

Facility: Millstone Unit 3

Date of Examination: 9/14/09

Exam Level: RO  SRO-I  SRO-U

Operating Test No.: 2K9 (1)

Rev 2

**Control Room Systems<sup>@</sup> (8 for RO); (7 for SRO-I); (2 or 3 for SRO-U, including 1 ESF)**

System / JPM Title	Type Code*	Safety Function
a. S.1 / Align Safety Grade Boration Path	N, S, A, E	1 - 004
b. S.2 / Manually Perform MSLI	D, S, A, E, EN	2 - 013
c. S.3 / Depressurize the RCS For S/G Backfill	D, S, E	3 - 010
d. S.4 / Align RHR Train A for Shutdown Risk Inventory Control	N, S, L	4.1 - 005
e. S.5 / Depressurize SG to RCS Pressure	D, S, A, E	4.2 - 041
f. S.6 / Stopping Containment Spray	D, S, A, E	5 - 026
g. S.7 / Restoring 4.16 KV Bus Following a Loss of Power	D, S	6 - 062
h. S.8 / Initial Actions on Shutdown Outside Control Room	D, S, E	7 - 012

**In-Plant Systems<sup>@</sup> (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)**

i. P.1 / Establish Alternate Charging Pump Cooling.	P, D, E, R	4.2 - 076
j. P.2 / Align ESF and Auxiliary Building Sump Pumps, Post LOCA.	N, A, E, R	6 - 062
k. P.3 / Local Isolation of a Faulted Steam Generator	M, E	4.1 - 039

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

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

(1) This is a new ES-301-2 (RO) for Millstone Unit 3 NRC 2K9 Exam submitted at the NRC's request, due to a potential exam security compromise.

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

(1) This is a new ES-301-2 (SRO-I) for Millstone Unit 3 NRC 2K9 Exam submitted at the NRC's request, due to a potential exam security compromise.

Facility: <u>Millstone Unit 3</u>		Date of Examination: <u>9/14/09</u>
Exam Level: RO <input type="checkbox"/> SRO-I <input type="checkbox"/> SRO-U <input checked="" type="checkbox"/>		Operating Test No.: <u>2K9</u> (1)
Rev 2		
Control Room Systems <sup>@</sup> (8 for RO); (7 for SRO-I); (2 or 3 for SRO-U, including 1 ESF)		
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In-Plant Systems <sup>@</sup> (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)		
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(A)lternate path	4-6 / 4-6 / 2-3	
(C)ontrol room		
(D)irect from bank	≤ 9 / ≤ 8 / ≤ 4	
(E)mergency or abnormal in-plant	≥ 1 / ≥ 1 / ≥ 1	
(EN)gineered safety feature	- / - / ≥ 1 (control room system)	
(L)ow-Power / Shutdown	≥ 1 / ≥ 1 / ≥ 1	
(N)ew or (M)odified from bank including 1(A)	≥ 2 / ≥ 2 / ≥ 1	
(P)revious 2 exams	≤ 3 / ≤ 3 / ≤ 2 (randomly selected)	
(R)CA	≥ 1 / ≥ 1 / ≥ 1	
(S)imulator		

(1) This is a new ES-301-2 (SRO-U) for Millstone Unit 3 NRC 2K9 Exam submitted at the NRC's request, due to a potential exam security compromise.

\* On the draft outline, P.1 & P.3 were planned for the SRO-U's. However, based upon prep week observation and logistical considerations, P.1 & P.2 were administered to the SRO-U's

Facility: Millstone 3 Scenario No.: 2K9 NRC-01 (Rev 2) Op-Test No.: 2K9 (1)

Examiners: \_\_\_\_\_

Operators: \_\_\_\_\_

Initial Conditions: IC-13, 100% Power, Beginning of life, Equilibrium Xe.

Turnover:

The plant is at 100% power and at beginning of life. The "B" HVK Chiller unit is out of service for planned maintenance.

