B	S	**062K3.02** AC Electrical Distribution – Knowledge of the effect that a loss or malfunction will have on EDG No comments. mgd 5/26 **Q is SAT**

Q	LOK	LOD	Stem Focus	Cues	T/F	Cred. Dist.	Partial	Job-Link	Minutia	# / units	Back-ward	Q= K/A	Source B/M/N	Status U/E/S	Explanation
49P	H	4											N	S	**063A1.01** DC Distribution - Ability to predict and/or monitor changes in parameters associated with operating the DC electrical system controls, including battery capacity as it is affected by discharge rate Called Unsat based on Job-Link and Minutia. Maintenance is doing a discharge test, but even if it were Operations, would an RO ever be called on to do the kind of calcs it takes to answer this? And why? You'd run the test till the battery met depletion criteria; what purpose is served in trying to predict when that will be? We need to give more bounding information. At what point do you stop the test? Reading the Q in a vacuum, we have Maintenance doing a discharge test for 4 hours; if we raise the loading, why can't the test still go for 4 hours? Is anyone going to know that 292A will deplete the battery in 4 hours? The key to this kind of test is that the discharge will be stopped when cell voltage reaches a pre-defined value, but we haven't stated that. Suggest something like: "Test will be terminated when any cell voltage reaches x.xxV, which is predicted to occur at 1200." I question our ability to defend the correct answer: Battery capacity is defined in amp hours of course, so many amps for so many hours. Starting with the premise of the question, 292A for 4h depletes the battery, so there must be 292A*4h=1168 amp hours in the battery. By 0815 we've consumed 0.25hr*292A=73A•hr, leaving 1168-73=1095. Then we discharge at 365 amps, so we should have 1095A•hr/365A=3h left on the battery. Then 8:15+3h=11:15. That's using a linear discharge rate model, however we know it will discharge faster, but **I don't think we can support it discharging specifically 15 minutes (or more) faster.** Revised the stem to include termination criteria of any cell voltage of 2.14 Volts. This value is based on the Surveillance requirements of TS 3.8.2.1which is ≥ 2.13 Volts. Revised WOOTF from"…the time the battery will be depleted?" to now read "…the time the battery will reach the termination criteria?" RCWH 4/4 If the correct answer were "Prior to 11:15" I could support that. Then I think the distractors should become: B. 11:15 (using a linear discharge rate) C. After 11:15, but before 12:00 (applicant does the math wrong or something) D. At 12:00 (the original time, the applicant not thinking that discharge rate matters at all.) This one I don't like so much, but I think it's more plausible than the current "after 12:00." Revised answer & distractors. RCWH 4/4 I still think the Q isn't very job-relevant, but I'm okay with the other aspects of it. mgd 5/3 **Q is SAT**
50	H	3											B	S	**063G2.1.20** DC Distribution – Ability to execute procedure steps Would you cite in the TechRefs the Caution at Step 5.1.2.3? A Caution is a little stronger than a P&L. mgd 5/26 Added caution to technical references. 5/31 Thanks. mgd 6/8 **Q is SAT**
51	H	3											N	S	**064A1.04** EDG - Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating EDG system controls, including crankcase temperature and pressure Great hit on this K/A, really makes you think. To keep the Q operationally valid we can't tell them why crankcase pressure is rising or that debris is clogging the LO filter, because just standing at the EDG you wouldn't know those things. So just state that crankcase pressure is rising, and either LO filter dp is rising, or its inlet P is rising with outlet P stable, or similar. Revised question stem as recommended. RCWH 6/3 Good. mgd 6/8 Is stating that the diesel was started IAW OP-155 enough to absolutely mean that non-emergency trips are in service? For a PMT run you want those trips in service, but I don't want it to be contestable. (I may not be understanding your system though; at RNP you put non-emergency trips in service with a key switch, but I don't see that in OP-155.) mgd 5/26 At HNP the Non-emergency trips remain available until defeated by an emergency start signal. RCWH 6/3 Interesting design. mgd 6/8 **Q is SAT**
52	F	3											N	S	**073A4.02** Process Rad Monitoring - Ability to operate and/or monitor in MCR: rad monitoring system control panel Great hit on this K/A. No comments mgd 5/27 **Q is SAT**
53	H	3											B	S	**076K4.01** Service Water - Knowledge of design features and/or interlocks which provide for: conditions initiating automatic closure of closed cooling water auxiliary building header supply and return valves Answer Analysis says "and realign the header isolation valves"; are those valves SW-39/40 & 274/275? Is that an automatic alignment? I ask because of K/A match, and couldn't find it in AOP-022 or ST-SWS. Would you make the Answer Analysis more specific as to which valves and if automatic? Revised Answer Analysis to include the specific system valves that realign automatically. RCWH 6/1 Much clearer now. mgd 6/8 **Q is SAT**

Q	LOK	LOD	Stem Focus	Cues	T/F	Cred. Dist.	Partial	Job-Link	Minutia	# / units	Back-ward	Q= K/A	Source B/M/N	Status U/E/S	Explanation
54	H	3											N	S	**078K4.01** IA - Design features and/or interlocks which provide for manual/automatic transfers of control I see from ST-ISA that the power supply is 1D344-11: does the "1D" mean the breaker is on Aux Bus 1D? That's the part I think makes this particularly hard, but the power supply is in the ST, so it's fair game. The Importance Ratings should be 2.7/2.9. Good Q. mgd 5/27 **Q is SAT**
55	F	3											N	S	**103K4.04** Containment - Design features/interlocks of personnel access hatch and emergency access hatch No comments. mgd 5/27 **Q is SAT**
56	H	2											N	S	**001K5.10** Control Rod Drive System - Knowledge of the operational implications of the effect of rod motion on core power distribution and RCS temperatures LOD 2 as we discussed previously. Great hit on the K/A. mgd 6/8 **Q is SAT**
57	H	3											B	S	**015K6.02** NIs - Knowledge of the effect a loss or malfunction of discriminator/ compensation circuits has on NIs. ST-NIS LO 8.e doesn't fit. Maybe 4 and/or 7? mgd 5/27 Updated to ST NIS LO 4 & 7. RCWH 5/31 **Q is SAT**
58	H	3											N	S	**016K3.10** Non-nuclear Instrumentation - Knowledge of the effect a loss or malfunction of NNIS will have on CCS Backward Logic: We're told what happened (flow switch failed low) and then asked the status of a light. In real-life you'd get the alarm, look at the light, then deduce what happened (since the light is NOT on, then it wasn't O/L, so it was low flow [if it wasn't loss of power]). But flipping it gets tricky if we want the light to be off, because we know it's <u>not</u> O/L, but it *could* be low flow OR power lost. Is there a fan On/Off indicator that would be green if it was low flow? If so then the 1st-part could become: "This alarm, white light off, green light on, did the fan trip on O/L or low flow?" Thoughts? mgd 5/27 Revised stem to list the S-2 1A-SA of the control switch indicating lights and revised the 1st part of the WOOTF statement to read "S-2 1A-SA indicates the alarm actuated due to a failure of the ___(1)___". RCWH 6/1 Great changes. It adds some analysis to the Q, so I changed LOK to H. mgd 6/8 **Q is SAT**
59	F	2											B	S	**027K2.01** Containment Iodine Removal - Knowledge of bus power supply to fans A little concerned because the LO doesn't specifically say "power supplies", but "Identify the controls" gets close, plus it's in the text. And we have ES-401 D.1.b which says just because it's not an LO is not sufficient basis to not test the K/A. Just a note to myself in case it comes up in appeal. mgd 5/27 **Q is SAT**

