ES-201 Examination Preparation Checklist Form ES-201-1

Facility: 2010 North Anna Date of Examination: 6/7 - 18/2010

Examinations Developed by: (Facility) NRC — Written/Operating

Target Date*	Task Description (Reference)	Chief Examiner's Initials
-180	1. Examination administration date confirmed (C.1.a; C.2.a and b)	
-120	2. NRC examiners and facility contact assigned (C.1.d; C.2.e)	
-120	3. Facility contact briefed on security and other requirements (C.2.c)	
-120	4. Corporate notification letter sent (C.2.d)	
[-90]	[5. Reference material due (C.1.e; C.3.c; Attachment 2)]	
{-75}	6. Integrated examination outline(s) due, including Forms ES-201-2, ES-201-3, ES-301-1, ES-301-2, ES-301-5, ES-D-1's, ES-401-1/2, ES-401-3, and ES-401-4, as applicable (C.1.e and f; C.3.d)	
{-70}	{7. Examination outline(s) reviewed by NRC and feedback provided to facility licensee (C.2.h; C.3.e)}	Oct/November 2009
{-45}	8. Proposed examinations (including written, walk-through JPMs, and scenarios, as applicable), supporting documentation (including Forms ES-301-3, ES-301-4, ES-301-5, ES-301-6, and ES-401-6), and reference materials due (C.1.e, f, g and h; C.3.d)	
-30	9. Preliminary license applications (NRC Form 398's) due (C.1.l; C.2.g; ES-202)	
-14	10. Final license applications due and Form ES-201-4 prepared (C.1.l; C.2.i; ES-202)	
-14	11. Examination approved by NRC supervisor for facility licensee review (C.2.h; C.3.f)	
-14	12. Examinations reviewed with facility licensee (C.1.j; C.2.f and h; C.3.g)	
-7	13. Written examinations and operating tests approved by NRC supervisor (C.2.i; C.3.h)	
-7	14. Final applications reviewed; 1 or 2 (if >10) applications audited to confirm qualifications / eligibility; and examination approval and waiver letters sent (C.2.i; Attachment 4; ES-202, C.2.e; ES-204)	
-7	15. Proctoring/written exam administration guidelines reviewed with facility licensee (C.3.k)	
-7	16. 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.

FINAL

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

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.			
	b. Assess whether the outline was systematically and randomly prepared in accordance with Section D.1 of ES-401 and whether all K/A categories are appropriately sampled.			
	c. Assess whether the outline over-emphasizes any systems, evolutions, or generic topics.			
	d. Assess whether the justifications for deselected or rejected K/A statements are appropriate.			
2. SIMULATOR	a. Using Form ES-301-5, verify that the proposed scenario sets cover the required number of normal evolutions, instrument and component failures, technical specifications, and major transients.	dgt	MS	tsl
	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.	dgt	MS	tsl
	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.	dgt	MS	tsl
3. W/T	a. Verify that the systems walk-through outline meets the criteria specified on Form ES-301-2: (1) the outline(s) contain(s) the required number of control room and in-plant tasks distributed among the safety functions as specified on the form (2) task repetition from the last two NRC examinations is within the limits specified on the form (3) no tasks are duplicated from the applicants' audit test(s) (4) the number of new or modified tasks meets or exceeds the minimums specified on the form (5) the number of alternate path, low-power, emergency, and RCA tasks meet the criteria on the form.	S	MS	tsl
	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	S	MS	tsl
	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.	S	MS	tsl
4. GENERAL	a. Assess whether plant-specific priorities (including PRA and IPE insights) are covered in the appropriate exam sections.	S	MS	tsl
	b. Assess whether the 10 CFR 55.41/43 and 55.45 sampling is appropriate.	S	MS	tsl
	c. Ensure that K/A importance ratings (except for plant-specific priorities) are at least 2.5.	S	MS	tsl
	d. Check for duplication and overlap among exam sections.	S	MS	tsl
	e. Check the entire exam for balance of coverage.	S	MS	tsl
	f. Assess whether the exam fits the appropriate job level (RO or SRO).	S	MS	tsl

	Printed Name/Signature	Date
a. Author	Denise Tudis/DGT SRAllen/SRA	5/27/10
b. Facility Reviewer (*)	Walt Shurtz/Walt Shurtz	5/27/10
c. NRC Chief Examiner (#)	Edwin Lea Jr/Edwin Lea, Jr	6/3/2010
d. NRC Supervisor	MARK A. BATES/Mark A. Bates FOR M. WIDMANN	6/3/2010

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

	Printed Name/Signature	Date
a. Author	Steven R. Crawford / SC Crawford	6-3-2010
b. Facility Reviewer (*)	Walt Shura / WS Shura	6/3/10
c. NRC Chief Examiner (#)	Edwin Lea, Jr. / Edwin Lea, Jr.	6/15/2010
d. NRC Supervisor	MALCOLM T. WIDMANN / Malcolm T. Widmann	06/15/10

Note: # Independent NRC reviewer initial items in Column "c"; chief examiner concurrence required.

Copy 6/24/10

ES-201 **Examination Security Agreement** **Form ES-201-3**

1. Pre-Examination

I acknowledge that I have acquired specialized knowledge about the NRC licensing examinations scheduled for the week(s) of June 21st 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.	David Dixon	OPS		6-21-10		6-24-10
2.	Ted Webner	OPS		6/21/10		6/24/10
3.	Travis Hill	OPS		6/21/10		6/24/10
4.	JOHN BALTOR	OPS		6/21/10		6/24/10
5.	Christopher S. Call	OPS		6-21-10		6-24-10
6.	Susan Lowe	OPS		6-21-10		6-24-10
7.	DAVID Crutchfield	TRAINING		6-21-10		6-23-10
8.	TODD YOUNG	TRAINING		6-21-10		6-23-10
9.	JOHN ASHLY HART	OPS		6-21-10		6-24-10
10.	DAVID MCGOWAN	OPS		6-21-10		6-24-10
11.	JASON RUSSELL	OPS		6-21-10		6-23-10
12.	JONATHAN ALLEN	OPS		6-21-10		6-23-10
13.	MARCUS A. HOFFMANN	OPS		6-21-10		6-23-10
14.	Joe Edwards	OPS		6-21-10		6-23-10
15.	Stanley G. Krysztopik	OPS		6-21-10		6-23-10
NOTES: 16.	Arthur L. Stephens	OPS		6-21-10		6-23-10

ES-201	Examination Security Agreement	Form ES-201-3

1. Pre-Examination

I acknowledge that I have acquired specialized knowledge about the NRC licensing examinations scheduled for the week(s) of June 7, 2010 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.	Jim Crossman	Asst. Ops Mgr.		6/7/10		6/23/10	
2.	PEGGY S. ANDERSON	Process Asst II		06/07/10		06/23/10	
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Copy 6/24/10

ES-201 | Examination Security Agreement | Form ES-201-3

1. Pre-Examination

I acknowledge that I have acquired specialized knowledge about the NRC licensing examinations scheduled for the week(s) of ~~6/7, 6/14, 6/21-6~~ June 2010 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 ~~6/7, 6/14, 6/21-6~~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.	S R Allen	Instructor / Exam Author		11-18-09		6/23/10	
2.	Denise Tibbs	Instructor / Exam Author		11-18-09		6/23/10	
3.	Richard M. Wasley	Sup. of Shift Ops / Ops Rep.		11/24/09		6/24/10	1308
4.	Wade Shuyler	WS Supervisor / Project Mgr		~~11/24/09~~ 12/1/09		6/24/10	
5.	S.R. Crawford	Instructor / Exam author		12-1-09		6-23-10	
6.	JJ MOSHER	UNIT SUPERVISOR / EXAM REVIEW		1-5-10			
7.	John Lithe	UNIT SUP / EXAM REVIEW		2-9-10		6/24/10	
8.	Joe Gordon	RO / EXAM REVIEW		2/9/10		6/24/10	
9.	JESSICA HARVEY	RO / EXAM REVIEW		2/9/10			
10.	PAUL TRENT	SRO / EXAM REVIEW		2/10/10			
11.	Alex Blanchard	RO / EXAM REVIEW		2/18/10			
12.	WILLIAM SPICER	RO / EXAM REVIEW		2-22-10			
13.	MIKE AZZARELLO	SRO / EXAM REVIEW		2-22-10			
14.	Donald MacArthur	Instructor / JPM		2-22-10	Per telcon	6/24/10	
15.	Robert A Caruso	SRO / Exam Review		2/22/10		6/24/10	

NOTES:

ES-201	Examination Security Agreement	Form ES-201-3

1. Pre-Examination

I acknowledge that I have acquired specialized knowledge about the NRC licensing examinations scheduled for the week(s) of June 2010 ~~6/7, 6/14, 6/21-10~~ 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 ~~6/7, 6/14, 6/21-10~~ 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 S. PICKERING	UNIT SUPERVISOR		3/10/10			
2.	Jason L Kusterer	Reactor Operator		3/11/10			
3.	ROB WILMOUTH	UNIT SUPERVISOR		3/11/10			
4.	T. mothy A. Morris	Reactor operator		3/11/10			
5.	KERRY LINE	INSTRUCTOR		3-18-10		6-23-10	
6.	Reg Robinson	R.O.		4-5-10		6-23-10	
7.	Bryle Dennison	RO/BOP		4/5/10			
8.	Tom CRAWFORD	SR. O		4-6-10		6-24-10	
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NOTES:

1. Pre-Examination

4/7, 6/14/6/21-16

I acknowledge that I have acquired specialized knowledge about the NRC licensing examinations scheduled for the week(s) of June 2010 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 ~~June 2010~~ 4/5 → 21 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.	JIM SALE	SENIOR INST. (NUKE OPS)		3/11/10			
2.	KHANH LE	SENIOR SIM SUPPORT		3/11/10			
3.	SHARAD KUMAR	SENIOR SIM SUPPORT		3/11/10		06/23/10	
4.	HIROKI KOZAI	SENIOR SIM SUPPORT		3/22/10		06/23/10	
5.	KEN ELBERT	SENIOR SIM SUPPORT		3/24/10		6/23/10	
6.	CONNIE ARMSTRONG	TRAINING ADMINISTRATOR		4/16/10			
7.	BRENDA PARRISH	Process Asst IV		05/20/10		06/23/10	
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NOTES:

1. Pre-Examination

I acknowledge that I have acquired specialized knowledge about the NRC licensing examinations scheduled for the week(s) of 6/7/10 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 6/7/10, 6/14/10 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 S. Royce	Millstone 3 Instructor/Exam Reviewer	R S R	3/31/10	SRR per telcon	6/24/10	
2.	MICHAEL BROPHY	EO / Exam Reviewer	MBrophy	6/5/10			
3.	Brian Scott	SM / EXAM REVIEW	Brian Scott	6/2/10	Ben Scott	6/24/10	
4.	Robert Rink	SRO / EXAM REVIEW		6/2/10			
5.	Ronald D. Butler-ST	RO / Exam review		6/2/10		6/24/10	
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NOTES:

Facility: North Anna (JPM Set A - FINAL) Date of Examination: 6/21/2010

Exam Level : RO ☒ SRO-I ☒ SRO-U ☒ Operating Test No.: 1

Control Room Systems@ (8 for RO); (7 for SRO-I); (2 or 3 for SRO-U, including 1 ESF)		
System / JPM Title (KA)	Type Code*	Safety Function
a.) 026 / Terminate quench spray (1/2-E-1). (A4.05) **(ALL)**	C, D, E, EN, L	5
b.) 005 / Restore RHR flow (1-AP-11). (A4.01) **(ALL)**	A, L, M, S	4 (Pri)
c.) 001 / Borate the reactor coolant system using the blender (1-GOP-8.3.4). (A4.02) **(ALL)**	A, D, S	1
d.) 039/059/061 / Identify and isolate a ruptured steam generator (EA1.32) **(RO and SRO-I)**	A, M, S	4 (Sec)
e.) 062 / Reset load shed (0-AP-47). (A4.01) **(RO and SRO-I)**	C, D, E	6
f.) 073 / Restore the blowdown radiation monitors (1-E-1). (A4.02) **(RO and SRO-I)**	D, E, S	7
g.) 075 / Respond to circulating water flooding in the turbine building (0-AP-39.1). (A2.02) **(RO and SRO-I)**	A, D, E, S	8
h.) 006 / Fill the safety injection accumulators (1-OP-7.3). (A4.02) **(RO)**	D, EN, S	3
In-Plant Systems@ (3 for RO; 3 for SRO-I; 3 or 2 for SRO-U)		
i.) 063 / Place a battery charger in operation on the safeguards watchstation (1-OP-26.4.1). (A4.01) **(ALL)**	D	6
j.) 003 / Isolate the reactor coolant pump seals locally (1-ECA-0.0) **(ALL)**	D, E, R	2
k.) 061 / Reset the auxiliary feedwater turbine trip and throttle valve (1/2-AR-F-D8). (A2.04) **(RO and SRO-I)**	D, E	4

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

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

Facility: North Anna (JPM Set B – FINAL) Date of Examination: 6/21/2010

Exam Level : RO ☒ SRO-I ☒ SRO-U ☒ Operating Test No.: 1

Control Room Systems@ (8 for RO); (7 for SRO-I); (2 or 3 for SRO-U, including 1 ESF)		
System / JPM Title (KA)	Type Code*	Safety Function
a.) 001 / Respond to a misaligned control rod (1-AP-1.3). (A1.02) **(RO and SRO-I)**	A, E, M, P, S	1
b.) 055 / Manually align condenser air ejector discharge to containment (1-E-3). (A4.01) **(RO and SRO-I)**	D, E, L, S	4 (Sec)
c.) 003 / Respond to a loss of reactor coolant pump seal cooling (1-AP-33.2). (AA1.22) **(ALL)**	A, E, M, S	4 (Pri)
d.) 026 / Configure emergency bus loads to prevent emergency diesel overload (0-AP-10). (A2.05) **(RO)**	D, E, S	6
e.) 004 / Charging flow control valve fails closed (1-AP-49). (A4.06) **(ALL)**	A, D, E, S	2
f.) 073 / Respond to recirculation spray heat exchanger service water radiation monitor alarm (1-AP-5). (A4.01) **(RO and SRO-I)**	C, D, E, P	7
g.) 006 / Establish Redundant cold leg injection flow paths (1-E-1). (A4.06) **(ALL)**	A, D, EN, S	3
h.) 022 / Reduce containment pressure to subatmospheric (1/2-FR-Z4). (A4.04) **(RO and SRO-I)**	C, A, D, EN	5
In-Plant Systems@ (3 for RO; 3 for SRO-I; 3 or 2 for SRO-U)		
i.) 004 / Align a charging flowpath locally. (A2.07) **(ALL)**	D, R	2
j.) 055 / Prepare the station blackout diesel generator for loading following an automatic start (0-OP-6.4), (EA2.03) **(ALL)**	D, E, L	6
k.) 061 / Align both motor driven auxiliary feedwater pumps to feed the steam generator by way of the motor operated valve header (1-AP-22.1). (A2.04) **(RO and SRO-I)**	D, E, L	4 (Sec)

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

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

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

Facility:	Date of Examination:	Operating Test Number:

	1. General Criteria	Initials a	Initials b*	Initials c#
a.	The operating test conforms with the previously approved outline; changes are consistent with sampling requirements (e.g., 10 CFR 55.45, operational importance, safety function distribution).	G	WS	KJ
b.	There is no day-to-day repetition between this and other operating tests to be administered during this examination.	G	WS	KJ
c.	The operating test shall not duplicate items from the applicants' audit test(s). (see Section D.1.a.)	G	WS	KJ
d.	Overlap with the written examination and between different parts of the operating test is within acceptable limits.	G	WS	KJ
e.	It appears that the operating test will differentiate between competent and less-than-competent applicants at the designated license level.	G	WS	KJ
	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	G	WS	KJ
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.	G	WS	KJ
	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.		N/A	WS	KJ

		Printed Name / Signature	Date
a.	Author	Denise Tiedis/DGTiedis SRAllen/SRAllen	5/27/10
b.	Facility Reviewer(*)	Walt Shura/WaltShura	5/27/10
c.	NRC Chief Examiner (#)	Edwin Lea, Jr/Edwin Lea, Jr	6/3/2010
d.	NRC Supervisor	MARK A. BATES/Mark A. Bates FOR MWIDMANN	6/3/2010

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

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

Facility: North Anna Date of Exam: 6/7/2010 Scenario Numbers: 1 / 2 / 3 / 4 / 5 /6 Operating Test No.: 1

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.	dgt	WS	kf
2. The scenarios consist mostly of related events.	dgt	WS	kf
3. Each event description consists of • the point in the scenario when it is to be initiated • the malfunction(s) that are entered to initiate the event • the symptoms/cues that will be visible to the crew • the expected operator actions (by shift position) • the event termination point (if applicable)	dgt	WS	kf
4. No more than one non-mechanistic failure (e.g., pipe break) is incorporated into the scenario without a credible preceding incident such as a seismic event.	dgt	WS	kf
5. The events are valid with regard to physics and thermodynamics.	dgt	WS	kf
6. Sequencing and timing of events is reasonable, and allows the examination team to obtain complete evaluation results commensurate with the scenario objectives.	dgt	WS	kf
7. If time compression techniques are used, the scenario summary clearly so indicates. Operators have sufficient time to carry out expected activities without undue time constraints. Cues are given.	dgt	WS	kf
8. The simulator modeling is not altered.	dgt	WS	kf
9. The scenarios have been validated. Pursuant to 10CFR55.46(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.	dgt	WS	kf
10. Every operator will be evaluated using at least one new or significantly modified scenario. All other scenarios have been altered in accordance with Section D.5 of ES-301.	dgt	WS	kf
11. All individual operator competencies can be evaluated, as verified using Form ES-301-6 (submit the form along with the simulator scenarios).	dgt	WS	kf
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).	dgt	WS	kf
13. The level of difficulty is appropriate to support licensing decisions for each crew position.	dgt	WS	kf

