

VERMONT YANKEE EXAM OUTLINE COMMENTS

Admin. Topics

- A.1 Calculate pressure for 100F/hr cool down rate - Appears to be simplistic GFE. Licensee indicated this is an STA task but will try to beef it up and or replace.
- A.2 Review CRO log. Appears to rather simplistic possibly non-discriminating. Licensee agreed to look at again and consider beefing it up and or replacing.
- A.3 Plan to do in-plant with in-plant JPMs. Rich do you see any problems with that.
- A.4 Add minor twist to give to an operator close to exceeding his rad exposure limits so can explore dose extensions.
- A.5 Simplistic phone talker assignment doesn't adequately examine ED functions. Licensee agreed to beef up.

Control Room/In Plant JPMs - none of these tasks repeated from last 2 NRC exams iaw Mike Gosekamp.

- Verify that one of systems tested is an ESF.
- "c&f" JPMs were modified by making alt path.

Scenario Outlines

- Make sure the Cts are well defined with success/failure criteria.
- Scenario #1, events 2, 3, 4 don't seem very challenging. Same comment for Scenario #2, events 4 and 5. Scenario #3, events 2, 5, and 7 same comment.
- None of these scenarios appear to confront the SRO applicants with competing priorities. These scenarios seem less challenging than those recently submitted by other region 1 licensees. Mike Gosekamp understood concern and indicated that he would take this into consideration.

Written Outlines

- #2 - extensively tested on the dynamic portion of the exam.
- #8 and 9 seem to be very closely related.
- Cautioned on a number of SRO topics may be difficult to write good SRO level questions (e.g. #11, 13, 17, 19, 23, 27, 33, 41, 96).
- #15, 20, 29 topics may be too closely related.
- #35 looks like overlap with scenario #1, event 8.

- Simple power supply questions okay in limited #s (42, 63).
- #9 and 68 may overlap - similar areas tested.
- #83 may be GFE.
- #96 and 97 EOP entry conditions, definitions may be too easy even for an RO questions and all these applicants are SRO applicants.



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EXAM Development X 4155 Exam Room
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November 16, 2004
TDL 04-012
BVY 04-122

Mr. John Caruso
United States Nuclear Regulatory Commission
475 Allendale Road
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References: (a) License No. DPR-28 (Docket No. 50-271)

Subject: Preliminary Operator Licensing Examination Material –
Vermont Yankee, February 2005

Received
4/17/04

5 SKOTL S
1 SKOTI

My word word
one guy depends
depends if RT
Can approve
Send in early

Enclosed for your review are the examination outlines to support the Vermont Yankee NRC Examination scheduled for the week of January 31, 2005.

Per ES-201, Attachment 1, regarding examination security, I would request that the enclosed materials be withheld from public disclosure until after the examinations have been completed.

This sample plan has been developed in accordance with NUREG-1021 Revision 9.

For any additional assistance, please call Frank Fagan at (802) 258-4256 or myself at (802) 258-4161.

Sincerely,

Entergy Nuclear Northeast - Vermont Yankee

Michael E. Gosekamp
Operations Training Superintendent

- c: USNRC Resident Inspector – VYNPS (Attachments Withheld from Public Disclosure)
USNRC Project Manager – VYNPS (Attachments Withheld from Public Disclosure)
Document Control Desk – (Attachments Withheld from Public Disclosure)
VT Department of Public Service (Attachments Withheld from Public Disclosure)

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Sincerely,

Entergy Nuclear Northeast - Vermont Yankee

A handwritten signature in black ink, appearing to read "M. Gosekamp", written over the printed name.

Michael E. Gosekamp
Operations Training Superintendent

- c: USNRC Resident Inspector – VYNPS (Attachments Withheld from Public Disclosure)
USNRC Project Manager – VYNPS (Attachments Withheld from Public Disclosure)
Document Control Desk – (Attachments Withheld from Public Disclosure)
VT Department of Public Service (Attachments Withheld from Public Disclosure)

Narrative Summary

A.1 The plant is in EOP-1 and the Control Room Supervisor (CRS) has directed the Control Room Operator (CRO) to conduct a cool-down, not to exceed 100 deg. F per hour. The applicant is to calculate and provide the CRO a pressure which corresponds to 100 deg. F per hour cool-down. *Sounds Simple*

A.2 The on shift Control Room Supervisor will review the CRO log of a CRO trainee on shift. The applicant will determine if all readings are in spec and take any required action for out of spec readings.