Q	LOK	LOD	Stem Focus	Cues	T/F	Cred. Dist.	Partial	Job-Link	Minutia	# / units	Back-ward	Q= K/A	Source B/M/N	Status U/E/S	Explanation
60	H	3											N	S	**028A1.01** Hydrogen Recombiner and Purge Control System - Ability to predict and/or monitor changes in hydrogen concentration (to prevent exceeding design limits) associated with operating the HRPS controls Concerned about support for the correct answer and incorrectness of distractors. The 1st part, continuous sample mode, is absolutely correct if the Q asked, "IAW E-1, the Hydrogen Monitoring System is *initially* aligned in what mode?" But it doesn't say that (though that might've been the intent). Surely at some point you're going to want to sample containment, so you *might be* in Remote Sample Dilution Panel Operation (Section 8.3). Or you might at some point want to obtain manual readings per Section 8.1. D/A C doesn't really support why remote dilution operation is incorrect. Revised 1st part of the question to ask the initial alignment of the Hydrogen monitoring system and revised D/A C to reflect the incorrectness of the distractor. RCWH 6/3 Looks good. mgd 6/8 2nd part, whether you're allowed to purge or not, the Answer Analysis doesn't support why this is correct. In fact, I'd argue that an RO wouldn't know this, and possibly even SRO. This seems to come from E-1 23.c RNO: "Consult…staff for additional recovery actions (including use of hydrogen purge)." As a test-taker, how do I get from that that purge is absolutely allowed? That's not even a call the control room staff makes. ST-PAHC says the same thing near the top of p. 12. mgd 5/31 Revised 2nd part of the question to determine if placing Hydrogen purge in service is considered, which can be evaluated by both RO and SRO candidates based on the question stem and system knowledge. RCWH 6/3 Better, but almost to the point of being an implausible distractor (times 2). You're making hydrogen in containment, so <u>of course</u> you're going to ***consider*** purging. The whole time from 0.5% up to 5% someone would've been *thinking* about it. So why would I ever pick, "No, I'm not going to consider purging."? In both versions of the Q we're really asking, "Is there a step in E-1 that prompts you to consider purging hydrogen from containment?" And I'm not sure that's an RO-level question. Let's noodle on this one some more and if we can't come up with anything then we'll revisit it when you're here. Lowered difficulty to 3 because the 2nd part got tremendously easier, and upgraded the Q to E. mgd 6/8 We reviewed this Q in-office and determined that "<u>consider</u> purging" was too easy, so we came up with a new 2nd part that asks if you can purge or not. Will review new Q when you have it ready. mgd 6/14 Reviewed revised Q, appears to be satisfactory. To improve the plausibility argument, are there other ventilation systems rated for higher-than-atmospheric pressure? Containment Fan Coolers, Fan Coil Units are examples of Containment ventilation systems that are designed to operate with Containment pressurized. RCWH 6/27 The "normal" purge that's in service all the time, does it have a pressure limit? Containment Normal Purge maintains a slight vacuum in containment of -3.75 inwc. RCWH 6/27 And you probably have a containment pressure relief system that's good up to a fairly high pressure? What's that number? HNP only has a containment vacuum relief system which opens at -2.25 inwc to restore containment vacuum to greater than -1.0 inwc. RCWH 6/27 And what's the number for adverse conditions in containment, 3#? 3 psig. RCWH 6/27 Maybe add that to the D/A: a person could think that since P is less than that then H2 purge is okay. mgd 6/24 Revised D/A A(2): "…(3 psig) and other containment ventilation systems such as containment cooling are allowed to be in service when containment is above atmospheric pressure, the candidate may improperly determine operation of the hydrogen purge system is allowed. Additionally the…" RCWH 6/27 Good. mgd 6/27 **Q is SAT**
61	F	3											B	S	**041G2.1.27** Steam Dump and Turbine Bypass Control - Knowledge of system purpose and/or function B(2) & D(2): where does the POAH piece come from? Appears to have been added for distractor balance, replaced with verbiage directly from the FSAR. RCWH 6/3 Okay. mgd 6/8 The Purposes in the FSAR (p. 10.4.4-1) doesn't have it, nor does ST-SDS, which has the same list. Are ROs required to know what's in the FSAR? In the Answer Analysis can we replace that with, or at least add, ST-SDS? Added ST-SDS to technical references. RCWH 6/3 Thanks. mgd 6/8 Plausibility of 1st part distractor isn't great, but acceptable. Can we massage it and the D/A to get more at the idea of <u>NOT ALL</u> MSIVs closing? It currently reads, "preventing overpressurization of the SGs after **<u>an</u>** MSIV goes shut," which I thought was interesting ("an MSIV", or one), but the D/A kind of talks about <u>all</u> being shut. Something like this might make them think about it a bit more: "preventing overpressurization of the SG(s) if one or more MSIVs closes while at power." Or similar idea. mgd 5/31 Revised the distractor C(1) and D(1). RCWH 6/3 Good. mgd 6/8 **Q is SAT**