Event No.	Malf. No	Event Type*	Event Description
1	RX09A	I (RO)	Controlling channel of PZR pressure fails high. (AOP 3571)
2	RX12P	I (BOP)	'D' steam generator level channel (controlling) fails high. (AOP 3571)
3	CC01B	C (RO)	'B' RPCCW pump trip. Alignment and start of the standby RPCCW pump. (AOP 3561)
4		R (RO) R (SRO) N (BOP)	'B' Turbine Driven Main Feed Pump (TD MFP) seal failure. Rapid downpower (1%/min) to place the Motor Driven Main Feed Pump (MD MFP) in service.
5	TU02 RP09A/B RP10A/B		High Turbine Vibrations. (Annunciator response) Results in a manual reactor trip attempt. Automatic and manual reactor trip failure.
6	I/O 32N	M (ALL)	ATWS / Load Center 32N fails to deenergize.
7	TC03	C (BOP)	Turbine fails to trip automatically or manually. Must be Runback.
8	I/O MV8104	C (RO)	Emergency boration valve, 3CHS*MV8104 will fail to open.
9	MS01B	M (ALL)	'B' main steam line break in CTMT.
10	RP08A/B	C (BOP)	Main Steamline Isolation fails to automatically actuate.
11	RP11H	C(RO)	Several RPCCW components fail to respond to a Safety Injection signal.

(1) This is a new ES-D-1 for 2K9 NRC-01 submitted at the NRC's request, due to a potential exam security compromise.

\* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor

Facility: Millstone 3 Scenario No.: 2K9 NRC-02 (Rev 2) Op-Test No.: 2K9 (1)

Examiners: \_\_\_\_\_ Operators: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Initial Conditions: IC-13, 100% Power, Beginning of life, Equilibrium Xe.

Turnover:

The plant is at 100% power and at beginning of life. The 'B' MDAFW pump is out of service for planned maintenance.

Event No.	Malf. No	Event Type*	Event Description
1	CV04B	I (RO)	Letdown Temperature transmitter fails low. (Annunciator response)
2		R (RO) R (SRO) N (BOP)	CONVEX directed Emergency Load Reduction. (AOP 3575 at 5%/min)
3	RX16A	I (RO, BOP)	Turbine Impulse pressure instrument (3MSS-PT505) fails as is, concurrent with downpower. (AOP 3571)
4	CV11A	C (RO)	'A' Charging pump trip. (EOP 3506)
5	RX13E	I (BOP)	'C' SG Feed Flow instrument failure (3FWS-FT530). (AOP 3571)
6	CV13C		'C' RCP #1 seal degradation results in high seal leakoff. Procedurally required reactor trip. (Annunciator Response)
7	RC02C	M (ALL)	Small break LOCA inside CTMT (catastrophic loss of 'C' RCP seal package).
8	RP07A/B	C (RO)	Safety Injection fails to automatically actuate.
9	RP11E	C(RO)	Several HPSI components fail to respond to a Safety Injection signal.
10	RP11L	C (BOP)	Feedwater Isolation fails to automatically actuate.
11	FW21A FW19		'A' MDAFW pump discharge valve closed. TDAFW pump trips.
12	ED01 RP11M	C (RO) C (BOP)	Loss of offsite power. BOP must manually close the EDG output breakers. RO must restart ECCS pumps.

(1) This is a new ES-D-1 for 2K9 NRC-02 submitted at the NRC's request, due to a potential exam security compromise.

\* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor

Facility: Millstone 3 Scenario No.: 2K9 NRC-03 (Rev 2) Op-Test No.: 2K9 (1)

Examiners: \_\_\_\_\_ Operators: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Initial Conditions: IC-13, 100% Power, Beginning of life, Equilibrium Xe.

Turnover:

The plant is at 100% power and at beginning of life. The 'C' TPCCW pump is out of service for planned maintenance. Rod Control is in 'Manual' to allow I & C calibrate the Tavq –Tref rod control circuitry.