A.3 The applicant is the Refueling SRO and is in the process of moving fuel. Fuel pool level starts to decrease and the applicant is to direct fuel movement stop, the bundle lowered and all personnel evacuate the refuel floor. The SRO will then be directed to fill the fuel pool with the local fill valve. *Am I to go with the in plant*

A.4 The applicant will utilize a radiological survey to determine the area of highest dose, lowest contamination and allowable stay time. *gives task to operator close to quickly limit*

A.5 A Site Area Emergency will be declared and the applicant will be directed to make the appropriate notifications to plant personnel, the states and the NRC. The NAS phone will not function and the backup phone numbers will be used to contact the states.

*NOT sure how
this fits together
of Equip Control
ST, Maint, possion,
Kemp Med, P&ID
this just looks like
another JPL plot type
OK 4 2.2.28*

Facility: Vermont YankeeDate of Examination: Jan 31, 2005Examination Level (circle one): SROOperating Test Number: 1

Administrative Topic (see Note)	Type Code*	Describe activity to be performed
Conduct of Operations	N	A.1 Determine pressure for a 100F/hr cool-down with a starting pressure of 950 psig 2.1.25
Conduct of Operations	M, D	A.2 (29902) Evaluate CRO logs for readings out of specification and determine required action 2.1.18
Equipment Control	D	A.3 (23411) Respond to lowering spent fuel pool level during refueling 2.2.28
Radiation Control	D, P	A.4 (29903) Locate and determine radiological conditions for valve inspection 2.3.4
Emergency Plan	M, S	A.5 (35270) Implement reporting requirements of the emergency plan with failure of NAS phone 2.4.15

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

* Type Codes & Criteria:

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

Facility: Vermont Yankee			Date of Exam: Jan 31, 2005			Operating Test No.: 1									
A P P L I C A N T	E V E N T T Y P E	Scenarios												T O T A L	M I N I M U M
		1			2			3 (Spare)			4				
		CREW POSITION			CREW POSITION			CREW POSITION			CREW POSITION				
		S R O	A T C	B O P	S R O	A T C	B O P	S R O	A T C	B O P	S R O	A T C	B O P		
SRO-I	RX		5		3			3	3						1*
	NOR				2			1	1						1*
	I/C		4,7		1,4 5,7			2,4 5,7	2,4						4*
	MAJ		6		6,8			6,8	6						2
	TS				1,3			4,5							2
SRO-U	RX	5			3			3							1*
	NOR	1			2			2							1*
	I/C	2,3 4,7			1,4 5,7			1,4 5,7							4*
	MAJ	6,8			6,8			6,8							2
	TS	1,3			1,3			4,5							2
RO SRO-I SRO-U	RX														1*
	NOR														1*
	I/C														4*
	MAJ														2
	TS														2
RO SRO-I SRO-U	RX														1*
	NOR														1*
	I/C														4*
	MAJ														2
	TS														2

Instructions:

- Circle the applicant level and enter the operating test number and Form ES-D-1 event numbers for each event type; TS are not applicable for RO applicants. ROs must serve in both the "at-the-controls (ATC)" and "balance-of-plant (BOP)" positions; Instant SROs must do one scenario, including at least two instrument or component (I/C) malfunctions and one major transient, in the ATC position.
- Reactivity manipulations may be conducted under normal or *controlled* abnormal conditions (refer to Section D.5.d) but must be significant per Section C.2.a of Appendix D. *Reactivity and normal evolutions may be replaced with additional instrument or component malfunctions on a 1-for-1 basis.
- Whenever practical, both instrument and component malfunctions should be included: only those that require verifiable actions that provide insight to the applicant's competence count toward the minimum requirement.

Author: _____

NRC Reviewer: _____

Facility: Vermont Yankee Scenario No.: 1 (new) Op-Test No.: _____

Examiners: _____ Operators: _____

Initial Conditions:

100% power, ORAM Sentinel is GREEN, Rapid Shutdown Sequence is latched

Turnover:

"A" APRM is bypassed due to inability to adjust gain – I&C troubleshooting is in progress

The plant is at 100% power. The quarterly Core Spray Operability Test is schedule to be completed this shift for the "A" Core Spray Pump. Steps C.1 and C.2 of OP 4123 are complete.

Scenario Summary:

Following turnover, the crew will commence the performance of the "A" CS full flow test entering the correct Technical Specification for the given surveillance. When the "A" CS pump is started, the pump amps will fail high but the pump will fail to trip. Subsequently, a loss of DC-1 will occur, requiring a Technical Specification plant shutdown and implementation of ON 3159 to mitigate the event. After control power is transferred for Bus 1, the "A" recirculation pump will trip resulting in entry into the exclusion region. OT 3117 and OT 3118 will be implemented to address the recirc pump trip and operation within the exclusion region. Control rods will be inserted to exit the exclusion region.