Q	LOK	LOD	Stem Focus	Cues	T/F	Cred. Dist.	Partial	Job-Link	Minutia	# / units	Back-ward	Q= K/A	Source B/M/N	Status U/E/S	Explanation
62	F	2											B	S	**071K4.05** Waste Gas - Knowledge of design features and/or interlocks which provide for: point of release Since 3WG-229 is normally locked closed unless you're doing a release, what do you think about adding "if open" to the end of correct answer B? I don't want someone to talk themselves out of it because we don't tell them a release is in progress, so they know it's closed already. (I also don't want to add that a release is in progress, because that would tend to point to the correct answer.) Revised the correct answer. RCWH 6/3 Change looks good. mgd 6/8 **Q is SAT**
63	H	3											B	S	**072K1.04** Area Radiation Monitoring - Knowledge of the physical connections and/or cause-effect relationships between the ARM system and control room ventilation Instead of the correct answer being "maintain the respective OAI isolated," what do you think about making the words more closely match the Tech Spec language, and also refer just to the North Emergency OAI: "within 1 hour isolate the 'B' Train North MCR Emergency OAI." Or words to that effect. As it is, *maintain* isolated is probably not technically correct because you haven't taken the OWP actions *to* isolate it yet. Revised A(2) and C(2). RCWH 6/3 Looks good. mgd 6/8 Answer Analysis says that a CRIS has occurred, but no basis. I see in ST-RMS that a lot of rad monitors provide their trip function on loss of power, but couldn't find that specifically for the OAI monitors (Emergency or Normal). Also not stated in AOP-005-BD. We should have a rock-solid basis for stating that. Added OP-118 P&L #12 verbiage for rad monitor response to loss of power. RCWH 6/3 Thanks. mgd 6/8 Also would like to add "Action 29" for the 2nd part. Added TS Table 3.3-6 action 29 to answer analysis. RCWH 6/3 B(2) has "**place** MCR…", while D(2) has "**maintain** MCR…" Suggest "place" for both. And for those 2 D/As, would you mind adding that the guidance comes from the 2nd part or sentence of Action 29? Revised B(2) & D(2) and added T.S. Table 3.3-6 action 29 to D/A. RCWH 6/3 Thanks. mgd 6/8 **Q is SAT**
64	H	3											B	S	**075A2.02** Circulating Water System - Ability to predict the impacts of loss of circulating water pumps, and use procedures to correct, control, or mitigate I don't think I've seen a procedure Q written quite like this one, "WOOTF directions is the MINIMUM required IAW AOP-012." It almost implies that you could stop once you did this "minimum action." Did it validate okay? 7 of 7 validators correctly answered this question during validations RCWH 6/1 What if we asked what the FIRST action taken is, or similar? And I think we should start with, "Given the above conditions, WOOTF…", otherwise someone could argue that they read the WOOTF as a stand-alone Q (which it kind of is) and picked "turbine trip" because that's the first thing you'd do in some scenarios. Revised question WOOTF statement. RCWH 6/1 I like that better. mgd 6/8 **Q is SAT**
65	F	2											B	S	**086A3.01** Fire Protection - Ability to monitor automatic operation, including starting mechanisms of fire pumps I see where OP-149 setpoints support the correct answer, but ***ST-FP Rev. 10 has very different numbers***. (See pages 5 & 6.) I'd already been thinking that the OP might not be the best basis, but couldn't find the OST that tests the auto-starts. There surely is one, or an I&C calibration procedure that has definitive numbers. Updated technical reference to FPT-3001 for the MDFP and FPT-3010 for the DDFP and updated D/A to reflect the new references. RCWH 6/1 Looks great. mgd 6/9 **Q is SAT**
66	F	2											N	S	**G2.1.14** Knowledge of criteria or conditions that require plant-wide announcements In the fill-in-the-blank statement I see how "load" comes from AD-OP-1000, but technically it's *voltage* and not *load*. What do you think about changing that? And we can probably delete the words after the 2nd blank. Revised WOOTF statement. RCWH 6/1 D/A 'A' last phrase ("however, this is not correct since…") may be talking about a prior version, because it refers to "the entire switchgear room", but the distractor is just the switchgear. mgd 5/31 Updated D/A 'A' to reflect the current version of this question. RCWH 6/1 .Thanks. mgd 6/9 **Q is SAT**
67	F	2											B	S	**G2.1.18** Ability to make accurate, clear, and concise logs, records, status boards, and reports Plausibility of the delta symbol: I can't tell exactly from the D/A, but a late entry in ESOMS gets flagged with a Δ? Is it like Distractor A or Distractor C, or something else? The D/A says it "indicates the difference in the current time and actual time the log entry should've been entered", so is it something like "Δ so-many-minutes"? ESOMS requires a Late Entry to be annotated by clicking a check box to flag that the entry has a difference in the logged time verses the actual time the event occurred. The Δ is the symbol that is used to identify for the log reviewer that log entry difference. RCWH 6/1 Understood. mgd 6/9 **Q is SAT**
68	F	3											B	S	**G2.1.8** Ability to coordinate personnel activities outside the control room No comments. mgd 6/1 **Q is SAT**

Q	LOK	LOD	Stem Focus	Cues	T/F	Cred. Dist.	Partial	Job-Link	Minutia	# / units	Back-ward	Q= K/A	Source B/M/N	Status U/E/S	Explanation
69	F	3											N	S	**G2.2.21** Knowledge of pre- and post-maintenance operability requirements To help hit the "post-maintenance operability requirements" piece of the K/A would you change the stem to "manually backseated using its handwheel to allow packing replacement"? (Assuming that's allowed at HNP.) I think that was the intent, but the Q doesn't say that we're specifically *doing* anything to the valve. mgd 6/1 Revised question stem. RCWH 6/1 Good changes. mgd 6/9 Answer Analysis doesn't address the energized/deenergized piece, but rather talks about Operability, so I'm guessing that was an earlier version of the Q. I actually like that better because it absolutely nails the K/A, whereas the question, "Can you manually operate an MOV with it energized" is kind of a tack-on. I'm okay with it either way, but if you stay with energized or not then massage the Answer Analysis and D/As, and add "Step 8" to the Technical Reference. mgd 6/1 Updated Answer Analysis, D/A and technical reference. RCWH 6/1 Okay, we're staying with "energized or not"; we need some wording changes I didn't mention before: FITB, after blank (1): replace "prior to" with "for" or similar. Otherwise A(1) & B(1) read, "The MOV remains energized prior to backseating", which is a true statement, depending on how long prior. A(1) &B(1): add "can" to the front. Since the correct answer is "must be de-energized", then the distractors should have a permission-type flavor also "Can you leave it energized, or must you de-energize it?" mgd 6/9 Revised FIB to read "The MOV (1) . for…" and revised A(1) &B(1) to read "can remain energized" RCWH 6/10 Good changes. mgd 6/13 **Q is SAT**
70	H	3											M	S	**G2.2.35** Ability to determine Technical Specification Mode of Operation Concur that 2014 Exam Q68 is Modified. No comments. mgd 6/9 **Q is SAT**
71	H	4											N	S	**G2.2.41** Ability to obtain and interpret station electrical and mechanical drawings Great 1st-part distractor! mgd 6/1 **Q is SAT**
72	H	3											B	S	**G2.3.14** Knowledge of radiation or contamination hazards that may arise during normal, abnormal, or emergency conditions or activities LO is from an E-3 (SGTR) LP and doesn't apply. Updated LO to ST MIDS LO 4.a. RCWH 6/3 D/A 'C' is a copy-and-paste of D/A 'A' . Otherwise the Q is good. mgd 6/1 Updated. RCWH 6/3 Thanks. mgd 6/9 **Q is SAT**
73	F	3											**P** 2014-301 Q70	S	**G2.3.15** Knowledge of radiation monitoring systems, such as fixed radiation monitors and alarms, portable survey instruments, personnel monitoring equipment, etc. Verified it's the same Q, and same answer. No comments on the prior 401-9, where the Q was Bank. No post-exam comments. mgd 6/1 **Q is SAT**
74	H	3											B	S	**G2.4.17** Knowledge of EOP terms and definitions No comments. mgd 6/1 **Q is SAT**

