Draft Submittal
(Pink Paper)

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

& Written Exam Sample Plan

NORTH ANNA JUNE 2008 EXAM
05000338/2008301 & 05000339/2008301

DRAFT

Facility: NORTH ANNA Date of Exam: 6/24/08 Exam Level: RO ☑ SRO ☐

	Item Description	Initial a	Initial b*	Initial c#
1.	Questions and answers are technically accurate and applicable to the facility.	S	WS	BR MB *
2.	a. NRC K/As are referenced for all questions. b. Facility learning objectives are referenced as available.	S	WS	BR MB *
3.	SRO questions are appropriate in accordance with Section D.2.d of ES-401	N/A	WS	BR MB
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).	S	WS	BR MB
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)	S	WS	BR MB
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: 15 / N/A; Modified: 13 / N/A; New: 47 / N/A	S	WS	MB
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 / N/A; C/A: 40 / N/A	S	WS	MB *
8.	References/handouts provided do not give away answers or aid in the elimination of distractors.	S	WS	MB *
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.	S	WS	MB *
10.	Question psychometric quality and format meet the guidelines in ES Appendix B.	S	WS	MB *
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.	S	WS	MB

	Printed Name / Signature	Date
a. Author	SR Allen / SRA	4-17-08
b. Facility Reviewer (*)	Waltshura Waltshura	4-17-08
c. NRC Chief Examiner (#)	MARK A BATES / Mark A. Bates BRUNO CABALLERO BCaballero	4/30/08
d. NRC Regional Supervisor	MALCOLM T. WIDMANN / [signature]	04/30/08

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

* Exceptions noted on 401-9.

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

Facility: North Anna Date of Exam: 6/24/08 Exam Level: RO ☐ SRO X

	Item Description	Initial a	Initial b*	Initial c#
1.	Questions and answers are technically accurate and applicable to the facility.	S	WS	TBR MB *
2.	a. NRC K/As are referenced for all questions. b. Facility learning objectives are referenced as available.	S	WS	TBR MB *
3.	SRO questions are appropriate in accordance with Section D.2.d of ES-401	S	WS	TBR MB
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).			TBR MB
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)	S	WS	TBR MB
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: N/A / 0; Modified: N/A / 2; New: N/A / 23	S	WS	TBR MB
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: N/A / 6; C/A: N/A / 19	S	WS	TBR MB *
8.	References/handouts provided do not give away answers or aid in the elimination of distractors.	S	WS	TBR MB *
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.	S	WS	TBR MB *
10.	Question psychometric quality and format meet the guidelines in ES Appendix B.	S	WS	TBR MB *
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.	S	WS	TBR MB

	Printed Name / Signature	Date
a. Author	S R Allen / [signature]	4/1/08
b. Facility Reviewer (*)	Ward Shuey / Waltshura	4/11/08
c. NRC Chief Examiner (#)	MARK R. BFEES / [signature] BRUNO CABALLERO / B. Caballero	4/30/08
d. NRC Regional Supervisor	MALCOLM T. MIDDLEBROOKS / [signature]	04/30/08

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

* Exceptions noted on 401-9.

Rec'd 4/14/08

U.S. Nuclear Regulatory Commission

Site-Specific SRO Written Examination

Applicant Information

Name:	
Date: 6/2008	Facility/Unit: North Anna
Region: I ☐ II ☒ III ☐ IV ☐	Reactor Type: W ☒ CE ☐ BW ☐ GE ☐
Start Time:	Finish Time:

Instructions

Use the answer sheets provided to document your answers. Staple this cover sheet on top of the answer sheets. To pass the examination you must achieve a final grade of at least 80.00 percent overall, with 70.00 percent or better on the SRO-only items if given in conjunction with the RO exam; SRO-only exams given alone require a final grade of 80.00 percent to pass. You have 8 hours to complete the combined examination, and 3 hours if you are only taking the SRO portion.

Applicant Certification

All work done on this examination is my own. I have neither given nor received aid.

_____
Applicant's Signature

Results

RO/SRO-Only/Total Examination Values	N/A / 25 / ____	Points
Applicant's Scores	____ / ____ / ____	Points
Applicant's Grade	____ / ____ / ____	Percent

Rec'd 4/14/08

U.S. Nuclear Regulatory Commission

Site-Specific RO Written Examination

Applicant Information	
Name:	
Date:	Facility/Unit: NAPS / UNIT 1 & 2
Region: I ☐ II ☒ III ☐ IV ☐	Reactor Type: W ☒ CE ☐ BW ☐ GE ☐
Start Time:	Finish Time:

Instructions

Use the answer sheets provided to document your answers. Staple this cover sheet on top of the answer sheets. To pass the examination, you must achieve a final grade of at least 80.00 percent. Examination papers will be collected 6 hours after the examination begins.