Target Quantitative Attributes (Per Scenario; See Section D.5.d)	Actual Attributes 1 / 2 / 3 / 5 / 6			
1. Total malfunctions (5–8)	8 / 7 / 8 / 8 / 9	dgt	WS	kf
2. Malfunctions after EOP entry (1–2)	3 / 3 / 3 / 3 / 3	dgt	WS	kf
3. Abnormal events (2–4)	5 / 3 / 4 / 5 / 5	dgt	WS	kf
4. Major transients (1–2)	1 / 1 / 1 / 1 / 1	dgt	WS	kf
5. EOPs entered/requiring substantive actions (1–2)	2 / 2 / 1 / 2 / 2	dgt	WS	kf
6. EOP contingencies requiring substantive actions (0–2)	0 / 0 / 1 / 1 / 0	dgt	WS	kf
7. Critical tasks (2–3)	4 / 4 / 2 / 3 / 3	dgt	WS	kf

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

NOTE: I/C Events in **bold** happen *before* EOP entry

Facility: North Anna Power Station Date of Exam: 6/7/2010 Operating Test No.:1

APPLICANT	EVENT TYPE	Scenarios												TOTAL	MINIMUM(*)		
		1			2			3			5						
		CREW POSITION			CREW POSITION			CREW POSITION			CREW POSITION						
		SRO	ATC	BOP	SRO	ATC	BOP	SRO	ATC	BOP	SRO	ATC	BOP		R	I	U
RO X SRO-I ☐ SRO-U ☐	RX		1			4			1			2a			1	1	0
	NOR			1		2a	4		4a	1			2a		1	1	1
	I/C		**3,6**,9	**2,4, 6**,8		**2,4a 6**,7	**1,3**,6 8		**2,4**,7	**3,5**,7 8		**1,2a, 3**,7	**2,4**,7, 8		4	4	2
	MAJ		7	7		5	5		6	6		6	6		2	2	1
	TS														0	2	2
RO ☐ SRO-I X SRO-U X	RX	1			4			1			2a				1	1	0
	NOR				2a			4a							1	1	1
	I/C	**2,3,4, 6**,8,9			**1,2,3, 4a,6**, 7,8			**2,3,4** 5,7,8			**1,2,3, 4**,7,8				4	4	2
	MAJ	7			5			6			6				2	2	1
	TS	3,5			2,3			2,4,5			4,5				0	2	2
RO ☐ SRO-I X SRO-U ☐	RX		1			4			1			2a			1	1	0
	NOR					2a			4a						1	1	1
	I/C		**3,6**,9			**2,4a 6**,7			**2,4**,7			**1,3**,7			4	4	2
	MAJ		7			5			6			6			2	2	1
	TS														0	2	2
RO ☐ SRO-I ☐ SRO-U ☐	RX														1	1	0
	NOR														1	1	1
	I/C														4	4	2
	MAJ														2	2	1
	TS														0	2	2

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

NOTE: I/C Events in **bold** happen *before* EOP entry

Facility: North Anna Power Station	Date of Exam: 6/7/2010	Operating Test No.: 1

APPLICANT	EVENT TYPE	Scenarios													TOTAL	MINIMUM(*)		
		6 (spare)																
		CREW POSITION						CREW POSITION			CREW POSITION							
		SRO	ATC	BOP				SRO	ATC	BOP	SRO	ATC	BOP			R	I	U
RO X SRO-I ☐ SRO-U ☐	RX		5a													1	1	0
	NOR		1a	5a												1	1	1
	I/C		**1,3,5** 9	**2,4,5** 7,8,9												4	4	2
	MAJ		6	6												2	2	1
	TS															0	2	2
RO ☐ SRO-I X SRO-U X	RX	5a														1	1	0
	NOR	1a														1	1	1
	I/C	**1,2,3, 4,5**,7, 8,9														4	4	2
	MAJ	6														2	2	1
	TS	1,4														0	2	2
RO ☐ SRO-I X SRO-U ☐	RX		5a													1	1	0
	NOR		1a													1	1	1
	I/C		**1,3,5 9**													4	4	2
	MAJ		6													2	2	1
	TS															0	2	2
RO ☐ SRO-I ☐ SRO-U ☐	RX															1	1	0
	NOR															1	1	1
	I/C															4	4	2
	MAJ															2	2	1
	TS															0	2	2

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ES-301 **Competencies Checklist** **Form ES-301-6**

Facility: North Anna	Date of Examination: 6/7/2010												Operating Test No.: 1			
Competencies	APPLICANTS															
	RO/BOP X SRO-I ☐ SRO-U ☐				RO X SRO-I X SRO-U ☐				RO ☐ SRO-I X SRO-U ☐				RO ☐ SRO-I ☐ SRO-U X			
	SCENARIO				SCENARIO				SCENARIO				SCENARIO			
	1	2	3	5	1	2	3	5	1	2	3	5	1	2	3	5
Interpret/Diagnose Events and Conditions	2,3, 4,5, 6,7, 8,9	1,2, 3,4a 5,6, 8	2,3, 4,5, 6,7, 8	1,2, 3,4, 5,6, 7,8	3,5, 6,7, 9	2,4, 4a,5 6	2,4, 6,7	1,3, 5,6, 7	2,3, 4,5, 6,7, 8,9	1,2, 3,4a 5,6, 8	2,3, 4,5, 6,7, 8	1,2, 3,4, 5,6, 7,8	2,3, 4,5, 6,7, 8,9	1,2, 3,4a 5,6, 8	2,3, 4,5, 6,7, 8	1,2, 3,4, 5,6, 7,8
Comply With and Use Procedures (1)	1,2 3,4, 5,6, 7,8	1,2, 2a,3 4,4a 5,6, 8	1,2, 3,4, 4a,5 6,7, 8	1,2, 2a,3 4,5, 6,7, 8	1,3, 5,7	2,4, 4a,5 6	1,2, 4,4a 6,7	1,2a 3,4, 5,6 7	1,2 3,4, 5,6, 7,8	1,2, 2a,3 4,4a 5,6, 8	1,2, 3,4, 4a,5 6,7, 8	1,2, 2a,3 4,5, 6,7, 8	1,2 3,4, 5,6, 7,8	1,2, 2a,3 4,4a 5,6, 8	1,2, 3,4, 4a,5 6,7, 8	1,2, 2a,3 4,5, 6,7, 8
Operate Control Boards (2)	1,2, 3,4, 6,8, 7,9	1,2, 2a,3 4,4a 5,6, 8	1,2, 3,4, 4a,5 6,7, 8	1,2a 3,4, 6,7 8	1,3, 6,7	2,2a 3,4, 4a,5 6	1,2, 4,4a 6,7	1,2a 3,6								
Communicate and Interact	1,2, 3,4, 5,6, 7,8, 9	1,2, 2a,3 4,4a 5,6, 8	1,2, 3,4, 4a,5 6,7, 8	1,2, 2a,3 4,5, 6,7, 8,	1,3, 5,6, 7	2,2a 3,4 4a,5 6	1,2, 4,6, 7	1,2a 3,4, 5,6, 7	1,2, 3,4, 5,6, 7,8, 9	1,2, 2a,3 4,4a 5,6, 8	1,2, 3,4, 4a,5 6,7, 8	1,2, 2a,3 4,5, 6,7, 8,	1,2, 3,4, 5,6, 7,8, 9	1,2, 2a,3 4,4a 5,6, 8	1,2, 3,4, 4a,5 6,7, 8	1,2, 2a,3 4,5, 6,7, 8,
Demonstrate Supervisory Ability (3)									1,2, 3,4, 5,6, 7,8 9	1,2, 2a,3 4,4a 5,6 8	1,2, 3,4, 4a,5 6,7	1,2a 3,4, 5,6, 7,8	1,2, 3,4, 5,6, 7,8 9	1,2, 2a,3 4,4a 5,6 8	1,2, 3,4, 4a,5 6,7	1,2a 3,4, 5,6, 7,8
Comply With and Use Tech. Specs. (3)									3,5	2,3	2,4 5	4,5	3,5	2,3	2,4 5	4,5

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

Instructions:

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

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ES-301 **Competencies Checklist** **Form ES-301-6**