Q	LOK	LOD	Stem Focus	Cues	T/F	Cred. Dist.	Partial	Job-Link	Minutia	# / units	Back-ward	Q= K/A	Source B/M/N	Status U/E/S	Explanation
75	F	2											N	S	**G2.4.50** Ability to verify system alarm setpoints and operate controls identified in alarm response manual Partial: I don't see how entering AOP-010 can be wrong: "ENTRY CONDITIONS - Any Main Feedwater … malfunction *causing a flow transient*." You would "do" IA step 1, RNO to step 5, then go to Continuous Action step 7, where the 3rd bullet would "let" you take Manual control. If not there, then step 8 RNO. Credible Distractors: C & D are very similar. It's not stated in D, but won't the bands and limits come from the CRS? So essentially in both choices you're "waiting for CRS permission". mgd 6/1 Revised question stem, distractors. Reordered distractors and updated D/A for new distractors. RCWH 6/3 I think this revision is going to work. You've fixed the credible distractor concerns by eliminating the "bands & limits" distractor. I like the AOP-038 angle, and you've provided a lot of basis for plausibility. You've stayed with AOP-010, but added "isolate blowdown". That's very good for making that the wrong choice, but it's not discussed in the D/A. Is the only place AOP-010 isolates SGBD at Step 3 RNO, but you don't get there unless a MFP trips? You changed the IC to 91% power and added some words to the D/A about AOP-010 requiring Rx trip "on a loss of MFW flow to the SG A." What does the next sentence mean when it says "this answer is incorrect because manually tripping the Reactor is the AOP IA *when above 90%*."? Updated D/A C to clarify the required actions and the reason why the response is incorrect based on adjusting the IC of 88% reactor power. RCWH 6/10 Was the intent for the IC to put us <90%? Revised question stem to have Rx power at 88%. You are correct about the intent to put the candidate at a point (above 80% but less than 90%) where the action would be correct had a MFP trip occurred. RCWH 6/10 The bullet in the stem about FCV-478 "throttling" shut may be ambiguous, particularly regarding its speed. How about something like, "is slowly drifting SHUT in Automatic", and maybe even giving a level trend: "'A' SG level has lowered x% in the last y minutes." Something slow enough that you had, say 5-10 minutes before reaching the low-level trip setpoint, so it's clear they have time enough to react. Upgraded to E. mgd 6/9 Revised question stem bullet 3 to read "…has lowered to 51% over the last 5 minutes" and revised bullet 5 to read "…is slowly throttling SHUT". RCWH 6/10 Good changes. mgd 6/13 At the in-office review we determined that distractors C & D were implausible, and B was weak, kicking this Q back to its original status of U. Found four past Qs to this K/A and forwarded to HNP. mgd 6/14 Reviewed a new Q provided during prep week, appears to be satisfactory. Please add marked-up page(s) from OP-116 that clearly show that the cleanup/purification pumps are used for inventory makeup. Added Title, TOC and purpose statement for OP-116 and OP-116.01 to list of reference pages. RCWH 6/27 Then in the Answer Analysis last sentence incorporate OP-116 somehow. Added explanation of how OP-116 has been split into multiple sections and the current purpose statement for each section OP-116, OP-116.01 and OP-116.02 to A/A page. RCWH 6/27 First bullet of stem: "fuel shuffle is in progress…" Revised to read "…shuffle is in progress…" RCWH 6/27 2nd bullet: add a comma after "HI/LO LEVEL." mgd 6/24 Revised question stem bullet 2 to read "…HI/LO Level, has …" RCWH 6/27 Thanks. mgd 6/27 OP-116.01 Section 8.3 seems to let you add water through the Purification System whether a pump is running or not (see Step 3 and the Note before it). But it's an easy fix, just change the FITB to: "…SFP ____ ~~Pumps are~~ System is used…" Thoughts? mgd 6/27 Requested changes were made. mgd 6/28 **Q is SAT**

SRO Section

Q	LOK	LOD	Stem Focus	Cues	T/F	Cred. Dist.	Partial	Job-Link	Minutia	# / units	Back-ward	Q= K/A	SRO Only	Source B/M/N	Status U/E/S	Explanation
76	H	3												N	S	**011EG2.1.25** LBLOCA - Ability to interpret reference materials, such as graphs, curves, tables, etc. Looks like a good Q. At 0706 do you want to maybe say that PRZ level is lowering rapidly? Revised 0706 bullet to read "PRZ level lowers rapidly…". RCWH 6/1 Perfect. mgd 6/13 **Q is SAT**
77	F	3												B	S	**025G2.2.25** Loss of RHR - Knowledge of the bases in TS for LCOs and safety limits No technical comments. I'm not familiar with your load blocks: does "Sequencer *reaches* Load Block 9" mean everything worked like it should? Could someone read that as *reaches* but does not *complete* LB9? It shouldn't be a problem. Technically speaking the statement "reaches LB-9" means everything got a start signal from the sequencer and the component in LB-8 (the last component to be started) energized as required and LB-9 automatically removes any sequencer block signals allowing the manual start of equipment. RCWH 6/1 Okay. mgd 6/9 **Q is SAT**

Q	LOK	LOD	Stem Focus	Cues	T/F	Cred. Dist.	Partial	Job-Link	Minutia	# / units	Back-ward	Q= K/A	SRO Only	Source B/M/N	Status U/E/S	Explanation
78P	H	4												N	S	**026AA2.0.2** Loss of CCW - Ability to determine and interpret the location of a leak in the CCWS Do we need to tell them it's a CCW leak? Don't the indications all point to that? A T_{ave} change of 1.6° is a lot. What's the envisioned time period? How long is the RHR pump run (maybe 15 minutes)? Is the pump still running at this time ("subsequently")? What time in core life is it? An applicant could argue it's very late in life, boron is very low, and you could pump CCW into the RCS for hours and wouldn't see 1.6°. Would like to see something in the stem about time in core life and/or boron concentration. Otherwise, possibly there's a CCW leak and something *else* is causing the T_{ave} change. And can we just state what the subsequent Tave is without using the word "rising"? It's somewhat leading. Also, has power gone up? Stem says DW-15 "has been opened." Better to say it "is open IAW AOP-015," so it can't be argued that it's now closed. And we should give a surge tank level and trend, because an applicant could infer all kinds of things if level were, say, 5% & lowering. Revised stem to read "is open IAW AOP-014", added boron concentration, reduced the second T_{avg} value to 586.1°F vice 587.1°F for a 0.6°F change in temperature, BOL conditions and 15% CCW Surge tank level and trend. RCWH 4/4 2nd part of correct answer: is that from step 3.2.16.b.(1)? Isn't CS-318 normally open, so it's already open in this scenario? A better thing that you actually do "to mitigate the event" is later in 16.b where you bypass and isolate the seal-water side of the SWHX, thus leaving seal water return to the VCT, but without CCW cooling. You'd want to drop or modify the words "prior to isolating CCW" in the WOOTF. In the WOOTF, the words "to mitigate the event," while I understand the intent (to make this an SRO Q), hurt the plausibility of A(2) & B(2). Checking for rising sump level isn't *mitigating* anything, and looking for CCW water in RHR isn't either (until you feed or bleed or something, then you're mitigating). Revised WOOTF to read "... procedure direction(s) required to for this event?" Revised correct answer D(2) to read "Locally bypass and isolate the Seal Water side of the Seal Water Return HX". RCWH 4/4 Not keen on distractor C(2): nowhere in AOP-014 do you open CS-321. In fact, the CVCS ST at p. 38 states: "There is also a provision to route the flow to the CSIP suction header. This method is not preferred as it can lead to gases that come out of solution, primarily at the mini-flow orifices, being passed to the CSIP pump and degrade the operation of the pumps." What if it were something like, "Isolate the CCW side of the seal water HX"? That would accomplish the same goal of stopping the CCW leak and stopping the inadvertent dilution, it just wouldn't be right. Plausibility is that applicant might think, "CCW leak? Isolate CCW." Revised distractor to read "Locally isolate CCW side of Seal Water Return HX". RCWH 4/4 All modifications made as requested. mgd 5/3 **Q is SAT**
79	H	3												N	S	**056AA2.76** LOOP - Ability to determine and interpret reactor makeup water pump (running) Per our discussion before, Q does a good job hitting this awkward K/A. mgd 6/1 **Q is SAT**
80P	H	3												N	S	**065AG2.4.8** Loss of IA - Knowledge of how AOPs are used in conjunction with EOPs Instead of EOP-ES-0.1 in the answer choices I was expecting to see EOP-E-0. Would it be more correct to use E-0? Because the wording of AOP-017 RNO1.a is to "perform E-0 while continuing." This is still detailed procedure knowledge from a non-immediate action step, so it keeps the Q at SRO level. Revised question procedure selections from EOP-ES-0.1 to EOP-E-0. RCWH 4/4 Can we use graphs of IA pressure & SG level? It's not realistic that the crew is only looking at pressure every 10m. Revised stem to reduce the pressure and level over a 5 minute period (1 minute intervals) vice 30 minutes to match the profile of a tubing weld initially degrading then finally rupturing to account for the rapid loss of IA pressure at the end of the 5m period. Adjusted SG level values to reflect the FRV drifting close and finally going shut. Revised the answers to reflect new times of 1018 and 1019. RCWH 4/4 Agree with change, good way of handling it. mgd 5/3 **Q is SAT**