Applicant Certification

All work done on this examination is my own. I have neither given nor received aid.

_____
Applicant's Signature

Results	
Examination Value	75 Points
Applicant's Score	_____ Points
Applicant's Grade	_____ Percent

Rec'd 4/18/08

Facility: North Anna Date of Exam: June 2008

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	2	3	4	N/A			3	3	N/A		3	18	3	3	6
	2	0	2	2				2	2			1	9	2	2	4
	Tier Totals	2	5	6				5	5			4	27	5	5	10
2. Plant Systems	1	3	3	3	4	2	1	3	1	1	4	3	28	2	3	5
	2	2	0	1	2	0	1	0	1	1	1	1	10	2	1	3
	Tier Totals	5	3	4	6	2	2	3	2	2	5	4	38	4	4	8
3. Generic Knowledge and Abilities Categories		1			2			3			4		10	1	2	3	4	7
		3			3			2			2			2	2	1	2	

Note:

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/evolutions 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 K/As.
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.

ES-401 PWR Examination Outline Form ES-401-2

Emergency and Abnormal Plant Evolutions - Tier 1/Group 1 (RO / SRO)

E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	G	K/A Topic(s)	IR	#
000007 (BW/E02&E10; CE/E02) Reactor Trip - Stabilization - Recovery / 1									
000008 Pressurizer Vapor Space Accident / 3					R	S	S008AG2.4.8(43.5) R008AA2.24	S4.5 R2.6	
000009 Small Break LOCA / 3						R	R009AG2.4.4	R4.5	
000011 Large Break LOCA / 3		R					R011EK2.02	R2.6	
000015/17 RCP Malfunctions / 4		R					R015/17AK2.07	R2.9	
000022 Loss of Rx Coolant Makeup / 2			R				R022AK3.03	R3.1	
000025 Loss of RHR System / 4				R	S		S025AA2.03(43.5) R025AA1.12	S3.8 R3.6	
000026 Loss of Component Cooling Water / 8					R	S	S026AG2.1.7(43.5) R026AA2.01	S4.7 R2.9	
000027 Pressurizer Pressure Control System Malfunction / 3						R	R027AG2.2.42	R3.9	
000029 ATWS / 1	R						R029EK1.05	R2.8	
000038 Steam Gen. Tube Rupture / 3					S		S038EA2.15(43.5)	S4.4	
000040 (BW/E05; CE/E05; W/E12) Steam Line Rupture - Excessive Heat Transfer / 4		R					R W/E12EK2.1	R3.4	
000054 (CE/E06) Loss of Main Feedwater / 4			R				R054AK3.01	R4.1	
000055 Station Blackout / 6				R			R055EA1.06	R4.1	
000056 Loss of Off-site Power / 6					R	S	S056AG2.2.36(43.2) R056AA2.72	S4.2 R4.1	
000057 Loss of Vital AC Inst. Bus / 6						R	R057AG2.4.45	R4.1	
000058 Loss of DC Power / 6	R						R058AK1.01	R2.8	
000062 Loss of Nuclear Svc Water / 4					S		S062AA2.05(43.5)	S2.5	
000065 Loss of Instrument Air / 8			R				R065AK3.03	R2.9	
W/E04 LOCA Outside Containment / 3									
W/E11 Loss of Emergency Coolant Recirc. / 4									
BW/E04; W/E05 Inadequate Heat Transfer - Loss of Secondary Heat Sink / 4			R				R W/E05EK3.4	R3.7	
000077 Generator Voltage and Electric Grid Disturbances / 6				R			R077AA1.01	R3.6	
K/A Category Totals: R	2	3	4	3	3	3	Group Point Total:		18/6
S					3	3			

ES-401 PWR Examination Outline Form ES-401-2

Emergency and Abnormal Plant Evolutions - Tier 1/Group 2 (RO / SRO)