While still operating in the exclusion region, thermal hydraulic instabilities will be experienced requiring a manual reactor scram. Control rods will insert partially requiring actions from EOP-2, ATWS Control, to be implemented. Following rod insertion, a HPCI steam line break with a failure of Group VI isolation will occur. The crew will implement EOP-4, Secondary Containment Control to mitigate the event. Secondary containment temperatures will exceed their maximum safe limits in two different areas and an EOP-5, RPV-ED will be performed.

Critical Tasks:

EOP-2 With the reactor at power and a scram required, manually scram the reactor

EOP-2 With the reactor scram required and the reactor not shutdown, take actions to reduce power by injecting boron and/or inserting control rods, to prevent exceeding the primary containment design limits

EOP-4 With a primary system discharging into the Secondary Containment and area radiation/temperature/water levels exceed maximum safe operating levels in more than one area, initiate RPV-ED

Event No.	Malf. No.	Event Type*	Event Description Scenario #1
1		N	"A" CS Full Flow Test - Technical Specification
2	CS01A	I	"A"CS pump high amps without pump
3	ED06A	C	Loss of DC-1 ON 3159 Technical Specification
4		C	Recirc Pump Trip on Control Power Restoration - OT 3118
5		R	Power Reduction – Control Rod Insertion – OT 3117
6	Instability Event Trigger	M	Instabilities – Man Scram
7	RD12A/B	C	ATWS – Partial ATWS EOP-2
8	HP09 PC1HP15	M	HPCI Line Break with PCIS Failure RPV-ED on Secondary Containment Temperatures
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor			

Facility: Vermont Yankee Scenario No.: 2 (new) Op-Test No.: _____

Examiners: _____ Operators: _____

Initial Conditions:

100% power, ORAM Sentinel is GREEN, Rapid Shutdown Sequence is latched

Turnover:

"A" APRM is bypassed due to inability to adjust gain – I&C troubleshooting is in progress

"C" RFP is tagged out for oil replacement

Control Rod Operability Check, OP 4111 Section A, is schedule to be completed this shift

Scenario Summary:

Following turnover, the crew will respond to a failure of a Group II PCIS valve. After addressing the containment Technical Specifications and shutting the other in-line valve, the crew will commence the performance of the Control Rod Operability surveillance. When the coupling check is performed on rod 26-43, the coupling check will fail requiring actions from ON 3144 to be implemented. Control rod 26-43 will be declared inoperable until the control rod is fully inserted and disarmed. During the power reduction with recirculation, the master recirc controller will fail to respond. Control will be transferred to the individual recirculation controllers for the power reduction.

A small recirc break will occur requiring actions in OT 3111. The loss of bus 1 will occur causing a loss of all reactor feed pumps and require a manual reactor scram as directed in OT 3113. Following the scram, Bus 2 will fail to transfer and "A" D/G will fail to start. The loss of normal power will be implemented; however, bus 4 restoration from the Vernon tie will fail. HPCI will start but the HPCI inverter will fail preventing injection. RCIC will fail to automatically start, but should be started manually to maintain RPV water level. With RCIC maintaining RPV water level, containment parameters will be addressed by spraying the torus and drywell. Following drywell sprays, the recirc break will exceed the capacity of the RCIC system causing RPV water level to lower to TAF requiring an EOP-5 RPV-ED. RPV water level will be recovered using low pressure pumps.

Critical Tasks:

EOP-1 With the reactor shutdown and RPV level approaching +6 inches, restart available high pressure feed systems and maintain RPV level above +6 inches

EOP-3 Prior to RPV-ED, when torus pressure exceeds the suppression chamber spray initiation pressure, initiate drywell containment spray while in the safe region of the drywell spray initiation limit

EOP-1 With the reactor shutdown and reactor pressure greater than the shutoff head of the low pressure systems, initiate RPV-ED BEFORE RPV level reaches -19 inches

Event No.	Malf. No.	Event Type*	Event Description Scenario #2
1	PC2	C	PCIS Group II valve failure – Technical Specifications
2		N	Control Rod Operability
3	RD032643	R	Uncoupled Control Rod Technical Specifications, Power Reduction with recirculation flow – ON 3144
4	RR10	I	Master Recirc Failure
5	RR01A	C	Small Recirc break – OT 3111
6	ED12B ED03A ED18C ED21 DG05A	M	Loss of Bus 1 Loss of Normal Power Loss of Bus 4 ("A" D/G, Vernon Tie)
7	HP10 RC02	C	HPCI Inverter Trip RCIC failure to auto start
8	RR01A	M	Recirc Break RPV-ED RPV Low Level
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor			

Facility: Vermont Yankee Scenario No.: 3 (new, spare) Op-Test No.: _____

Examiners: _____ Operators: _____

Initial Conditions:

70% power, ORAM Sentinel is GREEN, Rapid Shutdown Sequence is latched

Turnover:

"A" APRM is bypassed due to inability to adjust gain – I&C troubleshooting is in progress

Maintenance on "A" CRD Pump is complete, ready for retest. AOs have been briefed and ready to support CRD pump operations

TSV Testing was just completed. After CRD pump swap, raise power to 100% using recirculation flow

Scenario Summary:

Following turnover, the crew will transfer CRD pumps. After the CRD pump transfer, the "A" CRD pump will trip. Following the restart of "B" CRD pump using ON 3145, reactor power will be increased using recirculation. During the power ascension, "C" APRM will fail downscale. With two APRMs failed, Technical Specification actions will require a manual half scram to be inserted. A seismic event will occur resulting in a SLC tank low level alarm and a Technical Specification required 24 hour cold shutdown. OP 3127 will be implemented to address the seismic event.

An aftershock will result in a turbine trip and an automatic scram signal; however, a scram will not occur until a manual scram is initiated. After stabilizing plant conditions, a torus leak will occur. Torus makeup will be initiated. With torus level continuing to lower, a cooldown will be initiated. The cooldown may be escalated to anticipate an RPV-ED by rapidly depressurizing the reactor through the bypass valves. With torus water level at 7 feet, an RPV-ED will be completed.

Critical Tasks:

EOP-2 With the reactor at power and a scram required, manually scram the reactor

EOP-3 When torus level cannot be maintained above 7 ft, perform RPV-ED. Actions to anticipate an RPV-ED is an acceptable action.

Event No.	Malf. No.	Event Type*	Event Description Scenario #3
1		N	CRD Pump Transfer "B" to "A"
2	RD01A	C	"A" CRD Pump Trip – ON 3145
3		R	Power increase with recirculation flow
4	NM05C	I	"C" APRM downscale failure Technical Specification
5	PP06 SL03	C	Seismic Event – OP 3127 SLC tank leak Technical Specification
6	PP06 TC01	M	Aftershock – Turbine Trip
7	RP01A	C	Auto Scram failure "B" Channel
8	PC10	M	Torus Leak RPV-ED Low Torus Level
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor			

Facility:		Date of Exam:																
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 Evolution	1	3	5	5	N/A			2	1	N/A			4	20	4	3	7	
	2	1	1	3				1	1				0	7	1	2	3	
	Tier Totals	4	6	8				3	2				4	27	5	5	10	
2. Plant Systems	1	6	2	2	4	1	1	1	4	2	2	2	26	3	2	5		
	2	0	0	2	1	1	1	1	1	2	1	0	12	2	1	3		
	Tier Totals	6	2	4	5	2	2	2	5	4	3	2	38	5	3	8		
3. Generic Knowledge and Abilities Categories					1		2		3		4		10	1	2	3	4	7
					3		2		2		3			2	2	1	2	

Note:

1. Ensure that at least two topics from every 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 ES-401, Attachment 2, 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/S 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.
8. On the following pages, enter the K/A numbers, a brief description of each topic, the topics' importance ratings (IR) for the applicable license level, and the point totals (#) for each system and category. Enter the group and tier totals for each category in the table above. 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

X = selected for RO section
S = selected for SRO section

ES-401

BWR Examination Outline
Emergency and Abnormal Plant Evolutions – Tier 1/Group 1 (RO / SRO)

Form ES-401-1

E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	G	K/A Topic(s)	IR	#
295001 Partial or Complete Loss of Forced Core Flow Circulation / 1 & 4		X					Knowledge of the interrelations between Partial or Complete Loss of Forced Core Flow Circulation and the following: (CFR: 41.7 / 45.8) AK2.04 Reactor/turbine pressure regulating system: Plant-Specific 3.30 3.30	3.30	1
						X	2.4.50 Ability to verify system alarm setpoints and operate controls identified in the alarm response manual (CFR 45.3) 3.30 3.30	3.30	2
295003 Partial or Complete Loss of AC / 6				X			Ability to operate and / or monitor the following as they apply to Partial or Complete Loss of AC (CFR: 41.7 / 45.6) AA1.01 A.C. electrical distribution system 3.70 3.80	3.70	3
295004 Partial or Total Loss of DC Power / 6			X				Knowledge of the reasons for the following responses as they apply to Partial or Total Loss of DC Power: (CFR: 41.5 / 45.6) AK3.01 Load shedding: Plant-Specific 2.60 3.10	2.60	4
295005 Main Turbine Generator Trip / 3		X					Knowledge of the interrelations between Main Turbine Generator Trip and the following: (CFR: 41.7 / 45.8) AK2.08 A.C. electrical distribution 3.20 3.30	3.20	5
295006 SCRAM / 1			X				Knowledge of the reasons for the following responses as they apply to SCRAM: (CFR: 41.5 / 45.6) AK3.01 Reactor water level response 3.80 3.90	3.80	6
295016 Control Room Abandonment / 7				X			Ability to operate and / or monitor the following as they apply to Control Room Abandonment: (CFR: 41.7 / 45.6) AA1.05 D.C. electrical distribution 2.80 2.90	2.80	7
295018 Partial or Total Loss of CCW / 8	X						Knowledge of the operational applications of the following concepts as they apply to the Partial or Total Loss of CCW: (CFR: 41.8 to 41.10) AK1.01 Effects on component/system operations 3.50 3.60	3.50	8
					S		Ability to determine and interpret the following as they apply to Partial or Total Loss of CCW: (CFR: 41.10 / 43.5 / 45.13) AA2.03 Cause for partial or complete loss 3.20 3.50	3.50	9