Q	LOK	LOD	Stem Focus	Cues	T/F	Cred. Dist.	Partial	Job-Link	Minutia	# / units	Back-ward	Q= K/A	SRO Only	Source B/M/N	Status U/E/S	Explanation
81	H	3												B	S	**WE04EA2.1** LOCA outside containment - Ability to determine and interpret facility conditions and selection of appropriate procedures during abnormal and emergency operations No 401-9 comments from 2014, and no post-exam comments. Answer choices 'A' & 'B' were swapped, which improves the way the Q looks on paper, but it left 'B' as the correct answer, same as before. I'd like to change that. mgd 6/1 Revised answer choices to alphabetical order. RCWH 6/1 Thanks. mgd 6/13 Notified by HNP on 6/29 that this Q had been used verbatim on the applicants' audit exam. This is not allowed per Form ES-401-6 Block 5, so this Q was Unsatisfactory to submit for this exam. mgd 7/5 New Q was pulled from the McGuire exam bank. After NRC review an addition was made to the initial conditions to tighten up the correct answer. mgd 7/8 **Q is SAT**
82	H	3												N	S	**028AG2.1.32** Pressurizer level control malfunction - Ability to explain & apply system limits & precautions What do you think about adding to the 0900 bullet: "placing Rod Control in Auto *IAW procedural direction in GP-005*," or just, "IAW GP-005"? That would firmly put the conditions in Mode 1 and no one could argue that you're putting rods in Auto for testing or something else. Added "…in accordance with GP-005". RCWH 6/6 Thanks. mgd 6/1 In A(1) & B(1) is it better to say "operable" than "available"? Would tie more closely to the Table heading. Revised A(1) and B(1) to read "…OPERABLE". RCWH 6/6 Good. mgd 6/13 Answer Analysis last sentence, would you add, "*Per the FSAR*, the High PRZ water level trip…"? Added "Per the FSAR …" RCWH 6/6 Thanks. mgd 6/13 **Q is SAT**
83	H	4												B	S	**068AA2.06** Control room evacuation - Ability to determine and interpret RCS pressure No technical comments. D/A 'B': might add that RCPs are tripped by AOP-004 (step 3.11), so sprays wouldn't work even if you tried. mgd 6/2 Updated D/A B. RCWH 6/6 Thanks. mgd 6/13 **Q is SAT**
84	H	3												N	S	**076AG2.4.47** High reactor coolant activity - Ability to diagnose and recognize trends in an accurate and timely manner utilizing the appropriate control room reference material With this data I feel like I should interpolate and get 0920 for the actual time when activity = 1.0, and maybe I should've conservatively entered the spec at 0915. I admit that isn't an option, and the MOST CORRECT answer is 0930, but would you decrease all the activity numbers by 0.1? That would make the data be: 0.5, 0.8, 1.1, 1.3, & 1.6, thus putting any interpolation closer to the 0930 answer or the 1000 distractor. mgd 6/2 Revised data table. RCWH 6/3 That looks good. mgd 6/13 **Q is SAT**
85	H	3												B	S	**WE10EA2.1** Natural Circ with Steam Void in Vessel with/without RVLIS - Ability to determine and interpret facility conditions and selection of appropriate procedures during abnormal and emergency operations D/A 'A': why would I think RVLIS <u>isn't</u> available, when I'm given Train 'A'? The D/A doesn't do a good job of explaining that. Is there an analogy you can think of (I haven't been able to) that would be similar to this, but you proceed as if you don't have that function? Added DA 'A' information: With ONLY one Train of RVLIS available a student could misapply how RVLIS readings are displayed and think that with one train inoperable the other train would AVERAGE both readings and be providing a false indication therefore the correct choice would be to transition to EOP-ES-0.4, NC w/o RVLIS. AWL 6/8 Not convinced, sorry. mgd 6/13 Answer Analysis, 2nd line, would you add this: "…with RVLIS available, the *Foldout* criteria for…" Added requested information. AWL 6/8 D/A 'D', would you add some specifics about subcooling? I calculated about 28°, so the Foldout criteria of 10°F - C isn't met. mgd 6/2 Added requested information. AWL 6/8 Q was modified during prep week to get away from the decision of whether ERFIS was available or not. Revised question is satisfactory. mgd 6/26 **Q is SAT**
86	H	2												N	S	**006G2.2.44** ECCS - Ability to interpret control room indications to verify status and operation of a system, & understand how operator actions and directives affect plant & system conditions I'll let you walk me through this one when you're here. For now I'll say that the K/A is met, LOK is H (maybe H^2 or even H^3), it's SRO, the LO is perfect. mgd 6/2 Using reference material that includes photos of the MCB indications and a copy of EOP-E-1 Attachment 2, an SRO should be able to determine that neither Train of RHR is available for Cold Leg Recirc. AWL 6/8 In-office, determined we'd remove E-1 Att. 2 from the student references. mgd 6/14 **Q is SAT**

Q	LOK	LOD	Stem Focus	Cues	T/F	Cred. Dist.	Partial	Job-Link	Minutia	# / units	Back-ward	Q= K/A	SRO Only	Source B/M/N	Status U/E/S	Explanation
87P	H	3												N	S	**005A2.02** RHR - Ability to (a) predict the impacts of Pressure transient protection during cold shutdown on the RHRS, & (b) based on those predictions, use procedures to correct, control, or mitigate consequences In D(2), why 3 square inches, when the TS number is 2.9? Might confuse people. Revised D(2) to 2.9 vice 3 square inches. RCWH 4/4 Don't understand the "assume setpoint tolerances are 5%" piece. OST-1021 is only for Modes 1 & 2, so doesn't even apply here. I'm not sure you can apply it like this (between indicators measuring the same parameter, yes, but not for lift setpoints). Recommend revising question stem to remove the 5% tolerance assumption, raise the value at which the PORV lifted from 435 to 480 psig and add PLP-106 Attachment 10 to the provided references. While having PLP-106 simplifies the determination of the tolerance the candidate will have to evaluate T.S. 3.4.9.4, perform 2 math calculations to evaluate the maximum tolerance from PLP-106 Attachment 10 and correctly determine that both PORV's are out of tolerance. RCWH 4/4 I like what you've done with the question and think it's pretty good now. One thing that bothers me is the interplay of "Operable" with "What TS action, if any, is required?" in Choices A & B. If something's Operable, then there'll be NO TS action required. And since the plausibility of C(2) is already playing off one PORV inop, what if we made the choices for the 1st parts be: "ONE inoperable" or "TWO inoperable"? Would that work, and do you think it improves the question, or not? mgd 5/3 A revision was submitted on 5/9 that addresses the concerns above. mgd 5/10 **Q is SAT**
88	H	2												N	S	**008G2.2.44** CCW - Ability to interpret control room indications to verify the status and operation of a system, and understand how operator actions and directives affect plant and system conditions Are C&D(1) saying there's a leak on the big *CCW piping*, or a leak on the transmitter's *sensing line(s)*? (The Figure in ST-CCW doesn't show where the FTs are.) If the former, then it would almost have to be a pipe-fell-off scenario to make flow indicate zero. But if the latter, then how do you differentiate it from a shaft shear? And I just realized it can't be just a transmitter problem because the 'B' pump started on low *pressure*, not *flow*. And the fact that pressure is back where it was with the standby pump running seems to rule out a leak. Maybe you can explain it to me, but I don't see anyone thinking leak here. D/A for plausibility of leak is that a leak could cause system pressure to decrease to point of auto starting of standby CCW pump (52 psig). The question is about distinguishing between a leak and a shaft shear by diagnosing the indications of before and after using multiple indicators. AWL 6/8 Got it, thanks. mgd 6/13 2nd part distractor assumes you miss the 6 hours, but the D/A doesn't explain why you would do that, only that you do. Makes these two distractors very weak; I'd be inclined to accept it, but not with the 1st part distractor how it is. I understand that TS times like this can be confusing for new SROs, but this is almost direct lookup. What would you think about asking for Cold Shutdown? Then you'd have to do 72 + 6 + 30, and it's at least a little more likely that you'd skip the 6. (Your TS wording is pretty clear, but I've seen people struggle with that concept, i.e., is it 30 *total* to CSD, or 30 + 6? Especially in a 3.0.3 situation, though again, your TS wording is pretty clear there too.) To strengthen the TS evaluation I changed the stem per your recommendation and it now asks when the plant would be placed in Cold Shut Down. Revised answers and D/A to reflect time to CSD vs. time to HSB. AWL 6/8 Looks great. mgd 6/13 **Q is SAT**