	E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	G	K/A Topic(s)	IR	#
1	000001 Continuous Rod Withdrawal / 1									
2	000003 Dropped Control Rod / 1									
3	000005 Inoperable/Stuck Control Rod / 1					S		S 005 AA 2.02 (43.5)	S 3.0	
4	000024 Emergency Boration / 1									
5	000028 Pressurizer Level Malfunction / 2									
6	000032 Loss of Source Range NI / 7			R				R 032 AK3.01	R3.2	
7	000033 Loss of Intermediate Range NI / 7									
8	000036 (BW/A08) Fuel Handling Accident / 8				R			R 036 AA1.01	R3.3	
9	000037 Steam Generator Tube Leak / 3									
10	000051 Loss of Condenser Vacuum / 4						S	S051AG2.2.44 (43.5)	S4.4	
11	000059 Accidental Liquid RadWaste Rel. / 9									
12	000060 Accidental Gaseous Radwaste Rel. / 9					R		R060AA205	R3.7	
13	000061 ARM System Alarms / 7					S	R	R061AG2.4.3 S061AA2.04(43.5)	R 3.7 S 3.5	
14	000067 Plant Fire On-site / 8									
15	000068 (BW/A06) Control Room Evac. / 8									
16	000069 (W/E14) Loss of CTMT Integrity / 5									
17	000074 (W/E06&E07) Inad. Core Cooling / 4									
18	000076 High Reactor Coolant Activity / 9		R					R 076 AK 2.01	R2.6	
19	W/EO1 & E02 Rediagnosis & SI Termination / 3									
20	W/E13 Steam Generator Over-pressure / 4						S	SW/E13AG2.4.20(43.5)	S 4.3	
21	W/E15 Containment Flooding / 5		R					R W/E15 EK2.1	R2.8	
22	W/E16 High Containment Radiation / 9			R				R W/E16 EK3.1	R2.9	
23	BW/A01 Plant Runback / 1									
24	BW/A02&A03 Loss of NNI-X/Y / 7									
25	BW/A04 Turbine Trip / 4									
26	BW/A05 Emergency Diesel Actuation / 6									
27	BW/A07 Flooding / 8									
28	BW/E03 Inadequate Subcooling Margin / 4									
29	BW/E08; W/E03 LOCA Cooldown - Depress. / 4				R			R W/E03 EA1.2	R3.7	
30	BW/E09; CE/A13; W/E09&E10 Natural Circ. / 4					R		R W/E09 EA2.1	R3.1	
31	BW/E13&E14 EOP Rules and Enclosures									
32	CE/A11; W/E08 RCS Overcooling - PTS / 4									
33	CE/A16 Excess RCS Leakage / 2									
34	CE/E09 Functional Recovery									
	K/A Category Point Totals: R	0	2	2	2	2	1	Group Point Total:		9/4
	S					2	2			

ES-401 PWR Examination Outline Form ES-401-2
Plant Systems - Tier 2/Group 1 (RO / SRO)

System # / Name	1 K1	2 K2	3 K3	4 K4	5 K5	6 K6	7 A1	8 A2	9 A3	10 A4	11 G	K/A Topic(s)	IR	#
003 Reactor Coolant Pump										R		R 003 A4.07	R 2.6	
004 Chemical and Volume Control											R	R 004 G2.2.3	R 3.8	
005 Residual Heat Removal	R										S	S 005 G2.2.40 (43.2/43.5) R 005 K1.06	S 4.7 R 3.5	
006 Emergency Core Cooling		R						S				S 006 A2.03 (#) R 006 K2.02	S 3.7 R 2.5	
007 Pressurizer Relief/Quench Tank			R							R	S	S 007 G2.2.38 (43.1) R 007 K3.01 R 007 A4.10	S 4.5 R 3.3 R 3.6	
008 Component Cooling Water				R								R 008 K4.01	R 3.1	
010 Pressurizer Pressure Control					R							R 010 K5.01	R 3.5	
012 Reactor Protection						R		S				S 012 A2.04 (43.5) R 012 K6.08	S 3.2 R 3.6	
013 Engineered Safety Features Actuation				R			R					R 013 K4.15 R 013 A1.07	R 2.6 R 3.6	
022 Containment Cooling	R							R				R 022 K1.04 R 022 A2.06	R 2.9 R 2.8	
025 Ice Condenser														
026 Containment Spray		R								R		R 026 K2.01 R 026 A4.01	R 3.4 R 4.5	
039 Main and Reheat Steam											R	R 039 G2.1.32	R 3.8	
059 Main Feedwater	R										S	S 059 G2.1.23 (43.5) R 059 K1.02	S 4.4 R 3.4	
061 Auxiliary/Emergency Feedwater		R										R 061 K2.01	R 3.2	
062 AC Electrical Distribution			R								R	R 062 G2.1.27 R 062 K3.03	R 3.9 R 3.7	
063 DC Electrical Distribution				R								R 063 K4.01	R 2.7	
064 Emergency Diesel Generator			R									R 064 K3.02	R 4.2	
073 Process Radiation Monitoring					R		R					R 073 K5.02 R 073 A1.01	R 2.5 R 3.2	
076 Service Water							R					R 076 A1.02	R 2.6	
078 Instrument Air				R						R		R 078 K4.03 R 078 A4.01	R 3.1 R 3.1	
103 Containment									R			R 103 A3.01	R 3.9	
K/A Category Point Totals: R	3	3	3	4	2	1	3	1	1	4	3	Group Point Total:		28/5
S								2			3			

No 10CFR43 reference, but it may be possible to write an SRO level Q.