Facility: North Anna	Date of Examination: 6/7/2010				Operating Test No.: 1											
Competencies	APPLICANTS															
	RO/BOP X SRO-I ☐ SRO-U ☐				RO X SRO-I X SRO-U ☐				RO ☐ SRO-I X SRO-U ☐				RO ☐ SRO-I ☐ SRO-U X			
	SCENARIO				SCENARIO				SCENARIO				SCENARIO			
	6				6				6				6			
Interpret/Diagnose Events and Conditions	1,2, 3,4, 5,6, 7,8, 9				1,3, 5,6				1,2, 3,4, 5,6, 7,8, 9				1,2, 3,4, 5,6, 7,8, 9			
Comply With and Use Procedures (1)	1,1a 2,3, 4,5 5a,6 7,8 9				1,1a 3,5 5a,6				1,1a 2,3, 4,5 5a,6 7,8 9				1,1a 2,3, 4,5 5a,6 7,8 9			
Operate Control Boards (2)	1,1a 2,3, 4,5a 6,7, 8,9				1,1a 3,5a 6											
Communicate and Interact	1,1a 2,3, 4,5, 5a,6 7,8, 9				1,1a 3,5, 5a,6				1,1a 2,3, 4,5, 5a,6 7,8, 9				1,1a 2,3, 4,5, 5a,6 7,8, 9			
Demonstrate Supervisory Ability (3)									1,1a 2,3, 4,5, 5a,6 7,8				1,1a 2,3, 4,5, 5a,6 7,8			
Comply With and Use Tech. Specs. (3)									1,4				1,4			

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.

ES-401, Rev. 9 **PWR Examination Outline** **Form ES-401-2**

Facility: North Anna Date of Exam: 2010

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	2	2	1				1	1			2	9	2		2		4
	Tier Totals	5	5	4				4	4			5	27	5		5		10
2. Plant Systems	1	3	3	1	3	3	3	3	2	2	2	3	28	3		2		5
	2	1	1	1	1	1	1	1	1	0	1	1	10	2	0	1		3
	Tier Totals	4	4	2	4	4	4	4	3	2	3	4	38	5		3		8
3. Generic Knowledge and Abilities Categories		1			2			3			4		10	1	2	3	4	7
		3			2			3			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 outline, the "Tier Totals" in each K/A category shall not be less than two).
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:
007EK2.02	Reactor Trip - Stabilization - Recovery / 1	2.6	2.8	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	Breakers, relays and disconnects
008AK3.02	Pressurizer Vapor Space Accident / 3	3.6	4.1	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	Why PORV or code safety exit temperature is below RCS or PZR temperature
009EA1.03	Small Break LOCA / 3	3.2	3.2	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐	Low-pressure SWS activity monitor
011EK1.01	Large Break LOCA / 3	4.1	4.4	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	Natural circulation and cooling, including reflux boiling.
015AK2.08	RCP Malfunctions / 4	2.6	2.6	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	CCWS
025AK2.03	Loss of RHR System / 4	2.7	2.7	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	Service water or closed cooling water pumps
026AA1.03	Loss of Component Cooling Water / 8	3.6	3.6	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐	SWS as a backup to the CCWS
027AK3.01	Pressurizer Pressure Control System Malfunction / 3	3.5	3.8	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	Isolation of PZR spray following loss of PZR heaters
038EA2.05	Steam Gen. Tube Rupture / 3	2.8	2.9	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	Causes and consequences of shrink and swell in S/Gs
040AK1.04	Steam Line Rupture - Excessive Heat Transfer / 4	3.2	3.6	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	Nil ductility temperature
056EK1.02	Station Blackout / 6	4.1	4.4	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	Natural circulation cooling

KA	NAME / SAFETY FUNCTION:	IR RO	IR SRO	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
056AG2.4.9	Loss of Off-site Power / 6	3.8	4.2	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of low power / shutdown implications in accident (e.g. LOCA or loss of RHR) mitigation strategies.
057AG2.4.45	Loss of Vital AC Inst. Bus / 6	4.1	4.3	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Ability to prioritize and interpret the significance of each annunciator or alarm.
062AA2.01	Loss of Nuclear Svc Water / 4	2.9	3.5	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	Location of a leak in the SWS
065AG2.1.27	Loss of Instrument Air / 8	3.9	4	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of system purpose and or function.
077AA1.02	Generator Voltage and Electric Grid Disturbances / 6	3.8	3.7	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐	Turbine / generator controls
WE05EK3.3	Inadequate Heat Transfer - Loss of Secondary Heat Sink / 4	4.0	4.1	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	Manipulation of controls required to obtain desired operating results during abnormal and emergency situations.
WE11EA2.1	Loss of Emergency Coolant Recirc. / 4	3.4	4.2	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	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:
001AK1.03	Continuous Rod Withdrawal / 1	3.9	4	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	Relationship of reactivity and reactor power to rod movement
032AA2.09	Loss of Source Range NI / 7	2.5	2.9	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	Effect of improper HV setting
033AA1.01	Loss of Intermediate Range NI / 7	2.9	3.1	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐	Power-available indicators in cabinets or equipment drawers
038AK3.01	Fuel Handling Accident / 8	3.1	3.7	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	Different inputs that will cause a reactor building evacuation
037AG2.1.19	Steam Generator Tube Leak / 3	3.9	3.8	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Ability to use plant computer to evaluate system or component status.
074EK1.03	Inad. Core Cooling / 4	4.5	4.9	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	Processes for removing decay heat from the core
WE02EK2.1	SI Termination / 3	3.4	3.9	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	Components and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes and automatic and manual features.
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.
we16EG2.4.50	High Containment Radiation / 9	4.2	4.0	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Ability to verify system alarm setpoints and operate controls identified in the alarm response manual.

KA	NAME / SAFETY FUNCTION:	IR RO	IR SRO	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
003K5.02	Reactor Coolant Pump	2.8	3.2	☐	☐	☐	☐	☑	☐	☐	☐	☐	☐	☐	Effects of RCP coastdown on RCS parameters
004G2.1.19	Chemical and Volume Control	3.9	3.8	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Ability to use plant computer to evaluate system or component status.
004K6.15	Chemical and Volume Control	2.8	3.1	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐	☐	Reason for venting VCT and pump casings while filling: vents must connect to LRS
005K6.03	Residual Heat Removal	2.5	2.6	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐	☐	RHR heat exchanger
006K6.18	Emergency Core Cooling	3.6	3.9	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐	☐	Subcooling margin indicators
007K4.01	Pressurizer Relief/Quench Tank	2.6	2.9	☐	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	Quench tank cooling
007K5.02	Pressurizer Relief/Quench Tank	3.1	3.4	☐	☐	☐	☐	☑	☐	☐	☐	☐	☐	☐	Method of forming a steam bubble in the PZR
008A3.10	Component Cooling Water	2.9	3.0	☐	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	CCW pump instruments and their respective sensors, including flow, pressure, oil level and discharge temperature
008G2.4.45	Component Cooling Water	4.1	4.3	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Ability to prioritize and interpret the significance of each annunciator or alarm.
010A3.01	Pressurizer Pressure Control	3.0	3.2	☐	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	PRT temperature and pressure during PORV testing
012K2.01	Reactor Protection	3.3	3.7	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	RPS channels, components and interconnections

KA	NAME / SAFETY FUNCTION:	IR RO	IR SRO	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
012K5.01	Reactor Protection	3.3	3.8	☐	☐	☐	☐	☑	☐	☐	☐	☐	☐	☐	DNB
013K2.01	Engineered Safety Features Actuation	3.6	3.8	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	ESFAS/safeguards equipment control
013K4.06	Engineered Safety Features Actuation	4.0	4.3	☐	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	Recirculation actuation system reset
022A1.01	Containment Cooling	3.6	3.7	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐	Containment temperature
026A2.09	Containment Spray	2.5	2.9	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	Radiation hazard potential of BWST
039A4.01	Main and Reheat Steam	2.9	2.8	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	☐	Main steam supply, valves
059A1.07	Main Feedwater	2.5	2.6	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐	Feed Pump speed, including normal control speed for ICS
059K1.04	Main Feedwater	3.4	3.4	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	S/GS water level control system
061G2.1.23	Auxiliary/Emergency Feedwater	4.3	4.4	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Ability to perform specific system and integrated plant procedures during all modes of plant operation.
062A1.03	AC Electrical Distribution	2.5	2.8	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐	Effect on instrumentation and controls of switching power supplies
062K1.04	AC Electrical Distribution	3.7	4.2	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	Off-site power sources

KA	NAME / SAFETY FUNCTION:	IR RO	IR SRO	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
063K4.04	DC Electrical Distribution	2.6	2.9	☐	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	Trips
064A4.10	Emergency Diesel Generator	3.3	3.4	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	☐	Need for and consequences of manually shedding (loads) safeguards bus
073A2.02	Process Radiation Monitoring	2.7	3.2	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	Detector failure
076K1.07	Service Water	2.5	2.3	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	Secondary closed cooling water
078K2.02	Instrument Air	3.3	3.5	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	Emergency air compressor
103K3.03	Containment	3.7	4.1	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	Loss of containment integrity under refueling operations.