Event No.	Malf. No	Event Type*	Event Description
1	RX11A	I (BOP)	'A' SG pressure channel fails low. (3MSS-PT514) (AOP 3571)
2	SI03C	C (RO)	SI Accumulator N2 pressure leak (Annunciator response).
3	I/O Ann	R (RO) R (SRO) N (BOP)	'B' Main transformer high temperature and subsequent procedurally required downpower, with Rod Control in manual. (Annunciator response, AOP 3575)
4	ED04D	C (RO) C (BOP)	Loss of emergency bus 34D. (AOP 3577)
5	ED01 EG06A	M (ALL)	Loss of offsite power resulting in a reactor trip. 'B' EDG if started, cannot close in to 34D (bus differential lockout). 'A' EDG fails to start automatically or manually from the control room.
6	RC07A	C (RO)	'A' PZR PORV (3RCS*PCV455A) is stuck partially open.
7	FW20C	C (BOP)	TD AFW fails to automatically start.
8			SBO Diesel is started locally and manually closed in on emergency bus 34C.

(1) This is a new ES-D-1 for 2K9 NRC-03 submitted at the NRC's request, due to a potential exam security compromise.

\* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor

Facility: Millstone 3 Scenario No.: 2K9 NRC-04 (spare) (Rev 2) Op-Test No.: 2K9 (1)

Examiners: \_\_\_\_\_ Operators: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Initial Conditions: IC-07 (modified), 3% power, Beginning of Life, No Xe.

\_\_\_\_\_

\_\_\_\_\_

Turnover:

The crew will take the shift with reactor power stable at the point of adding heat (reactor power 3%), following a reactor startup by the previous shift. This is the initial plant startup from a refueling outage. OP 3203, Plant Startup is in progress.

\_\_\_\_\_

\_\_\_\_\_

Event No.	Malf. No	Event Type*	Event Description
1		R (RO) R (SRO) N (BOP)	Power ascension from 3% to 8% power using OP 3203, <i>Plant Startup.</i>
2	RX10A	I (RO)	Controlling channel of PZR level fails low (AOP 3571)
3	NI09C	I (BOP)	Power Range Nuclear Instrument (NI) Channel 43 Lower Detector fails high requiring FRV Bypass valve controllers to be placed in manual.
4	CV05	I (RO)	Letdown pressure transmitter PT-131 fails low. (Annunciator response).
5	NI05B		Intermediate Range Nuclear Instrument (NI) Channel 36 fails high sending an automatic reactor trip signal.
6	RP10A/B RP09A/B	C (BOP)	Automatic and manual reactor trip switches fail. Successful manual reactor trip from load centers 32B and 32N.
7	MS01D	M (ALL)	'D' Main Steamline break in CTMT.
8	FW20	C (BOP)	AFW pumps fail to auto start.
9	RP11K	C (RO)	Containment Isolation Phase 'A' fails to automatically actuate.
10		I (RO)	Source Range NIs fail to automatically energize (as a result of IRNI 36 failing high).
11	SG01D	M (ALL)	Hot, dry 'D' SG results in a SGTR. Faulted, ruptured SG.

(1) This is a new ES-D-1 for 2K9 NRC-04 submitted at the NRC's request, due to a potential exam security compromise.

\* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor

Facility: Millstone 3		Date of Exam: Weeks of Sept 14 and 21, 2009																
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	A 2	G*	Total		
1. Emergency & Abnormal Plant Evolutions	1	5	2	1	N/A			4	4	N/A			2	18	4	2	6	
	2	2	0	1	N/A			2	2	N/A			2	9	0	4	4	
	Tier Totals	7	2	2	N/A			6	6	N/A			4	27	4	6	10	
2. Plant Systems	1	3	4	3	1	2	2	4	2	3	2	2	28	2	3	5		
	2	1	0	0	1	1	1	0	1	1	0	4	10	2	1	3		
	Tier Totals	4	4	3	2	3	3	4	3	4	2	6	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:
- 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).
  - 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  $\pm 1$  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.
  - 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 of ES-401 for guidance regarding the elimination of inappropriate K/A statements.
  - Select topics from as many systems and evolutions as possible; sample every system or evolution in the group before selecting as second topic for any system or evolution.
  - 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.
  - Select SRO topics for Tiers 1 and 2 from the shaded systems and K/A categories.
  - \* 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.
  - 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.
  - 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 10CFR55.43.