ES-401 PWR Examination Outline Form ES-401-2
Plant Systems - Tier 2/Group 2 (RO / SRO)

	System # / Name	1 K 1	2 K 2	3 K 3	4 K 4	5 K 5	6 K 6	7 A 1	8 A 2	9 A 3	10 A 4	11 G	K/A Topic(s)	IR	#
1	001 Control Rod Drive											R	R 001 G2.4.31	R 4.2	
2	002 Reactor Coolant														
3	011 Pressurizer Level Control														
4	014 Rod Position Indication														
5	015 Nuclear Instrumentation														
6	016 Non-nuclear Instrumentation	R											R 016 K1.02	R 3.4	
7	017 In-core Temperature Monitor								S		R		S 017 A2.02 (43.5) R 017 A4.02	S 4.1 R 3.8	
8	027 Containment Iodine Removal											S	S 027 G2.2.25 (43.2)	S 4.2	
9	028 Hydrogen Recombiner and Purge Control			R									R 028 K3.01	R 3.3	
10	029 Containment Purge				R								R 029 K4.03	R 3.2	
11	033 Spent Fuel Pool Cooling				R								R 033 K4.05	R 3.1	
	034 Fuel Handling Equipment								S				S 034 A2.03 (43.5)	S 2.0	
	035 Steam Generator														
14	041 Steam Dump/Turbine Bypass Control						R						R 041 K6.03	R 2.7	
15	045 Main Turbine Generator														
16	055 Condenser Air Removal									R			R 055 A3.03	R 2.5	
17	056 Condensate														
18	068 Liquid Radwaste														
19	071 Waste Gas Disposal								R				R 071 A2.02	R 3.3	
20	072 Area Radiation Monitoring														
21	075 Circulating Water														
22	079 Station Air	R											R 079 K1.01	R 3.0	
23	086 Fire Protection														
	K/A Category Point Totals: R	2	0	1	2	0	1	0	1	1	1	1	Group Point Total:		10/3
	S								2			1			

Facility: Date of Exam:

Category	K/A #	Topic	RO IR	RO #	SRO-Only IR	SRO-Only #
1. Conduct of Operations	2.1.	R G2.1.20	4.6			
	2.1.	R G2.1.41	2.8			
	2.1.	R G2.1.37	4.3			
	2.1.	S G2.1.4 (43.2)			3.8	
	2.1.	S G2.1.6 (43.5)			4.8	
	2.1.					
	Subtotal					
2. Equipment Control	2.2.	R G2.2.1	4.5			
	2.2.	R G2.2.7	2.9			
	2.2.	R G2.2.39	3.9			
	2.2.	S G2.2.35 (43.2)			4.5	
	2.2.	S G2.2.11 (43.3)			3.3	
	2.2.					
	Subtotal					
3. Radiation Control	2.3.	R G2.3.4	3.2			
	2.3.	R G2.3.15	2.9			
	2.3.	S G2.3.6 (43.4)			3.8	
	2.3.					
	2.3.					
	2.3.					
	Subtotal					
4. Emergency Procedures / Plan	2.4.	R G2.4.32	3.6			
	2.4.	R G2.4.9	3.8			
	2.4.	S G2.4.27 (43.5)			3.9	
	2.4.	S G2.4.6 (43.5)			4.7	
	2.4.					
	2.4.					
	Subtotal					
Tier 3 Point Total				10		7

Tier / Group	Randomly Selected K/A	Reason for Rejection
T1/G1	011 EK1.01	K/A Topic (LBLOCA) does not fit with EK1.01. New randomly selected K/A is: 011EK2.02.
T1/G1	065 AK2.02	No K/As in this section with IR ≥ 2.5. New randomly selected K/A is: 065AK3.03.
T1/G2	076 AK1.08	No K/As in this section with IR ≥ 2.5. New randomly selected K/A is: 076AK2.01.
T2/G1	022 K6.06	No K/As in this section with IR ≥ 2.5. New randomly selected K/A is: 022K1.04.
T2/G1	064 K5.02	No K/As in this section with IR ≥ 2.5. New randomly selected K/A is: 064K3.02.
T2/G1	078 A1.04	No K/A in this section with IR ≥ 2.5. New randomly selected K/A is: 078 K4.03
T2/G1	078 A2.01	No K/A in this section with IR ≥ 2.5. New randomly selected K/A is: 078 A4.01
T2/G2	017 K2.01	No K/A in this section with IR ≥ 2.5. New randomly selected K/A is: 017A4.02
T2/G2	033 K5.05	No K/A in this section with IR ≥ 2.5. New randomly selected K/A is: 033K4.05
T2/G2	079 A3.02	No K/A in this section with IR ≥ 2.5. New randomly selected K/A is: 079K1.01
T2/G2	055 A1.02	No K/A in this section with IR ≥ 2.5. New randomly selected K/A is: 055A3.03