ES-401, REV 9	T2G2 PWR EXAMINATION OUTLINE													FORM ES-401-2
KA	NAME / SAFETY FUNCTION:	IR		K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
		RO	SRO												
002K4.07	Reactor Coolant	3.1	3.5	☐	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	Contraction and expansion during heatup and cooldown
014A2.02	Rod Position Indication	3.1	3.8	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	Loss of power to the RPIS
015K2.01	Nuclear Instrumentation	3.3	3.7	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	NIS channels, components and interconnections
017A1.01	In-core Temperature Monitor	3.7	3.9	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐	Core exit temperature
029K1.03	Containment Purge	3.6	3.8	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	Engineered safeguards
034A4.01	Fuel Handling Equipment	3.3	3.7	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	☐	Radiation levels
045K3.01	Main Turbine Generator	2.9	3.2	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	Remainder of the plant
055G2.4.3	Condenser Air Removal	3.7	3.9	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Ability to identify post-accident instrumentation.
068K6.10	Liquid Radwaste	2.5	2.9	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐	☐	Radiation monitors
086K5.03	Fire Protection	3.1	3.4	☐	☐	☐	☐	☑	☐	☐	☐	☐	☐	☐	Effect of water spray on electrical components

KA	NAME / SAFETY FUNCTION:	IR RO	IR SRO	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
G2.1.18	Conduct of operations	3.9	3.8	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Ability to use plant computer to evaluate system or component status.
G2.1.20	Conduct of operations	4.6	4.6	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Ability to execute procedure steps.
G2.1.9	Conduct of operations	2.9	4.5	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Ability to direct personnel activities inside the control room.
G2.2.2	Equipment Control	4.6	4.1	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Ability to manipulate the console controls as required to operate the facility between shutdown and designated power levels.
G2.2.37	Equipment Control	3.6	4.6	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Ability to determine operability and/or availability of safety related equipment
G2.3.11	Radiation Control	3.8	4.3	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Ability to control radiation releases.
G2.3.13	Radiation Control	3.4	3.8	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of radiological safety procedures pertaining to licensed operator duties
G2.3.4	Radiation Control	3.2	3.7	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of radiation exposure limits under normal and emergency conditions
G2.4.27	Emergency Procedures/Plans	3.4	3.9	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of "fire in the plant" procedures.
G2.4.4	Emergency Procedures/Plans	4.5	4.7	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Ability to recognize abnormal indications for system operating parameters which are entry-level conditions for emergency and abnormal operating procedures.

ES-401, REV 9	SRO T1G1 PWR EXAMINATION OUTLINE												FORM ES-401-2
KA	NAME / SAFETY FUNCTION:	IR		K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
		RO	SRO												
008AA2.25	Pressurizer Vapor Space Accident / 3	2.8	3.4	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	Expected leak rate from open PORV or code safety
025AG2.2.36	Loss of RHR System / 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
058AA2.02	Loss of DC Power / 6	3.3	3.6	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	125V dc bus voltage, low/critical low, alarm
065AG2.1.19	Loss of Instrument Air / 8	3.9	3.8	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Ability to use plant computer to evaluate system or component status.
WE04EA2.1	LOCA Outside Containment / 3	3.4	4.3	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	Facility conditions and selection of appropriate procedures during abnormal and emergency operations.
we05EG2.4.2	Inadequate Heat Transfer - Loss of Secondary Heat Sink / 4	3.8	4.3	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of operational implications of EOP warnings, cautions and notes.

KA	NAME / SAFETY FUNCTION:	IR RO	IR SRO	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
001AA2.03	Continuous Rod Withdrawal / 1	4.5	4.8	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	Proper actions to be taken if automatic safety functions have not taken place
028AA2.08	Pressurizer Level Malfunction / 2	3.1	3.5	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	PZR level as a function of power level
038AG2.4.8	Fuel Handling Accident / 8	3.8	4.5	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of how abnormal operating procedures are used in conjunction with EOPs.
068AG2.2.40	Control Room Evac. / 8	3.4	4.7	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Ability to apply technical specifications for a system.

ES-401, REV 9	SRO T2G1 PWR EXAMINATION OUTLINE												FORM ES-401-2
KA	NAME / SAFETY FUNCTION:	IR		K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
		RO	SRO												
008G2.2.39	Emergency Core Cooling	3.9	4.5	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of less than one hour technical specification action statements for systems.
010G2.4.31	Pressurizer Pressure Control	4.2	4.1	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of annunciators alarms, indications or response procedures
026A2.09	Containment Spray	2.5	2.9	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	Radiation hazard potential of BWST
064A2.10	Emergency Diesel Generator	2.4	2.9	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	Unloading (reduction of generated power) in steps over a period of time
073A2.02	Process Radiation Monitoring	2.7	3.2	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	Detector failure

KA	NAME / SAFETY FUNCTION:	IR RO	IR SRO	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
015A2.03	Nuclear Instrumentation	3.2	3.5	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	Xenon oscillations
027G2.4.30	Containment Iodine Removal	2.7	4.1	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of events related to system operations/status that must be reported to internal orginizations or outside agencies.
035A2.02	Steam Generator	4.2	4.4	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	Reactor trip/turbine trip

KA	NAME / SAFETY FUNCTION:	IR RO	IR SRO	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
G2.1.31	Conduct of operations	4.6	4.3	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Ability to locate control room switches, controls and indications and to determine that they are correctly reflecting the desired plant lineup.
G2.1.38	Conduct of operations	3.7	3.8	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of the stations requirements for verbal communication when implamenting procedures
G2.2.20	Equipment Control	2.6	3.8	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of the process for managing troubleshooting activities.
G2.2.39	Equipment Control	3.9	4.5	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of less than one hour technical specification action statements for systems.
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
G2.3.6	Radiation Control	2.0	3.8	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Ability to aprove release permits
G2.4.26	Emergency Procedures/Plans	3.1	3.6	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of facility protection requirements including fire brigade and portable fire fighting equipment usage.

Tier / Group	Randomly Selected K/A	Reason for Rejection
3	G2.1.35	G2.1.38 - Unable to prepare a question at the SRO-only level
1/1	038EA2.16	038EA2.05 - Unable to prepare operationally valid, psychometrically sound question

Facility: North Anna Date of Exam: 06/16/10 Exam Level: RO ☑ SRO ☑

Item Description					Initial a	Initial b*	Initial c#
1.	Questions and answers are technically accurate and applicable to the facility.				SC	WS	GJ
2.	a. NRC K/As are referenced for all questions. b. Facility learning objectives are referenced as available.				SC	WS	GJ
3.	SRO questions are appropriate in accordance with Section D.2.d of ES-401				SC	WS	GJ
4.	The sampling process was random and systematic (If more than 4 RO or 2 SRO questions were repeated from the last 2 NRC licensing exams, consult the NRR OL program office).				SC	WS	GJ
5.	Question duplication from the license screening/audit exam was controlled as indicated below (check the item that applies) and appears appropriate: __ the audit exam was systematically and randomly developed; or __ the audit exam was completed before the license exam was started; or __ the examinations were developed independently; or ☒ the licensee certifies that there is no duplication; or __ other (explain)				SC	WS	GJ
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 33 / 4	Modified 6 / 2	New 36 / 19	SC	WS	GJ
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 30 / 6	C/A 45 / 19		SC	WS	GJ
8.	References/handouts provided do not give away answers or aid in the elimination of distractors.				SC	WS	N/A
9.	Question content conforms with specific K/A statements in the previously approved examination outline and is appropriate for the tier to which they are assigned; deviations are justified.				SC	WS	GJ
10.	Question psychometric quality and format meet the guidelines in ES Appendix B.				SC	WS	GJ
11.	The exam contains the required number of one-point, multiple choice items; the total is correct and agrees with the value on the cover sheet.				SC	WS	GJ

	Printed Name / Signature	Date
a. Author	Steve Crawford / SCrawford	5/27/2010
b. Facility Reviewer (*)	Walt Shura / WShura	5/27/2010
c. NRC Chief Examiner (#)	Edwin Lea Jr. / ELea	6/13/2010
d. NRC Regional Supervisor	MALCOLM T. WIDMANN / MWidmann	06/15/10

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

Q#	1. LOK (F/H)	2. LOD (1-5)	3. Psychometric Flaws					4. Job Content Flaws				5. Other		6. U/E/S	7. Explanation
			Stem Focus	Cues	T/F			Job-Link	Minutia	#/ units	Back-ward	Q= K/A	SRO Only		