**Rev. 2 (after NRC Lead Examiner Written Exam Review)**

ES-401		PWR Examination Outline						Form ES-401-2	
		Emergency and Abnormal Plant Evolutions - Tier 1/Group 1 (RO)							
E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	G	K/A Topic(s)	IR	#
000007 Reactor Trip - Stabilization - Recovery / 1		3					Interrelations between Reactor Trip and Reactor Trip Status Panel	3.5/3.6	1
000009 Small Break LOCA / 3						2.4.2	Knowledge of system setpoints, interlocks and automatic actions associated with EOP entry conditions	4.5/4.6	1
000011 Large Break LOCA / 3						2.4.46	Ability to verify alarms are consistent with plant conditions	4.2/4.2	1
000015/17 RCP Malfunctions / 4	2						Operational implications of the consequences of an RCPS failure	3.7/4.1	1
000022 Loss of Reactor Coolant Makeup / 2	1						Operational implications of thermal shock to RCP seals	2.8/3.2	1
000025 Loss of RHR System / 4					4		Determine/interpret location and isolability of leaks	3.3/3.6	1
000026 Loss of Component Cooling Water / 8				4			Operate/monitor CRDM high-temperature alarm system	2.7/2.8	1
000029 ATWS / 1	1						Operational implications of reactor nucleonics and thermo-hydraulic behavior	2.8/3.1	1
000038 Steam Gen. Tube Rupture / 3				9			Operate/monitor pressurizer level/pressure	3.2/3.3	1
000040 Steam Line Rupture / 4					3		Determine/interpret difference between steam line break and LOCA	4.6/4.7	1
000054 Loss of Main Feedwater / 4	2						Operational implications of effects of feed introduction into a dry steam generator	3.6/4.2	1
000055 Station Blackout / 6				4			Operate/monitor the reduction of loads on the batteries	3.5/3.9	1
000057 Loss of Vital AC Elec. Inst. Bus / 6					7		Determine/interpret valve indicator of charging pump suction valve from RWST	3.3/3.5	1
000062 Loss of Nuclear Service Water / 4			2				Reasons for automatic alignments of service water resulting from ESFAS actuation	3.6/3.9	1
000065 Loss of Instrument Air / 8					8		Determine/interpret failure modes of air-operated equipment	2.9/3.3	1
W/E04 LOCA Outside Containment / 3				1			Operate/monitor instruments, signals, interlocks, failure modes, auto/manual features	4.0/4.0	1
W/E11 Loss of Emergency Coolant Recirc. / 4		1					Interrelations between instruments, signals, interlocks, failure modes, auto/manual features	3.6/3.9	1
000077 Generator Voltage and Electric Grid Disturbances / 6	2						Operational implications of over-excitation	3.3/3.4	1
K/A Category Totals:	5	2	1	4	4	2	Group Point Total:		18

ES-401		PWR Examination Outline					Form ES-401-2		
Emergency and Abnormal Plant Evolutions - Tier 1/Group 1 (SRO)									
E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	G	K/A Topic(s)	IR	#
000015/17 RCP Malfunctions / 4					1		Determine/interpret the cause of an RCP failure	3.5	1
000025 Loss of RHR System / 4					6		Determine/interpret existence of proper RHR overpressure protection	3.4	1
000040 (W/E12) Steam Line Rupture – Excessive Heat Transfer / 4						2.4.31	Knowledge of alarms, indications, or annunciator response procedures	4.1	1
000062 Loss of Nuclear Service Water / 4					5		Determine/interpret normal values for SWS header flow rate and flow rates to components	2.5	1
000065 Loss of Instrument Air / 8						2.1.32	Ability to explain and apply system limits and precautions	4.0	1
W/E05 Inadequate Heat Transfer – Loss of Secondary Heat Sink / 4					2		Determine/interpret adherence to appropriate procedures and operation within facility license	4.3	1
K/A Category Totals:	0	0	0	0	4	2	Group Point Total:		6