ES-401

BWR Examination Outline
Emergency and Abnormal Plant Evolutions – Tier 1/Group 1 (RO / SRO)

Form ES-401-1

E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	G	K/A Topic(s)	IR	#
295019 Partial or Total Loss of Inst. Air / 8						X	2.4.49 Ability to perform without reference to procedures those actions that require immediate operation of system components and controls (CFR 41.10, 43.2, 45.6) 4.00 4.00	4.00	10
						S	2.1.32 Ability to explain and apply system limits and precautions (CFR 41.10, 43.2, 45.12) 3.40 3.80	3.80	11
295021 Loss of Shutdown Cooling / 4		X					Knowledge of the interrelations between Loss of Shutdown Cooling and the following: (CFR: 41.7 / 45.8) AK2.02 Reactor water cleanup 3.20 3.30	3.20	12
						S	Ability to determine and interpret the following as they apply to Loss of Shutdown Cooling: (CFR: 41.10 / 43.5 / 45.13) AA2.06 Reactor pressure 3.20 3.30	3.30	13
295023 Refueling Acc Cooling Mode / 8						X	Ability to determine and interpret the following as they apply to Refueling Acc Cooling Mode: (CFR: 41.10 / 43.5 / 45.13) AA2.04 Occurrence of fuel handling accident 3.40 4.10	3.40	14
295024 High Drywell Pressure / 5			X				Knowledge of the reasons for the following responses as they apply to High Drywell Pressure: (CFR: 41.5 / 45.6) EK3.08 Containment spray: Plant-specific 3.70 4.10	3.70	15
295025 High Reactor Pressure / 3		X					Knowledge of the interrelations between High Reactor Pressure and the following: (CFR: 41.7 / 45.8) EK2.06 HPCI: Plant-specific 3.80 3.80	3.80	16
						S	Ability to determine and interpret the following as they apply to High Reactor Pressure: (CFR: 41.10 / 43.5 / 45.13) EA2.01 Reactor pressure 4.30 4.30	4.30	17
295026 Suppression Pool High Water Temp. / 5	X						Knowledge of the operational applications of the following concepts as they apply to the Suppression Pool High Water Temp: (CFR: 41.8 to 41.10) EK1.01 Pump NPSH 3.00 3.40	3.00	18
						S	2.4.33 Knowledge of the process used to track inoperable alarms (CFR 41.10, 43.5, 45.13) 2.40 2.80	2.80	19
295027 High Containment Temperature / 5							Suppressed, no Mark III containment at VY		

ES-401

BWR Examination Outline
Emergency and Abnormal Plant Evolutions – Tier 1/Group 2 (RO / SRO)

Form ES-401-1

E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	G	K/A Topic(s)	IR	#
295032 High Secondary Containment Area Temperature / 5			X				Knowledge of the reasons for the following responses as they apply to High Secondary Containment Area Temperature: (CFR: 41.5 / 45.6) EK3.01 Emergency/normal depressurization 3.50 3.80	3.50	35
295033 High Secondary Containment Area Radiation Levels / 9									
295034 Secondary Containment Ventilation High Radiation / 9	X						Knowledge of the operational applications of the following concepts as they apply to the Secondary Containment Ventilation High Radiation: (CFR: 41.8 to 41.10) EK1.02 Radiation releases 4.10 4.40	4.10	36
295035 Secondary Containment High Differential Pressure / 5									
295036 Secondary Containment High Sump/Area Water Level / 5					X		Ability to determine and interpret the following as they apply to Secondary Containment High Sump/Area Water Level: (CFR: 41.10 / 43.5 / 45.13) EA2.02 Water level in the affected area 3.10 3.10	3.10	37
500000 High CTMT Hydrogen Conc. / 5									
K/A Category Point Totals							Group Point Total:		7/3