NORTH ANNA 2010 RO

Instructions

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

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

Q#	1. LOK (F/H)	2. LOD (1-5)	3. Psychometric Flaws					4. Job Content Flaws				5. Other		6. U/E/S	7. Explanation
			Stem Focus	Cues	T/F	Cred. Dist.	Partial	Job-Link	Minutia	#/ units	Back-ward	Q= K/A	SRO Only		
1	H	2												**S**	
2	H	2				X								**E**	Why did you select 23.4 and 27.7 in distracters B & D? Consider using

Q#	1. LOK (F/H)	2. LOD (1-5)	3. Psychometric Flaws					4. Job Content Flaws				5. Other		6.	7.
			Stem Focus	Cues	T/F	Cred. Dist.	Partial	Job-Link	Minutia	#/ units	Back-ward	Q= K/A	SRO Only	U/E/S	Explanation
															the same values. DECIDED TO USE THE NUMBERS AS PROVIDED.
3	H	2												**S**	
4	F	1												**S?**	Provide information as to where/if the other parameters information can be found (location). PROVIDED INFORMATION NEEDED TO SUPPORT QUESTION.
5	H	3				X								**E**	Need to look at the plausibility of distractors C & D. Need to discuss how the plant/system would respond to a stuck open relief valve. Will consider making changes to the distractors after discussion. DISCUSSED RELIEF VALVE OPERATION. DECIDED TO USE QUESTION. EVEN THOUGH THE CPs DO NOT HAVE RELIEF VALVES, THERE ARE OTHER PUMPS WHICH DO.
6	H	3				X								**E/U**	Need to discuss plausibility of distractors A & B. Explore using different leak rates and evaluate outcome. Discuss what would occur if charging was in auto. What would ever cause RHR pump flow to remain the same? DECIDED TO USE QUESTION AS IS .....
7	H	3												**S**	
8	F	2												**S**	
9	H	2												**S?**	Need to look a Rx flange O-ring drain path. DECIDED THAT QUESTION DID NOT ADDRESS THE COOLING OF THE QUENCH TANK (K/A) WILL REWRITE QUESTION - 5/24... STILL WAITING FOR A RESPONSE. REVISED QUESTION (OK)
10	H	2												**S**	
11	H	3												**S**	
12	H	2				X								**E**	Need to make sure there are not two correct answers. A & B. Need to answer the question concerning the enthalpy process. Does distance have any affect? CHANGED WORDS IN DISTRACTORS A & B.
13	H	3				X								**E/S**	Please explain relationship between the breakers and alarms. Explain selection of time delays. Why is it that in C & D you identify pump and not in A & B? Appears to be unnecessary information. ADDED WORDS TO THE STEM AND THE WORD BREAKER TO THE DISTRACTORS. QUESTION IS OK.
14	H	2												**S**	
15	H	2												**S**	

ES-401, Rev. 9 **Written Examination Review Worksheet** **Form ES-401-9**

Q#	1. LOK (F/H)	2. LOD (1-5)	3. Psychometric Flaws					4. Job Content Flaws				5. Other		6. U/E/S	7. Explanation
			Stem Focus	Cues	T/F			Job-Link	Minutia	#/ units	Back-ward	Q= K/A	SRO Only		

Q#	1. LOK (F/H)	2. LOD (1-5)	3. Psychometric Flaws					4. Job Content Flaws				5. Other		6. U/E/S	7. Explanation
			Stem Focus	Cues	T/F	Cred. Dist.	Partial	Job-Link	Minutia	#/ units	Back-ward	Q= K/A	SRO Only		
16	H	3	X											**S?**	Based on the information provided, need to make sure that Natural circulation is not occurring. NATURAL CIRC WAS NOT OCCURING.
17	F	2	X											**E**	There appears to be unnecessary information in the stem. Clarify what you are asking. Are you asking Train A and Train B of…….? Reword stem. REMOVED/REWORDED STEM AS SUGGESTED. (OK)
18	F	2												**S**	Only concern here is that this question addresses bases. Is this an RO question?
19	F	1												**S**	LOD.
20	H	2												**S**	
21	F?	1	X			X								**U**	This is a memory level question LOD. Stem can be improved to make sure that question matches all aspects of the K/A.Distractor A & C are not plausible. Please identify an event where following the loss of a normal power source where there is a backup power supply that can be used forever. LICENSEE PROVIDED INFORMATION WHICH INDICATED THAT THERE ARE SYSTEM WHICH COULD LOSE POWER AN BE ON BACKUP POWER FOR AN INDEFINITE PERIOD OF TIME. THIS MAKES DISTRACTORS A & B PLAUSIBLE. SHOULD NOT HAVE BEEN A U.
22														**S**	
23	H	2	X											**E**	It appears that the stem ask for only the system response. The distractors provide answers for a two part stem. AGREED WITH COMMENT. MODIFIED QUESTION. (OK)
24	H	2												**S**	
25														**S**	

Q#	1. LOK (F/H)	2. LOD (1-5)	3. Psychometric Flaws					4. Job Content Flaws				5. Other		6.	7.
			Stem Focus	Cues	T/F	Cred. Dist.	Partial	Job-Link	Minutia	#/ units	Back-ward	Q= K/A	SRO Only	U/E/S	Explanation
26	H	3										X		**U**	K/A doesn't match. Question should address loss of RHR. LICENSEE EXPLAINED HOW A LOSS OF SERVICE WATER WOULD EFFECT THE ABILITY TO COOL USING RHR. LESS COOLING WATER TO THE RHR HEAT EXCHANGERS. SHOULD NOT HAVE BEEN A U.
27	H	2				X								**S/?**	Can the operators be dispatched to locally open the valves? If this can be done, what is the outcome? WILL PROVIDE ADMIN PROCEDURE FOR VALVE OPERATION. CHANGED WORDING IN STEM.
28	F	2				X								**E/S**	Please provide additional information as to why you consider A plausible. What can does chilled water be used to cool? CHILLED WATER IS USED THROUGH THE PLANT TO PROVIDE A SOURCE OF COOLING. (OK).
29	H	3												**S**	
30	F	2												**S**	
31	F	2												**S**	.
32	H	2										X		**U**	The K/A ask for ability to monitor power-available indicators in cabinets or equipment draws. This concept is not included in the question. UNDERSTANDING THAT A BLOWN FUSE ON THE CABINET WOULD RESULT IN A LOSS OF CONTROL POWER TO THE DETECTORS. THIS WOULD CAUSE A REACTOR TRIP AND DUE TO ONE OUT OF TWO LOGIC ASSOCIATED WITH THE NI SYSTEM.
33	H	3										X		**U**	Please re-write question such that is evaluate to operator ability to operate or monitor from the control room radiations levels. LICENSEE DISCUSSED REASON WHY AND WE AGREE THAT THE K/A MATCHES AND IT IS AN RO LEVEL QUESTION. CARF TRIPS WILL RESULT IN SELECTED MONITORS TO BE INOPERABLE , THEREFORE THE ABILITY TO DETECT RADIATION LEVELS ARE REMOVED. QUESTION IS OK.
34	F	2												**S**	
35	H	3												**S/?**	Is this a RO level question? LICENSEE SAID THAT THEY CONSIDER IT APPROPRIATE FOR THEIR RO. ADDED THE WORD CREW TO THE STEM REMOVED APPROPRIATE (OK).
36														**U**	K/A doesn't match. After looking at the question and your comments I suggest replacing the K/A. WILL REPLACE K/A AND PROVIDE NEW QUESTION. AGREED WITH OUR COMMENTS.