**Rev. 2 (after NRC Lead Examiner Written Exam Review)**

ES-401		PWR Examination Outline Emergency and Abnormal Plant Evolutions - Tier 1/Group 2 (RO)						Form ES-401-2	
E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	G	K/A Topic(s)	IR	#
000003 Dropped Control Rod / 1				1			Operate/monitor the demand counter and the P/A converter	2.9/2.9	1
000032 Loss of Source Range NI / 7	1						Operational implications of the effect of voltage changes on performance	2.5/3.1	1
000033 Loss of Intermediate Range NI / 7				1			Operate/monitor power-available indicators in cabinets or equipment drawers	2.9/3.1	1
000036 Fuel Handling Accident / 8			3				Reasons for guidance contained in the EOP for fuel handling	3.7/4.1	1
000037 Steam Generator Tube Leak					9		Determine/interpret status, using independent, redundant condensate air ejector exhaust monitor	2.8/3.4	1
W/E07 Inad. Core Cooling / 4	3						Operational implications of annunciators, conditions, indications and remedial actions associated with saturated core cooling	3.2/3.6	1
W/E01 Rediagnosis					2		Determine/interpret adherence to appropriate procedures and operation within license	3.3/3.9	1
W/E13 Steam Generator Over-pressure / 4						2.2.37	Ability to determine operability and/or availability of safety related equipment	3.6/4.6	1
Site Specific Turbine Trip						2.4.31	Knowledge of alarms, indications, or annunciator response procedures	4.2/4.1	1
K/A Category Point Totals:	2	0	1	2	2	2	Group Point Total:		9

ES-401		PWR Examination Outline					Form ES-401-2		
Emergency and Abnormal Plant Evolutions - Tier 1/Group 2 (SRO)									
E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	G	K/A Topic(s)	IR	#
000059 Accidental Liquid Rad Waste Rel. / 9						2.1.23	Ability to perform specific system and integrated plant procedures during all modes of plant operation		4.4
W/E16 High Containment Radiation / 9						2.4.6	Knowledge of EOP mitigation strategies		4.7
W/E08 RCS Overcooling – PTS / 4						2.4.30	Knowledge of events that must be reported to internal organizations or external agencies, such as the State or NRC		4.1
Site Specific Loss of All AC Recovery with the SBO Diesel						2.2.44	Ability to interpret control room indications to verify status and operation of a system, and understand how operator actions affect plant and system conditions		4.4
K/A Category Point Totals:	0	0	0	0	0	4	Group Point Total:		4

ES-401	PWR Examination Outline Plant Systems - Tier 2/Group 1 (RO)											Form ES-401-2		
System # / Name	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A2	A 3	A 4	G	K/A Topic(s)	IR	#
003 Reactor Coolant Pump			2									Effect of a loss or malfunction of RCPs on S/Gs	3.5/3.8	1
003 Reactor Coolant Pump										8		Manually operate / monitor RCP cooling water supplies	3.2/2.9	1
004 Chemical and Volume Control								12				Predict the impact of and use procedures to mitigate the consequences of a CIA/SIS	4.1/4.3	1
004 Chemical and Volume Control							7					Predict / monitor changes in parameters associated with operating controls for maximum specified letdown flow	2.7/3.1	1
005 Residual Heat Removal							1					Predict / monitor changes in heatup/cooldown rates associated with operating controls	3.5/3.6	1
006 Emergency Core Cooling					9							Operational implications of thermodynamics, subcooling, superheat, and saturation	3.3/3.6	1
006 Emergency Core Cooling						5						Effect of a loss or malfunction on cooling water will have on ECCS	3.0/3.5	1
007 Pressurizer Relief/Quench Tank											2.4.11	Knowledge of abnormal condition procedures	4.0/4.2	1
008 Component Cooling Water		2										Knowledge of power supplies to CCW pumps including emergency backup	3.0/3.2	1
008 Component Cooling Water								3				Predict the impact of and use procedures to mitigate the consequences of high/low CCW temperature	3.0/3.2	1
010 Pressurizer Pressure Control									1			Monitor automatic operation of PRT temperature and pressure during PORV testing	3.0/3.2	1
012 Reactor Protection										4		Manually operate / monitor bistables, trips, resets, and test switches	3.3/3.3	1
013 Engineered Safety Features Actuation					1							Operational implications of the definition of a safety train and ESF channel	2.8/3.2	1
013 Engineered Safety Features Actuation				16								Design features / interlocks which provide for avoidance of PTS	3.8/4.2	1
022 Containment Cooling							2					Predict / monitor changes in Ctmt pressure associated with operating Ctmt cooling controls	3.6/3.8	1