Q	LOK	LOD	Stem Focus	Cues	T/F	Cred. Dist.	Partial	Job-Link	Minutia	# / units	Back-ward	Q= K/A	SRO Only	Source B/M/N	Status U/E/S	Explanation
89	H	3												N	S	**010A2.01** Pressurizer pressure control system - Ability to predict impacts of heater failures, and based on those predictions, use procedures to correct, control, or mitigate the consequences I like this Q, but a few suggested tweaks: Stem, 1st bullet, do you want to add IAW GP-005? Doesn't really add value, but that's been the practice. Reworded 1st bullet to read "The unit is at 20% power with a startup is in progress in accordance with GP-005, Power Operation (Mode 2 to Mode 1)". RCWH 6/3 Thanks. mgd 6/9 4th bullet: would you know from the MCR that it's "de-energized due to overcurrent"? Consider making that a report from the field. That information is probably needed because of the wording of the Corrective Actions in the APP. Speaking of which, the 'B' breaker must be different from the others, so let me ask this: we say the 'A' bkr trips on overcurrent, but in the APP I only see the words "overload" or "short circuit". I realize that's pretty much the same thing, but I noticed that the 'B' breaker in 3.c gets its own action if it trips on overcurrent. So to make it as clean as possible, might want to change overcurrent on the 'A' breaker to overload, *OR* switch to the 'B' breaker, which I don't think changes the Q. Modified 4th bullet and WOOTF statement for the 'B' breaker. RCWH 6/3 Thanks. mgd, 6/9 Last bullet: why is PRZ level rising? Is level even relevant to the Q? Not relevant, removed bullet. RCWH 6/3 Thanks. mgd 6/9 TS and Bases are terrible for this event. Neither tells you that ONLY 'A' and 'B' groups are TS-related; you have to go to the OWP or Student Text. Can you put that in the Answer Analysis? Because just reading that I think I still have 3 groups so the spec is met. 6/14: info added during in-office visit. mgd **Q is SAT**
90	H	2												B	S	**026G2.4.** Containment Spray - Knowledge of low power/shutdown implications in accident (e.g., loss of coolant accident or loss of residual heat removal) mitigation strategies Discussed plausibility of Distractors B(2) & D(2) during Atlanta in-office visit. mgd 6/14 **Q is SAT**
91	H	4												N	S	**001G2.1.25** Control Rod Drive - Ability to interpret reference materials, such as graphs, curves, tables, etc. Good Q, makes you work a bit. And great K/A hit. Does the load reduction start at 0600? I don't know why, but I assumed it started at 100% and this was a window in time. Might consider clarifying. Added clarifying information that the "indications are observed during the load reduction" RCWH 6/3 Thanks. mgd 6/9 An argument to modify B(2) & D(2) power levels: Check my math, but using 1.86 steps/% I get 67.20% for CB D at 125 steps, and 51.08% for CB D at 95 steps. If we rounded those to 67 & 51% I think it would make the distractors more plausible in that 1) someone would see those oddball numbers, calculate the power(s) required by Action b, see that the numbers are the same, and maybe choose the distractor, even though it would still be wrong because the time is 4h and not 2; and 2) they can't calculate the numbers and (using D(2) because it's the worst), say, "TS only *requires* me to go to 51%, so *<45%* must be wrong." Revised Distractor B(2) and D(2). RCWH 6/3 Thanks. mgd 6/9 D/A C: would like to capture that, yes, CB C is below the curve at this time, but CB D was out of spec earlier, so that's why it's wrong. mgd 6/3 Revised D/A C. RCWH 6/3 Thanks. mgd 6/9 **Q is SAT**

Q	LOK	LOD	Stem Focus	Cues	T/F	Cred. Dist.	Partial	Job-Link	Minutia	# / units	Back-ward	Q= K/A	SRO Only	Source B/M/N	Status U/E/S	Explanation
92P	H	3												N	S	**034A4.02** Fuel Handling Equip. - Ability to manually operate and/or monitor in control room: neutron level Plausibility of 1st-part distractor answer is based on thinking that BOTH SRNIs are inoperable; not sure why someone would think that. However, I can see someone easily missing the asterisk and entering 3.9.2.a, suspend core alterations. Basically keep the same distractor, but strike the words about boron concentration. Thoughts? The thought process is that the bases requires action b to be entered if audible is lost. The stem identifies that N-31 is selected for audible indication, but we could enhance the plausibility by making N-32 the detector selected for audible indication or remove the boron concentration as you suggest. RCWH 4/4 I see you struck the words about boron concentration from C(1) & D(1). If you're okay with that then I am. mgd 5/3 Distractor C(2): if I suspend refueling operations in the first part (with or without the boron piece), then I can't really say that the reason is to "ensure the reactor remains subcritical *during Core Alterations."* Agree suspending refueling operations alone only ensures the reactivity of the core is not changing and does not ensure the reactor remains subcritical, however the bases of the refueling boron concentration per T.S. 3.9.1 is to ensure the reactor is subcritical during core Alterations which would make the distractor plausible with regard to the action to determine the boron concentration. RCWH 4/4 Distractor D.(2) I thought was weak from the start, but if we remove the boron piece from the 1st part then it becomes meaningless. Working off the misconception that the only SRNI I think I have now is N31, perhaps C(2) & D(2) become something like, "loss of neutron flux monitoring capability in the half of the core not covered by NI-31," and "lack of a redundant instrument could let a slow failure of NI-31 go undetected," getting at the idea of defense-in-depth. I'm certainly open to other suggestions. Revised distractors as follows: C(2) "Minimizes reactivity changes during a reduced neutron flux monitoring capability event." and D(2) "Minimizes reactivity changes due to the delayed neutron flux monitoring response time from N-31." RCWH 4/4 I like what you've done here. mgd 5/3 In the SRO Justification, how is it that "the candidate must know procedural requirements associated with refueling activities, such as approvals required to amend core loading sheets" etc? Reworded SRO Justification to address 10 CFR Part 55 Content - 43(b)(2): Facility operating limitations in the TS and their bases. Looks good. All modifications made as requested. mgd 5/3 **Q is SAT**
93	F	3												M 2013 Q61	S	**071G2.2.42** Waste Gas Disposal - Ability to recognize system parameters that are TS entry conditions In the correct answer the words "due to an explosion" concern me because they're not in the TS basis. I know that's probably what they meant, but it might be best if we left that out, in case someone misses it and appeals as no correct answer. Revised 2nd part of B(2) & D(2). RCWH 6/3 Thanks. mgd 6/9 The 2nd part distractor is great too, with a good write-up about the EALs. It states that the WPB contains Safe Shutdown Equipment: would you give me one example, just so I can validate that? The safe shutdown analysis doesn't have a specific component. It only lists that the WPB contains safety related cables and trays. RCWH 6/6 Reviewed SSD analysis during in-office visit. mgd 6/14 **Q is SAT**
94P	F	2												N	S	**G2.1.3** Knowledge of shift or short-term relief turnover practices Credible Distractors: I don't think CRS <u>AND</u> SM is very plausible. "X*" in Partial because "CRS only" is more MINIMUM than BOTH, so someone could argue that is a correct answer; in fact, <u>the</u> most correct. mgd 5/3 A 5/9 revision addresses the concerns about Distractors and Partial, but it's still very easy, especially for an SRO Q. mgd 5/10 **Q is SAT**