Q#	1. LOK (F/H)	2. LOD (1-5)	3. Psychometric Flaws					4. Job Content Flaws				5. Other		6. U/E/S	7. Explanation
			Stem Focus	Cues	T/F			Job-Link	Minutia	#/ units	Back-ward	Q= K/A	SRO Only		

Q#	1. LOK (F/H)	2. LOD (1-5)	3. Psychometric Flaws					4. Job Content Flaws				5. Other		6. U/E/S	7. Explanation
			Stem Focus	Cues	T/F	Cred. Dist.	Partial	Job-Link	Minutia	#/ units	Back-ward	Q= K/A	SRO Only		
37	H	3				X								**E/?**	The K/A discusses operating/monitoring from the control room. Can throttling not be done from the control room? Your procedure appears to indicate that it can be done form there. If it can then there are two correct answers. Not sure why someone would pick 150. Provide additions information to justify. DETERMINED QUESTION WAS OK BASED ON THE FACT THAT THE 3 INCH BYPASS ARE USED TO CONTROL HEATUP RATE.
38			X			X						X		**U**	Not a direct match to K/A. K/A addresses steam line rupture. Question doesn't. Two possible answers C & D. excessive RCS cooldown could affect Nil Ductility. AGREED WITH OUR COMMENTS. WILL WRITE A NEW QUESTION – USING VOTGLE AND ANO EXAM QUESTION AS EXAMPLES. – REPLACE QUESTION. REVIEWED THE REPLACEMENT ON 5/20. AGREED IT WAS ACCEPTABLE.
39												X		**U**	K/A not matched. Question doesn't address main turbine system. AGREED WITH THE LICENSEE THAT THE QUESTION DID MATCH THE K/A. PLANT PRAMATERS PROVIDED WAS AN INDICATION OF A MT/G SYSTEM PROBLEM. MODIFIED DISTRACTORS.
40			X			X								**E**	The question states that SG pressure is 190 psig. The Caution in 1 ECA-0.0 states that SG pressure should be maintained greater than 190 psig. There may not be a correct answer since pressure is not greater than 190 psig. This is on the line such that it could be correct or incorrect. Distracter B is not plausible because it is a procedural requirement as opposed to a physical consequence. REPLACED 190 PSIG WITH 180 PSIG. REWORDED DISTRACTOR "B" (OK).
41														**U/E**	Explain the correlation between the steamline radiation monitor identified in the question and the condenser air removal system (which is required to be addressed by the K/A). As is I do not see the K/A match.

Q#	1. LOK (F/H)	2. LOD (1-5)	3. Psychometric Flaws					4. Job Content Flaws				5. Other		6.	7.
			Stem Focus	Cues	T/F	Cred. Dist.	Partial	Job-Link	Minutia	#/ units	Back-ward	Q= K/A	SRO Only	U/E/S	Explanation
															ACCEPTED QUESTION AS IS.
42	H	3										X		**U/S**	Explain why you consider this a loss of offsite power. PROVIDED DRAWING AND INFORMATION WHICH EXPLAINED WHY IT WAS A LOSS OF OFFSITE POWER. (OK)
43	H													**S**	
44												X		**U**	Question fails to address power level restrictions for MFW system as required by K/A. LICENSEE AGREED WITH COMMENT. WROTE NEW QUESTION.
45	H	3												**S**	
46	H	3												**S?**	Need to make sure that B & C are not correct. ONLY ONE CORRECT ANSWER. WILL MAKE DISTRACTOR "B" LOOK LIKE "A"
47	H	2												**S**	
48	H	2												**S**	
49	H	2												**S**	
50	H	2												**S**	
51	F	2				X								**E**	Dist D is not plausible. Can't think of any situations where an operator can selectively arrange tripping of loads. ACCEPTED COMMENT. MADE NO CHANGE.
52	F	2										X		U	K/A doesn't match. K/A ask for knowledge of system purpose or function. REWROTE STEM. IT NOW APPEARS TO MATCH THE K/A. DID NOTHING TO THE DISTRACTORS. SHOULD NOT HAVE BEEN A U.
53														S	
54	H		X											E	Change the stem to address /ask what will occur as a result of the alarm (expected valve position). Then ask what must be done to re-establish the release. QUESTION WAS DETERMINED TO BE OK. RICK SUGGESTED..... BUT WORD VERIFY WAS FROM PROCEDURE
55	H	3												S	
56	F	2												S	
57	F	2	X			X								E	Consider re-wording the stem such that it ask which item alone will discriminate or provide indication of..... need to verify simulator. Which answer is correct? Make sure there are not two correct answers...ADDED

ES-401, Rev. 9 **Written Examination Review Worksheet** **Form ES-401-9**

Q#	1. LOK (F/H)	2. LOD (1-5)	3. Psychometric Flaws					4. Job Content Flaws				5. Other		6. U/E/S	7. Explanation
			Stem Focus	Cues	T/F			Job-Link	Minutia	#/ units	Back-ward	Q= K/A	SRO Only		
															WORDS TO THE STEM (OK)...
58	F	2												S	
59	H											X		U/E?	Question doesn't appear to match. K/A. Need to discuss normal pump operation and pump operation under spray condition. Could not locate information to evaluate. ACCEPTED QUESTIONS AS IS.
60												X		U	Question doesn't appear to match. K/A. DECIDED TO LET THEM USE THE QUESTION AS IS. NOT A U.
61	F	2												S	
62	H					X								**U**	Both A & B appear to be correct. DETERMINED THAT THERE WERE NOT TWO CORRECT ANSWERS – VERIVY CONDENSER PRESSURE WAS AN IMMEDIATE ACTION IN AP-14. QUESTION SHOULD NOT HAVE BEEN A U.
63	F	1	X		X									**E**	LOD. Unnecessary information in the stem. This is a list of true false statements. REWORDED DISTRACTOR "A"
64	F	3	X											**E/S**	Re word stem. Consider : Which one of the following describe the correct sequence that must be performed when a fast load reduction is required in accordance with.... REWORDED STEM (OK).
65	H	2			X									U	Distractors A and D are not plausible. Why would actions need to be taken if a component is operable or why would actions not have to be taken if a component inoperable? OK WITH REASION PROVIDED BY THE LICENSEE. SHOULD NOT HAVE BEEN A U.
66														S	
67	H	1	X											S	LOD – meets K/A

Q#	1. LOK (F/H)	2. LOD (1-5)	3. Psychometric Flaws					4. Job Content Flaws				5. Other		6.	7.
			Stem Focus	Cues	T/F	Cred. Dist.	Partial	Job-Link	Minutia	#/ units	Back-ward	Q= K/A	SRO Only	U/E/S	Explanation
68		1												S	LOD – meets K/A
69														S	
70	F	2				X								E	Change identified leakage to an even number (15) and power lost to 20 minutes. CHANGED DISTRACTOR "D" TO 30 MINUTES AND INFORMATION TO STEM
71	H	3												S	? Would indications be different if both trains failed to reset? PROVIDED INFORMATION AS REQUESTED (OK)
72														**S**	
73	H	3				X								E	There may be two correct answers based on the fact that you have completed Step 9 of 1-ES-1.3. There is another question similar to this one concerning transition requirement between EOP and FR. DECIDED QUESTION (OK)
74	H	3				X								U	Distractors A & B are not plausible. Information provided in the stem states that ORANGE Path conditions exist. Therefore, the crew knows that at some point and time the condition which caused the ORANGE Path must be addressed and a transition to FR-Z.2 would be entered. LICENSEE PROVIDED INDICATIONS WHY THEY CONSIDERED DISTRACTOR A WAS PLAUSIBLE. AGREED WITH REASONS – DID NOT REVISE DISTRACTORS. QUESTIONS SHOULD NOT HAVE BEEN A U.
75	H	2				X								U/E	Distractors B & D are not plausible. Why would one expect the need to evacuate the Fuel Building? Could not locate any information that would support your answer. REVISED (OK)

Q#	1. LOK (F/H)	2. LOD (1-5)	3. Psychometric Flaws					4. Job Content Flaws				5. Other		6. U/E/S	7. Explanation
			Stem Focus	Cues	T/F			Job-Link	Minutia	#/ units	Back-ward	Q= K/A	SRO Only		

Q#	1. LOK (F/H)	2. LOD (1-5)	3. Psychometric Flaws					4. Job Content Flaws				5. Other		6. U/E/S	7. Explanation
			Stem Focus	Cues	T/F			Job-Link	Minutia	#/ units	Back-ward	Q= K/A	SRO Only		

NORTH ANNA 2010 SRO

Instructions

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

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

Q#	1. LOK (F/H)	2. LOD (1-5)	3. Psychometric Flaws					4. Job Content Flaws				5. Other		6. U/E/S	7. Explanation
			Stem Focus	Cues	T/F	Cred. Dist.	Partial	Job-Link	Minutia	#/ units	Back-ward	Q= K/A	SRO Only		
76(1)	H	2	X			X							X	**U**	It appears that the question can be answered with RO only knowledge. Rules for procedure usage may be used to answer first part of the question - RO knowledge. Can immediately eliminate distractors A & B.