ES-401	PWR Examination Outline Plant Systems - Tier 2/Group 1 (RO) Continued											Form ES-401-2		
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	#
026 Containment Spray									1			Monitor automatic operation of pump starts and MOV positioning	4.3/4.5	1
039 Main and Reheat Steam			6									Effect of a loss or malfunction of MSS on steam dumps	2.8/3.1	1
059 Main Feedwater											2.2.42	Ability to recognize system parameters that are entry conditions for Tech Specs	3.9/4.6	1
059 Main Feedwater	5											Physical connections / cause-effect relationship between MFW and RCS	3.1/3.2	1
061 Auxiliary/ Emergency Feedwater							5					Predict / monitor changes in AFW flow/motor amps associated with operating controls	3.6/3.7	1
061 Auxiliary/ Emergency Feedwater					1							Effect of a loss or malfunction of controllers / positioners on AFW	2.5/2.8	1
062 AC Electrical Distribution		1										Knowledge of power supplies to major system loads	3.3/3.4	1
063 DC Electrical Distribution	2											Physical connections / cause-effect relationship between DC and AC distribution	2.7/3.2	1
064 Emergency Diesel Generator		3										Knowledge of power supplies to EDG control power	3.2/3.6	1
073 Process Radiation Monitoring			1									Effect of a loss or malfunction of Rad Monitors on radioactive effluent releases	3.6/4.2	1
076 Service Water									2			Monitor automatic operation of emergency heat loads	3.7/3.7	1
078 Instrument Air		1										Knowledge of power supplies to instrument air compressor	2.7/2.9	1
103 Containment	7											Physical connections / cause-effect relationship between Ctmt and Ctmt vacuum system	3.5/3.7	1
K/A Category Point Totals:	3	4	3	1	2	2	4	2	3	2	2	Group Point Total:		28

ES-401	PWR Examination Outline Plant Systems - Tier 2/Group 1 (SRO)											Form ES-401-2			
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	#	
012 Reactor Protection												2.1.7	Ability to evaluate plant performance and make operational judgments	4.7	1
026 Containment Spray												2.4.9	Knowledge of low power / shutdown implications in accident (LOCA) mitigation strategy	4.2	1
039 Main and Reheat Steam								4					Predict the impact of and use procedures to mitigate the consequences of a malfunctioning steam dump	3.7	1
059 Main Feedwater								7					Predict the impact of and use procedures to mitigate the consequences of tripping of MFW turbine	3.3	1
062 AC Electrical Distribution												2.1.20	Ability to interpret and execute procedure steps	4.6	1
K/A Category Point Totals:	0	0	0	0	0	0	0	2	0	0	3	Group Point Total:		5	