ES-401

BWR Examination Outline
Plant Systems – Tier 2/Group 1 (RO / SRO)

Form ES-401-1

System # / Name	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G	K/A Topic(s)	IR	#
203000 RHR/LPCI: Injection Mode											X	2.4.22 Knowledge of the bases for prioritizing safety functions during abnormal/emergency operations (CFR 43.5, 45.12) 3.00 4.00	3.00	38
205000 Shutdown Cooling											X	2.4.45 Ability to prioritize and interpret the significance of each annunciator or alarm (CFR 43.5, 45.3, 45.12) 3.30 3.60	3.30	39
206000 HPCI								X				Ability to (a) predict the impacts of the following on the HPCI and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal operation: (CFR: 41.5 / 45.6) A2.15 Loss of control oil pressure: BWR-2, 3, 4 3.40 3.50	3.40	40
											S	2.4.46 Ability to verify that the alarms are consistent with the plant conditions (CFR 43.5, 45.3, 45.12) 3.50 3.60	3.60	41
207000 Isolation (Emergency) Condenser												Suppressed, system does not exist at VY		
209001 LPCS		X										LPCS Knowledge of electrical power supplies to the following: (CFR: 41.7) K2.02 Valve power 2.50 2.70	2.50	42
209002 HPCS												Suppressed, system does not exist at VY		
211000 SLC	X											Knowledge of the physical connections and/or cause-effect relationships between SLC and the following: (CFR: 41.2 to 41.9 / 45.7 to 45.8) K1.07 Jet pump differential pressure indication: Plant-Specific 2.60 2.60	2.60	43
											S	2.4.07 Knowledge of event based EOP mitigation strategies (CFR 41.10, 43.5, 45.13) 3.10 3.80	3.80	44
212000 RPS										X		RPS Ability to manually operate and/or monitor in the control room: (CFR: 41.7 / 45.5 to 45.8) A4.12 Close/open SCRAM instrument volume vent and/or drain valves 3.90 3.90	3.90	45

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BWR Examination Outline
Plant Systems – Tier 2/Group 1 (RO / SRO)

Form ES-401-1

System # / Name	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G	K/A Topic(s)	IR	#
215003 IRM	X											Knowledge of the physical connections and/or cause-effect relationships between IRM and the following: (CFR: 41.2 to 41.9 / 45.7 to 45.8) K1.02 Reactor manual control 3.60 3.60	3.60	46
215004 Source Range Monitor	X											Knowledge of the physical connections and/or cause-effect relationships between Source Range Monitor and the following: (CFR: 41.2 to 41.9 / 45.7 to 45.8) K1.06 Reactor vessel 2.80 2.80	2.80	47
215005 APRM / LPRM			X									Knowledge of the effect that a loss or malfunction of the APRM / LPRM will have on the following: (CFR: 41.7 / 45.4) K3.06 IRM: Plant-Specific 3.50 3.60	3.50	48
								S				Ability to (a) predict the impacts of the following on the APRM / LPRM and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal operation: (CFR: 41.5 / 45.6) A2.06 Recirculation flow channels upscale 3.40 3.50	3.40	49
217000 RCIC					X							Knowledge of the operational implications of the following concepts as they apply to the RCIC: (CFR: 41.5 / 45.3) K5.01 Indications of pump cavitation 2.60 2.60	2.60	50
									X			Ability to monitor automatic operations of the (SYSTEM) including: (CFR: 41.7 / 45.7) A3.03 System pressure 3.70 3.60	3.70	51
218000 ADS								X				Ability to (a) predict the impacts of the following on the ADS and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal operation: (CFR: 41.5 / 45.6) A2.03 Loss of air supply to ADS valves: Plant-Specific 3.40 3.60	3.40	52
					X							Knowledge of the operational implications of the following concepts as they apply to the ADS: (CFR: 41.5 / 45.3) K5.01 ADS logic operation 3.80 3.80	3.80	53