Q#	1. LOK (F/H)	2. LOD (1-5)	3. Psychometric Flaws					4. Job Content Flaws				5. Other		6.	7.
			Stem Focus	Cues	T/F	Cred. Dist.	Partial	Job-Link	Minutia	#/ units	Back-ward	Q= K/A	SRO Only	U/E/S	Explanation
															When an ATWAS is identified, the first action taken is to attempt to trip the reactor as directed by E-0. Also would one not expect the RO to know what system lineup would be best to lower reactivity. The stem ask which one identifies the procedure flow path to mitigate the event. Distractors A and B do not identify a procedure flowpath. Consider rewriting the stem and modifying distracters A & B. Need to take a look a possible two correct answers. Explain actions in step 5 of the procedure. How would maximum boration through the blender effect reactivity? ACCEPTED LICENSEE'S COMMENTS. QUESTION SHOULD NOT HAVE BEEN A U (OK)
77 (2)	F?	3				X								**U**	RO know that C & D would not put you in a TS. Therefore, why is C & D considered/ LICENSEE PROVIDED SUPPORTING INFORMATION TO JUSTIFY USE OF QUESTION AS IS (OK)
78 (3)	H	3												S	Stem could be reworded. REWORDED STEM AS SUGGESTED.
79 (4)	H	3											X	U/?	Explain why you consider this an SRO only question. Is it not common operator knowledge to know which RCP should be tripped when a particular PRZR spray valve and block valve can't be closed? DETERMINED QUESTION WAS OK. NOT A U.
80 (5)	H	3	X			X								U/E	As the stem is written there appears to be two correct answers. Allowing AFD to drift in either direction would place the AFD closer to an unacceptable operating region. Can this question be answered by only knowing the meaning of AFD? MADE CHANGES AS WE SUGGESTED. (OK)
81 (6)	H	2												S	
82 (7)	H	3	X			X								E	None of the distractors contain the actual TS required time (1 in 8 hour information) . Also need to make sure that the answer provided is totally correct.
83 (8)	H	2												S	
84 (9)	H	3											X		Explain why this is considered an SRO level question. Expected actions are identified in the normal ops procedure. Who makes to report? CONCLUDED THAT IT WAS SRO ONLY BASED ON WHO IS REQUIRED TO MAKE REPORT FOLLOWING ENTRY INTO TS/SRMs. (OK)

ES-401, Rev. 9 **Written Examination Review Worksheet** **Form ES-401-9**

Q#	1. LOK (F/H)	2. LOD (1-5)	3. Psychometric Flaws					4. Job Content Flaws				5. Other		6. U/E/S	7. Explanation
			Stem Focus	Cues	T/F			Job-Link	Minutia	#/ units	Back-ward	Q= K/A	SRO Only		
85 (10)	H	2											X	**U**	It appears that this question can be answered with RO only knowledge. What is the purpose of the pressurizer high level trip function? Is this not something the RO should know- system purpose? ACCEPTABLE BASED ON COMMENTS AND OUR GUDIANCE.
86 (11)	H	2											X	**U**	This question can be answered with RO knowledge only. System/component knowledge - what makes a PORV operable/inoperable. The applicant doesn't need to know anything about LCO 3.7.4. _BASED ON COMMENTS PROVIDED, QUESTION IS ACCEPTABLE AS SRO PER OUR GUIDANCE.
87 (12)	H	2												**S**	
88 (13)	H	2												**S**	
89 (14)	F	1												**E/S**	LOD. First part of question can be answered with RO only knowledge. Is there a 30 minute associated with DG operation. NO CHANGES WERE MADE TO THE QUESTION BASED ON LICENSEE'S COMMENT. (OK)
90 (15)	F	2											X	**U**/?	It appears that this question can be answered by RO only knowledge – trip set point and immediate operator actions that must be performed once 1-ES-0.1 has been entered. ACCEPTED LICENSEE'S COMMENTS. DETERMINED THAT QUESTATION WAS SAT.
91 (16)	F	3												S	
92 (17)	H	2	X											E	Consider rewording conditions in the stem. Containment pressure 21 psia and slowly increasing…….. Fans are not operated by the procedure….. MADE CHANGES AS SUGGESTED. (OK)

Q#	1. LOK (F/H)	2. LOD (1-5)	3. Psychometric Flaws					4. Job Content Flaws				5. Other		6. U/E/S	7. Explanation
			Stem Focus	Cues	T/F	Cred. Dist.	Partial	Job-Link	Minutia	#/ units	Back-ward	Q= K/A	SRO Only		
85 (10)	H	2											X	**U**	It appears that this question can be answered with RO only knowledge. What is the purpose of the pressurizer high level trip function? Is this not something the RO should know- system purpose? ACCEPTABLE BASED ON COMMENTS AND OUR GUDIANCE.
86 (11)	H	2											X	**U**	This question can be answered with RO knowledge only. System/component knowledge - what makes a PORV operable/inoperable. The applicant doesn't need to know anything about LCO 3.7.4. _BASED ON COMMENTS PROVIDED, QUESTION IS ACCEPTABLE AS SRO PER OUR GUIDANCE.
87 (12)	H	2												**S**	
88 (13)	H	2												**S**	
89 (14)	F	1												**E/S**	LOD. First part of question can be answered with RO only knowledge. Is there a 30 minute associated with DG operation. NO CHANGES WERE MADE TO THE QUESTION BASED ON LICENSEE'S COMMENT. (OK)
90 (15)	F	2											X	**U**/?	It appears that this question can be answered by RO only knowledge – trip set point and immediate operator actions that must be performed once 1-ES-0.1 has been entered. ACCEPTED LICENSEE'S COMMENTS. DETERMINED THAT QUESTATION WAS SAT.
91 (16)	F	3												S	
92 (17)	H	2	X											E	Consider rewording conditions in the stem. Containment pressure 21 psia and slowly increasing…….. Fans are not operated by the procedure….. MADE CHANGES AS SUGGESTED. (OK)

Q#	1. LOK (F/H)	2. LOD (1-5)	3. Psychometric Flaws					4. Job Content Flaws				5. Other		6.	7.
			Stem Focus	Cues	T/F	Cred. Dist.	Partial	Job-Link	Minutia	#/ units	Back-ward	Q= K/A	SRO Only	U/E/S	Explanation
93 (18)	H?	1											X	**U**	LOD. RO level of knowledge. The question asks how the RO will carry out this action. What is unique to SRO? PROVIDED ANOTHER K/A. NEW QUESTION. PROVIDED NEW QUESTION .... Reviewed question. Had a concern about one of the distractors. Talked to Steve Allen about changing the distractor. Will get back with me……..
94 (19)	L	2												S	
95 (20)	H?	3												S	
96 (21)	H	3				X							X	**U**	It appears that the question can be answered with RO only knowledge. What equipment is required to give you two trains of MCR/ESGR EVS. Are the ROs not aware that Fan 1-HV-F-141 is not used to determine operability due to location of fan? Therefore, when determining operability, it is not a part of the equation. Also, the second part of distracters B & D do not appear to be plausible. ACCEPTED QUESTION AS IS BASED ON INFORMATION PROVIDED BY THE LICENSEE. SHOULD NOT HAVE BEEN A U. (OK)
97 (22)	H	3				X								**U**	Distractors B & D are not plausible. Do not know of any 0.1 rem limits. Consider using the information contained in the bases ---- 0.5 rem in 2 hours……..
98 (23)	H	3				X							X	U/E	Explain what makes this a SRO only question. Would like to review fire brigade training lesson. Distractor D is not plausible. When would you replace a licensed operator with a non licensed operator? BASED ON INFORMATION PROVIDED ASSOCIATED WITH OUR CONCERE, DETERMINED THAT THE QUESTION IS SRO. SHOULD NOT HAVE BEEN A U (OK)
99 (24)	H	3												S	
100 (25)	?	2	X			X								U/E	This is a memory question. None of the information in the stem is required to answer the question – explain the Caution and its bases. Distractors B & D do not appear to be plausible. Please explain why they are. Are there any references in FR-H-1 which refer to creep rupture failure. PROVIDED INFORMATION SHOWING THAT DISTRACTORS WERE PLAUSIBLE. ADDED INFORMATION TO THE STEM (OK)

Q#	1. LOK (F/H)	2. LOD (1-5)	3. Psychometric Flaws					4. Job Content Flaws				5. Other		6. U/E/S	7. Explanation
			Stem Focus	Cues	T/F			Job-Link	Minutia	#/ units	Back-ward	Q= K/A	SRO Only		

Facility: North Anna | Date of Exam: 06/16/10 | Exam Level: RO ☑ SRO ☑

Item Description	Initials a	b	c	
1. Clean answer sheets copied before grading	SC	S	LL	MJR
2. Answer key changes and question deletions justified and documented	SC	S	LL	MJR
3. Applicants' scores checked for addition errors (reviewers spot check > 25% of examinations)	SC	S	LL	MJR
4. Grading for all borderline cases (80 ±2% overall and 70 or 80, as applicable, ±4% on the SRO-only) reviewed in detail	SC	S	N/A	N/A
5. All other failing examinations checked to ensure that grades are justified	SC	S	N/A	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	SC	S	LL	MJR

	Printed Name/Signature	Date
a. Grader	Steven R. Crawford / SRCrawford	6-23-2010
b. Facility Reviewer(*)	MARK J. RICHES / Mark J. Riches Steven R. Allen / SRA	06/30/10 6-23-2010
c. NRC Chief Examiner (*)	Edwin Lea, Jr / Edwin Lea, Jr.	7/2/2010
d. NRC Supervisor (*)	MALCOLM T. WIDMANN /	7/12/10

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