**Rev. 2 (after NRC Lead Examiner Written Exam Review)**

ES-401	PWR Examination Outline Plant Systems - Tier 2/Group 2 (RO)											Form ES-401-2		
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	#
002 Reactor Coolant								2				Predict the impact of and use procedures to mitigate the consequences of a loss of coolant pressure	4.2/4.4	1
011 Pressurizer Level Control											2.1.28	Purpose of major system components and controls	4.1/4.1	1
014 Rod Position Indication											2.2.22	Knowledge of LCOs and Safety Limits	4.0/4.7	1
015 Nuclear Instrumentation						1						Effect of a loss or malfunction of sensors on NIS	2.9/3.2	1
016 Non-nuclear Instrumentation				1								Design features / interlocks which provide for reading NNI outside control room	2.8/2.9	1
017 In-core Temperature Monitor					2							Operational implications of saturation and subcooling	3.7/4.0	1
029 Containment Purge									1			Monitor automatic operation of Ctmt purge isolation	3.8/4.0	1
033 Spent Fuel Pool Cooling											2.2.12	Knowledge of surveillance procedures	3.7/4.1	1
035 Steam Generator	1											Physical connections / cause-effect relationship between S/Gs and MFW/AFW	4.2/4.5	1
041 Steam Dump/ Turbine Bypass Control											2.4.31	Knowledge of annunciators, indications, or response procedures	4.2/4.1	1
<b>K/A Category Point Totals:</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>0</b>	<b>1</b>	<b>1</b>	<b>0</b>	<b>4</b>	<b>Group Point Total:</b>		<b>10</b>

ES-401	PWR Examination Outline Plant Systems - Tier 2/Group 2 (SRO)											Form ES-401-2		
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	#
011 Pressurizer Level Control											2.4.4	Ability to recognize abnormal parameters that are entry conditions for emergency and abnormal operating procedures	4.7	1
086 Fire Protection								1				Predict the impact of and use procedures to mitigate the consequences of FPS manual shutdown	3.1	1
Site Specific AMSAC								X				Predict the impact of and use procedures to mitigate the consequences of AMSAC malfunction	N/A	1
K/A Category Point Totals:	0	0	0	0	0	0	0	2	0	0	1	Group Point Total:		3

Facility: Millstone Unit 3		Date of Exam:				
Category	K/A #	Topic	RO		SRO-Only	
			IR	#	IR	#
1. Conduct of Operations	2.1.13	Knowledge of requirements for controlling vital/controlled access	2.5/3.2	1		
	2.1.14	Knowledge of criteria requiring a plant-wide announcement	3.1/3.1	1		
	2.1.20	Ability to interpret and execute procedure steps	4.6/4.6	1		
	2.1.34	Knowledge of primary and secondary plant chemistry limits			3.5	1
	2.1.39	Knowledge of conservative decision making practices			4.3	1
		Subtotal			3	2
2. Equipment Control	2.2.15	Ability to determine expected plant configuration using documents	3.9/4.3	1		
	2.2.18	Knowledge of the process for managing shutdown maintenance activities, such as risk assessments, work prioritization, etc.	2.6/3.9	1		
	2.2.41	Ability to obtain and interpret electrical and mechanical drawings	3.5/3.9	1		
	2.2.22	Knowledge of limiting conditions for operations and safety limits			4.7	1
	2.2.38	Knowledge of conditions and limitations in the facility license			4.5	1
		Subtotal			3	2
3. Radiation Control	2.3.13	Knowledge of radiological safety procedures pertaining to licensed operators such as radiation monitor alarms, Cmt entry etc	3.4/3.8	1		
	2.3.14	Knowledge of radiation hazards that may arise during activities	3.4/3.8	1		
	2.3.4	Knowledge of normal and emergency exposure limits			3.7	1
		Subtotal			2	1
4. Emergency Procedures/ Plan	2.4.29	Knowledge of the emergency plan	3.1/4.4	1		
	2.4.45	Ability to prioritize and interpret the significance of annunciators	4.1/4.3	1		
	2.4.44	Knowledge of emergency plan protective action recommendations			4.4	1
	2.4.50	Ability to verify alarm setpoints and operate per alarm responses			4.0	1
		Subtotal			2	2
Tier 3 Point Total					10	7