System # / Name	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G	K/A Topic(s)	IR	#
223002 PCIS/Nuclear Steam Supply Shutoff								X				Ability to (a) predict the impacts of the following on the PCIS/Nuclear Steam Supply Shutoff and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal operation: (CFR: 41.5 / 45.6) A2.07 Various process instrumentation failures 2.70 2.90	2.70	54
						X						Knowledge of the effect that a loss or malfunction of the following will have on the PCIS/Nuclear Steam Supply Shutoff: (CFR: 41.7 / 45.7) K6.02 D.C. electrical distribution 3.00 3.20	3.00	55
239002 SRVs								S				Ability to (a) predict the impacts of the following on the SRVs and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal operation: (CFR: 41.5 / 45.6) A2.01 Stuck open vacuum breakers 3.00 3.30	3.30	56
											X	SRVs Ability to manually operate and/or monitor in the control room: (CFR: 41.7 / 45.5 to 45.8) A4.06 Reactor water level 3.90 4.10	3.90	57
259002 Reactor Water Level Control								X				Ability to (a) predict the impacts of the following on the Reactor Water Level Control and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal operation: (CFR: 41.5 / 45.6) A2.01 Loss of any number of main steam flow inputs 3.30 3.40	3.30	58
261000 SGTS									X			Ability to monitor automatic operations of the SGTS including: (CFR: 41.7 / 45.7) A3.03 Valve operation 3.00 2.90	3.00	59
262001 AC Electrical Distribution	X											Knowledge of the physical connections and/or cause-effect relationships between AC Electrical Distribution and the following: (CFR: 41.2 to 41.9 / 45.7 to 45.8) K1.04 Uninterruptible power supply 3.10 3.40	3.10	60

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BWR Examination Outline
Plant Systems – Tier 2/Group 1 (RO / SRO)

Form ES-401-1

System # / Name	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G	K/A Topic(s)	IR	#
262002 UPS (AC/DC)							X					Ability to predict and/or monitor changes in parameters associated with operating the UPS (AC/DC) controls including: (CFR: 41.5 / 45.5) A1.02 Motor generator outputs 2.50 2.90	2.50	61
	X											Knowledge of the physical connections and/or cause-effect relationships between UPS (AC/DC) and the following: (CFR: 41.2 to 41.9 / 45.7 to 45.8) K1.06 Unit computer: Plant-Specific 2.60 2.70	2.60	62
263000 DC Electrical Distribution		X										DC Electrical Distribution Knowledge of electrical power supplies to the following: (CFR: 41.7) K2.01 Major D.C. loads 3.10 3.40	3.10	63
					X							Knowledge of the operational implications of the following concepts as they apply to the DC Electrical Distribution: (CFR: 41.5 / 45.3) K5.01 Hydrogen generation during battery charging 2.60 2.90	2.60	64
264000 EDGs								S				Ability to (a) predict the impacts of the following on the EDGs and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal operation: (CFR: 41.5 / 45.6) A2.10 LOCA 3.90 4.20	4.20	65
					X							Knowledge of the operational implications of the following concepts as they apply to the EDGs: (CFR: 41.5 / 45.3) K5.06 Load sequencing 3.40 3.50	3.40	66
300000 Instrument Air	X											Knowledge of the physical connections and/or cause-effect relationships between Instrument Air and the following: (CFR: 41.2 to 41.9 / 45.7 to 45.8) K1.05 Main Steam Isolation valve air 3.10 3.20	3.10	67
400000 Component Cooling Water			X									Knowledge of the effect that a loss or malfunction of the Component Cooling Water will have on the following: (CFR: 41.7 / 45.4) K3.01 Loads cooled by CCWS 2.90 3.30	2.90	68
K/A Category Point Totals												Group Point Total:		26/5

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BWR Examination Outline
Plant Systems – Tier 2/Group 2 (RO / SRO)

Form ES-401-1

System # / Name	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G	K/A Topic(s)	IR	#
245000 Main Turbine Gen. / Aux.			X									Knowledge of the effect that a loss or malfunction of the Main Turbine Gen. / Aux. will have on the following: (CFR: 41.7 / 45.4) K3.07 Reactor protection system 3.60 3.70	3.60	81
256000 Reactor Condensate														
259001 Reactor Feedwater														
268000 Radwaste														
271000 Offgas														
272000 Radiation Monitoring														
286000 Fire Protection				X								Knowledge of Fire Protection design feature(s) and or interlock(s) which provide for the following: (CFR: 41.7) K4.06 Fire suppression capability that does not rely on the displacement of oxygen (Halon): Plant-Specific 3.40 3.40	3.40	82
288000 Plant Ventilation														
290001 Secondary CTMT														
290003 Control Room HVAC														
290002 Reactor Vessel Internals				X								Knowledge of Reactor Vessel Internals design feature(s) and or interlock(s) which provide for the following: (CFR: 41.7) K4.05 Natural circulation 3.30 3.50	3.30	83
K/A Category Point Totals												Group Point Total:		12/3

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Generic Knowledge and Abilities Outline (Tier 3)

Form ES-401-3

Facility:

Date of Exam

Category	K/A #	Topic	RO		SRO-Only	
1. Conduct of Operations	2.1.		IR	#	IR	#
	2.1.8	Ability to coordinate personnel activities outside the control room (CFR 45.5, 45.12, 45.13)	3.8	84		
	2.1.19	Ability to use plant computer to obtain and evaluate parametric information on system or component status (CFR 45.12)	3.0	85		
	2.1.32	Ability to explain and apply system limits and precautions (CFR 41.10, 43.2, 45.12)	3.4	86		
	2.1.13	Knowledge of facility requirements for controlling vital / controlled access (CFR 41.10, 43.5, 45.9, 45.10)			2.9	87
	2.1.4	Knowledge of shift staffing requirements (CFR 41.10, 43.2)			3.4	88
	Subtotal					
2. Equipment Control	2.2.13	Knowledge of tagging and clearance procedures (CFR 41.10, 45.13)	3.6	89		
	2.2.30	Knowledge of RO duties in the control room during fuel handling such as alarms from fuel handling area, communication with fuel storage facility, systems operated from the control room in support of fueling operations, and supporting instrumentation (CFR 45.12)	3.5	90		
	2.2.					
	2.2.					
	2.2.7	Knowledge of the process for conducting tests for experiments not described in the safety analysis report (CFR 43.3, 45.13)			3.2	91
	2.2.20	Knowledge of the process for managing troubleshooting activities (CFR 43.5, 45.13)			3.3	92
	Subtotal					

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Generic Knowledge and Abilities Outline (Tier 3)

Form ES-401-3

Facility:

Date of Exam

Category	K/A #	Topic	RO		SRO-Only	
3. Radiation Control	2.3.11	Ability to control radiation releases (CFR 45.9, 45.10) 2.70 3.20	2.7	93		
	2.3.1	Knowledge of 10 CFR 20 and related facility radiation control requirements (CFR 41.12, 43.4, 45.9, 45.10) 2.60 3.00	2.6	94		
	2.3					
	2.3					
	2.3					
	2.3.2	Knowledge of facility ALARA program (CFR 41.12, 43.4, 45.9, 45.10) 2.50 2.90			2.9	95
	Subtotal					
4. Emergency Procedures / Plan	2.4.1	Knowledge of EOP entry conditions and immediate action steps (CFR 41.10, 43.5, 45.13) 4.30 4.60	4.3	96		
	2.4.17	Knowledge of EOP terms and definitions (CFR 41.10, 45.13) 3.10 3.80	3.1	97		
	2.4.29	Knowledge of the emergency plan (CFR 43.5, 45.11) 2.60 4.00	2.6	98		
	2.4.					
	2.4.5	Knowledge of the organization of the operating procedures network for normal, abnormal, and emergency evolutions (CFR 41.10, 43.5, 45.13) 2.90 3.60				99
	2.4.32	Knowledge of operator response to loss of all annunciators (CFR 41.10, 43.5, 45.13) 3.30 3.50			3.5	100
	Subtotal					
Tier 3 Point Total				10		7

Tier / Group	Randomly Selected K/A	Reason for Rejection
3/4	2.4.18	Not referenced to 10CRF55.43 for SRO
3/2	2.2.5	< 2.5 IR for RO
3/4	2.4.42	< 2.5 IR for RO
3/3	2.3.5	< 2.5 IR for RO
3/2	2.2.20	< 2.5 IR for RO
3/2	2.2.19	< 2.5 IR for RO
3/2	2.2.31	< 2.5 IR for RO
1/1	295024 EK3.03	No Mark III containment
1/1	295021 AK2.06	No head spray system
2/1	211000 K1.10	No connection or cause effect relationship between SLC and HPCI
2/1	215005 K3.04	No RCIS system
2/2	245000 K2	< 2.5 IR for RO for all K2 K&As
2/1	264000 K5.03	< 2.5 IR for RO
2/1	262002 K1.01	No relationship between UPS and feedwater level control
2/1	262002 K1.09	No relationship between UPS and drywell ventilation control
2/1	262002 K1.13	No relationship between UPS and recirculation pump speed control
2/1	262002 K1.14	No relationship between UPS and main steam line radiation monitors
2/1	262002 K1.15	No relationship between UPS and stack gas monitors
2/1	262002 K1.16	No relationship between UPS and MSIVs
2/1	262002 K1.17	No relationship between UPS and scram solenoid valves
2/1	262002 K1.20	No relationship between UPS and plant communications equipment
2/1	262002 A1.01	< 2.5 IR for RO
2/1	300000 K1.01	< 2.5 IR for RO
2/1	264000 2.4.46	System oversampled. Third K&A selected
1/2	295036 A1.02	Random change of K&A to insure RO Tier 1 has 2 "A2" K&As
2/1	205000 A2.12	Random selection and change of K&A for RO Tier 2 to insure 2 "G" K&As