Q	LOK	LOD	Stem Focus	Cues	T/F	Cred. Dist.	Partial	Job-Link	Minutia	# / units	Back-ward	Q= K/A	SRO Only	Source B/M/N	Status U/E/S	Explanation
95	F	3												B	S	**G2.1.9** Ability to direct personnel activities inside the control room I think the question tests the least-important half of the basis. As the Answer Analysis says (quoting the WOG), the basis is "to minimize atmospheric releases from the ruptured S/G", so that's why you're raising the setpoint, to make it less likely that the PORV lifts. If we weren't worried about a code safety not reseating after operating we'd raise the s/p to or above 1170#. And if we truly wanted to "prevent lifting of the code safety valves" we wouldn't raise the setpoint at all; in fact we might even lower it. What do you think about changing the answer to that? mgd 6/6 No changes made. The original K/A this question was developed for was G2.3.14. I can't recall exactly why we didn't examine the first part of the basis. This is a bank question for this class which should be fair game. We can discuss further. RCWH 6/6 Let's. I still think it's minutia. mgd 6/13 Discussed during Atlanta in-office visit. mgd 6/14 **Q is SAT**
96	F	2												N	S	**G2.2.1** Ability to perform pre-startup procedures for the facility, including operating those controls associated with plant equipment that could affect reactivity Support for the correct answer: would you add Step 5.1.1.2.f to the Technical Reference section (and only if you want, to the Answer Analysis section)? That seems to be where the requirement to have an RM comes from. (And I don't see how Section 4.4.4 supports the answer.) mgd 6/6 Updated A/A & Technical reference. RCWH 6/6 Reviewed during in-office visit. mgd 6/14 **Q is SAT**
97	H	3												N	S	**G2.2.15** Ability to determine the expected plant configuration using design and configuration control documentation, such as drawings, line-ups, tag-outs, etc. Just looking at the drawing and not thinking of TS implications or anything else, could I not get double-valve isolation on the discharge side by tagging closed 217&218 (or 219&220)? I realize you'd have to have just 'A' CSIP supplying seal injection and 'B' supplying the charging header, but would that be acceptable? I don't want someone to think of that and choose the wrong answer. If you want to use 'A' or 'B' pump that would simplify the clearance a little (1 switch & bkr vice 2 of each). Would also take away the ability to get double-valve isolation (at-power anyway). OWP-CS-03 has a Precaution about opening the casing drains, monitoring VCT level, and THEN closing the miniflow isolation valve. The clearance isn't sequenced that way. I will have the OPS SRO review the clearance sequence again and possibly change the pump being tagged. I've had 6 SRO's review this question so far and they have not commented on the sequencing. With that being said we do have 2 upgrades from the WCC group and they may read more into the sequence than the on-shift personnel have. RCWH 6/6 Okay. mgd 6/13 Normally every valve inside the boundary that isn't tagged would be "NOT" tagged on the clearance; Step 5 of 0200 Att. 19 is HNP-specific guidance on that, and I think that's what it's saying. Ask your Ops guy(s) if someone very familiar with the clearance process would be looking for those. If so, I really don't want you to add them, but maybe have a note that they don't need to check for this. (The question actually asks if "the required isolation boundary is satisfied," which is great, but I don't want someone to get hung up on that, or we have to answer a bunch of questions on exam day. Added the following "NOTE: For the purpose of the clearance valves inside the isolation boundary are NOT listed." To the student reference special instructions page. RCWH 6/6 Good, thanks. mgd 6/13 During Atlanta in-office visit we discussed NRC concerns with giving what's essentially an Admin JPM as a written-exam question. Licensee desired to keep the Q, but is evaluating using the 'A' or 'B' pump to simplify the clearance somewhat. mgd 6/14 Revised clearance to place the 'B' CSIP under clearance vice the 'C' CSIP to reduce the number of tagging points that must be evaluated by the candidate. RCWH 6/27 Looks okay. mgd 6/27 **Q is SAT**
98	F	3												M 2013 Q98	S	**G2.3.4** Knowledge of radiation exposure limits under normal or emergency conditions Verified Q is the same as its predecessor, and there were no post-exam comments. Was a Bank Q in 2013, and comments on the 401-9 were incorporated, putting it in its present form. mgd 6/3 Notified by HNP on 6/29 that this Q had been used verbatim on the applicants' audit exam. This is not allowed per Form ES-401-6 Block 5, so this Q was Unsatisfactory to submit for this exam. mgd 7/5 First part of Q was modified to test a different, but related, concept, and information in the stem was changed for the 2nd part of the Q. The second-part answer is the same, but the knowledge is solicited in a different way. mgd 7/8 **Q is SAT**
99	F	2												N	S	**G2.3.7** Ability to comply with radiation work permit requirements during normal or abnormal conditions No technical comments. One typo in the stem was fixed. mgd 6/6 **Q is SAT**

Q	LOK	LOD	Stem Focus	Cues	T/F	Cred. Dist.	Partial	Job-Link	Minutia	# / units	Back-ward	Q= K/A	SRO Only	Source B/M/N	Status U/E/S	Explanation
100 P	H	3												B	S	**G2.4.35** Knowledge of local auxiliary operator tasks during an emergency and resultant operational effects No problems with the Q, but D/A's all have this sentence I don't understand: "The RNO for 1SI-3 directs locally shut or isolate the BIT Outlet valves but the User's Guide states preferentially the BIT Outlet Valves." Agree that the U.G. prefers the <u>outlets</u>, but it goes on to say that if a BIT <u>outlet</u> can't be shut then you can shut the <u>inlets</u>, 1SI-1 & 1SI-2. Shutting the inlets isn't an option in E-0, but I'm okay with that being a distractor because of the discussion in the U.G. However I think the D/As should be reworked a bit: For A, the 2nd part is <u>correct</u>, so just take out that sentence about the User's Guide. For B & D, working off the first part of what you have, how about something like, "The RNO for 1SI-3 directs locally shut or isolate the BIT Outlet valves, so shutting the Inlet valves is incorrect. But it is plausible because the EOP User's Guide discusses closing the Inlet valves if the Outlet valves cannot be shut." The 5/19 revision addresses the above concerns. mgd 6/3 **Q is SAT**

Facility: Harris Date of Exam: 7/19/16 Exam Level: RO ☒ SRO ☒

Item Description	Initials a	Initials b	Initials c
1. Clean answer sheets copied before grading	✓	N/A	✓
2. Answer key changes and question deletions justified and documented (None)	✓	N/A	✓
3. Applicants' scores checked for addition errors (reviewers spot check > 25% of examinations)	✓	N/A	✓
4. Grading for all borderline cases (80 ±2% overall and 70 or 80, as applicable, ±4% on the SRO-only) reviewed in detail	✓	N/A	✓
5. All other failing examinations checked to ensure that grades are justified (None)	✓	N/A	✓
6. Performance on missed questions checked for training deficiencies and wording problems; evaluate validity of questions missed by half or more of the applicants	✓	N/A	✓

	Printed Name/Signature	Date
a. Grader	NEWTON LACY / [signature]	8/2/16
b. Facility Reviewer(*)	N/A	N/A
c. NRC Chief Examiner (*)	Mike Doulthan / Mike Doulthan	8/3/16
d. NRC Supervisor (*)	Eugene Guthrie / [signature]	8/12/16

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

Harris Nuclear Plant
5413 Shearon Harris Rd
New Hill NC 27562-9300

HNP-16-030

Mr. Eugene F. Guthrie
Chief, Operations Branch 2
U.S. Nuclear Regulatory Commission, Region II
245 Peachtree Center Ave., NE, Suite 1200
Atlanta, GA 30303-1257

Shearon Harris Nuclear Power Plant, Unit 1
Docket No. 50-400

Subject: Licensed Operator Initial Examination 05000400/2016301

Dear Mr. Guthrie:

Enclosed are the operating test outline and the supporting reference materials for the Reactor and Senior Reactor Operator Initial Examination to be administered at the Harris Nuclear Plant during the weeks of July 11, 2016, and July 18, 2016. This submittal complies with the requirement identified in your letter dated February 19, 2016, to furnish these materials by April 11, 2016. The enclosed materials shall be withheld from public disclosure until after the examination is complete.

If you have any questions regarding these materials, please contact Mr. Richard (JR) Horton at (984) 229-6445.

Sincerely,

4-5-16

Scott Rua
Supervisor – Nuclear Operations Training
Auxiliary Operator Training – Regulated Exam Supervisor
Harris Plant

Enclosures: Written Examinations, Operating Tests and Reference Materials

c: Mr. J. D. Austin, NRC Senior Resident Inspector, HNP (w/o Enclosure)
Ms. M. Barillas, NRC Project Manager, HNP (w/o Enclosure)
Mr. V. M. McCree, NRC Regional Administrator, Region II (w/o Enclosure)

bc: (w/o copies of enclosure)
John Caves
Rick Garner
Donald Griffith
Richard (JR) Horton
Teresa Midgette
Ingrid Nordby
Scott Rua

Nuclear Records

Harris Nuclear Plant
5413 Shearon Harris Rd
New Hill NC 27562-9300

May 11, 2016
Serial: HNP-16-039

Mr. Eugene F. Guthrie
Chief, Operations Branch 2
U.S. Nuclear Regulatory Commission, Region II
245 Peachtree Center Ave., NE, Suite 1200
Atlanta, GA 30303-1257

Shearon Harris Nuclear Power Plant, Unit 1
Docket No. 50-400

Subject: Licensed Operator Initial Examination 05000400/2016301

Dear Mr. Guthrie:

Enclosed are the operating tests and supporting reference materials for the Reactor and Senior Reactor Operator Initial Examination to be administered at the Harris Nuclear Plant during the weeks of July 11, and July 18, 2016. This submittal complies with the requirement identified in your letter dated February 19, 2016, to furnish these materials by May 12, 2016. The enclosed materials may be released for public disclosure after the examination is complete.

If you have any questions regarding these materials, please contact Mr. Richard (JR) Horton at (984) 229-6445.

Sincerely,

Scott Rua
Supervisor – Nuclear Operations Training
Auxiliary Operator Training – Regulated Exam Supervisor
Harris Nuclear Plant
(984) 229-6388

Enclosures: Operating Tests and associated Reference Materials

c: Mr. J. D. Austin, NRC Senior Resident Inspector, HNP (w/o Enclosure)
Ms. M. Barillas, NRC Project Manager, HNP (w/o Enclosure)
Mr. V. M. McCree, NRC Regional Administrator, Region II (w/o Enclosure)

bc: (w/o copies of enclosure)
John Caves
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Richard (JR) Horton
Teresa Midgette
Ingrid Nordby
Scott Rua

Nuclear Records

Harris Nuclear Plant
5413 Shearon Harris Rd
New Hill NC 27562-9300

May 19, 2016
Serial: HNP-16-042

Mr. Eugene F. Guthrie
Chief, Operations Branch 2
U.S. Nuclear Regulatory Commission, Region II
245 Peachtree Center Ave., NE, Suite 1200
Atlanta, GA 30303-1257

Shearon Harris Nuclear Power Plant, Unit 1
Docket No. 50-400

Subject: Licensed Operator Initial Examination 05000400/2016301

Dear Mr. Guthrie:

Enclosed are the written examinations and supporting reference materials for the Reactor and Senior Reactor Operator Initial License Examination to be administered at the Harris Nuclear Plant during the weeks of July 11, and July 18, 2016. This submittal complies with the requirement identified in your letter dated February 19, 2016, to furnish these materials by May 20, 2016. The enclosed written examinations shall be withheld from public disclosure until after July 19, 2018. The remainder of the enclosed materials may be released for public disclosure after the examination is complete.

If you have any questions regarding these materials, please contact Mr. Richard (JR) Horton at (984) 229-6445.

Sincerely,

Scott Rua
Supervisor – Nuclear Operations Training
Auxiliary Operator Training – Regulated Exam Supervisor
Harris Plant (984) 229-6388

Enclosures: Written Examinations and Reference Materials

c: Mr. J. D. Austin, NRC Senior Resident Inspector, HNP (w/o Enclosure)
Ms. M. Barillas, NRC Project Manager, HNP (w/o Enclosure)
Mr. V. M. McCree, NRC Regional Administrator, Region II (w/o Enclosure)

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Nuclear Records

Harris Nuclear Plant
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July 25, 2016
Serial: HNP-16-058

Mr. Eugene F. Guthrie
Chief, Operations Branch 2
U.S. Nuclear Regulatory Commission, Region II
245 Peachtree Center Ave., NE, Suite 1200
Atlanta, GA 30303-1257

Shearon Harris Nuclear Power Plant, Unit 1
Docket No. 50-400

Subject: Licensed Operator Initial Examination 05000400/2016301

Dear Mr. Guthrie:

Shearon Harris Nuclear Power Plant, Unit No. 1
Docket No. 50-400

Enclosed is the post-examination package for the Reactor and Senior Reactor Operator Initial Examinations given at the Harris Nuclear Plant July 11, 2016, through July 19, 2016
.
Included from the administration of the Written Examination are the student cover sheets, answer sheets, master examinations, answer key, log of applicant questions and answers, and the student seating chart.

If you have any questions regarding these materials, please contact Mr. Richard (JR) Horton at (984) 229-6445.

Sincerely,

Scott Rua
Supervisor – Nuclear Operations Training
Auxiliary Operator Training – Regulated Exam Supervisor
Harris Plant

Enclosures: Written Examinations, Operating Tests and Reference Materials

c: Mr. J. D. Austin, NRC Senior Resident Inspector, HNP (w/o Enclosure)
Ms. M. Barillas, NRC Project Manager, HNP (w/o Enclosure)
Mr. V. M. McCree, NRC Regional Administrator, Region II (w/o Enclosure)

bc: (w/o copies of enclosure)
John Caves
Rick Garner
Donald Griffith
Richard (JR) Horton
Becky Smith
Ingrid Nordby
Scott Rua

Nuclear Records

Harris Nuclear Plant
2016 Written Exam – Post Exam Comments

No Post Examination comments submitted