

Facility: <u>Millstone 3</u>		Date of Examination: <u>9/9/19 – 9/16/19</u>
Examination Level: RO <input checked="" type="checkbox"/> SRO <input type="checkbox"/>		Operating Test Number: <u>2019 NRC</u>
Administrative Topic (see Note)	Type Code*	Describe activity to be performed
Conduct of Operations RO A.1.1	D, R	Determine Reactivity Change for Rod Withdrawal K/A 2.1.37 (Knowledge of procedures, guidelines, or limitations associated with reactivity management) K/A Rating: 4.3 / 4.6
Conduct of Operations RO A.1.2	N, R	Perform a Shutdown Margin for MODE 3 with Two Stuck Control Rods. K/A 2.1.37 (Knowledge of procedures, guidelines associated with reactivity management) K/A Rating: 4.3 / 4.6
Equipment Control RO A.2	P, D, R	Recommend a Clearance Boundary for 3CCI*P1A. K/A 2.2.13 (Knowledge of tagging and clearance procedures.) K/A Rating: 4.1 / 4.3
Radiation Control RO A.3	N, R	Perform Independent Verification Of DRMS Work Station Database K/A 2.3.15 (Knowledge of radiation monitoring systems, such as fixed radiation monitors and alarms, portable survey instruments, personnel monitoring equipment, etc.) K/A Rating: 2.9 / 3.1
Emergency Plan		
NOTE: All items (five total) are required for SROs. RO applicants require only four items unless they are retaking only the administrative topics (which would require all five items).		
* Type Codes and Criteria: (C)ontrol room, (S)imulator, or Class(R)oom (D)irect from bank ( $\leq 3$ for ROs; $\leq 4$ for SROs and RO retakes) (N)ew or (M)odified from bank ( $\geq 1$ ) (P)revious 2 exams ( $\leq 1$ , randomly selected)		

Facility: <u>Millstone 3</u>		Date of Examination: <u>9/9/19 – 9/16/19</u>
Examination Level: RO <input type="checkbox"/> SRO <input checked="" type="checkbox"/>		Operating Test Number: <u>2019 NRC</u>
Administrative Topic (see Note)	Type Code*	Describe activity to be performed
Conduct of Operations A.1.1	P, D, R	Check Refueling Admin Requirements KA: GEN. 2.1.40 (Knowledge of refueling administrative requirements) K/A Rating: 2.8 / 3.9
Conduct of Operations A.1.2	N, R	Review a Shutdown Margin for MODE 3 with Two Stuck Control Rods K/A 2.1.37 (Knowledge of procedures, guidelines associated with reactivity management) K/A Rating: 4.3 / 4.6
Equipment Control A.2	M, R	Review a clearance boundary for 3CCI*P1B. K/A 2.2.13 (Knowledge of tagging and clearance procedures.) K/A Rating: 4.1 / 4.3
Radiation Control A.3	M, R	Determine and Perform Actions Required to Remove a Radiation Monitor from Service K/A 2.3.5 (Ability to use radiation monitoring systems, such as fixed radiation monitors and alarms, portable survey instruments, personnel monitoring equipment etc.) K/A Rating: 2.9 / 2.9
Emergency Plan A.4	N, R	Emergency Plan Classification and Protective Action Recommendation K/A 2.4.41 / 2.4.44 (Knowledge of emergency action level thresholds, classification / PARs) K/A Rating: 2.9 / 4.6 ; 2.4 / 4.4
NOTE: All items (five total) are required for SROs. RO applicants require only four items unless they are retaking only the administrative topics (which would require all five items).		
* Type Codes and Criteria: (C)ontrol room, (S)imulator, or Class(R)oom (D)irect from bank ( $\leq 3$ for ROs; $\leq 4$ for SROs and RO retakes) (N)ew or (M)odified from bank ( $\geq 1$ ) (P)revious 2 exams ( $\leq 1$ , randomly selected)		

Facility: <u>Millstone 3</u>		Date of Examination: <u>9/9/19 – 9/16/19</u>	
Exam Level: RO <input checked="" type="checkbox"/> SRO-I <input type="checkbox"/> SRO-U <input type="checkbox"/>		Operating Test Number: <u>2019 NRC</u>	
<b>REV. 1</b>			
Control Room Systems: 8 for RO, 7 for SRO-I, and 2 or 3 for SRO-U			
System/JPM Title	Type Code*	Safety Function	
a. S.1/ Respond to a Loss of All Charging Pumps (Overcurrent) K/A Number: 004-A4.08 K/A Rating: 3.8/3.4 APE:022 AA2.02; K/A Rating: 3.2/3.7	M, S, A	1-004	
b. S.2/ Transfer to Cold Leg Recirculation K/A Number: 006-A4.05; K/A Rating: 3.9/3.8 EPE 011-EA1.11 K/A Rating: 4.2/4.2	D, S, A	2-006	
c. S.3/ Depressurize the RCS During a SG Tube Rupture K/A Number: 010-A2.03 K/A Rating: 4.1 / 4.2	P, S, E, A	3-010	
d. S.4/ Align RHR for Cooldown K/A Number: 005-A4.01 K/A Rating: 3.6 / 3.4	D, S, L	4.1-005	
e. S.5/ Dump Steam Using Atmospheric Relief Valve K/A Number: 041-A4.06 K/A Rating: 2.9/3.1	N, S	4.2-039	
f. S.6/ Respond To An Inadvertent Containment Isolation Phase 'A' K/A Number: 103-A2.03; K/A Rating: 4.3/4.4	D, P, EN, S	5-103	
g. S.7/ Energizing Bus 34A And 34C After Fault K/A Number: 062-A2.05; K/A Rating: 2.9/3.3 EPE 055 EA1.07 K/A Rating: 4.3/4.5	N, S, A	6-062	
h. S.8/ Respond to RMS-41/42 Alarm K/A Number: 072-A3.01; K/A Rating: 2.9/3.1 APE 061 AA1.01 K/A Rating: 3.6/3.6	N, S, L	7-072	
In-Plant Systems: 3 for RO, 3 for SRO-I, and 3 or 2 for SRO-U			
i. P.1/ Cross-Connect Service Water To East Switchgear Ventilation K/A Number: 076-K1.19; K/A Rating: 3.6/3.7 APE 068 AA1.21 K/A Rating: 3.9/4.1	D, E, L, P	4.2 – 076	
j. P.2/ Locally Starting An Emergency Diesel Generator K/A Number: EPE-055-EA1.02; K/A Rating: 4.3/4.4	D, E, A	6-064	
k. P.3/ Establish Feed and Bleed on SI Pump Cooling K/A Number: APE-056-AA1.11; K/A Rating: 3.7/3.7	D, E, L, R	8-008	
* All RO and SRO-I control room (and in-plant) systems must be different and serve different safety functions, all five SRO-U systems must serve different safety functions, and in-plant systems and functions may overlap those tested in the control room.			
* Type Codes	Criteria for R /SRO-I/SRO-U		
(A)lternate path	4-6/4-6 /2-3		
(C)ontrol room	≤ 9/≤ 8/≤ 4		
(D)irect from bank	≥ 1/≥ 1/≥ 1		
(E)mergency or abnormal in-plant	≥ 1/≥ 1/≥ 1 (control room system)		
(EN)gineered safety feature	≥ 1/≥ 1/≥ 1		
(L)ow-Power/Shutdown	≥ 2/≥ 2/≥ 1		
(N)ew or (M)odified from bank including 1(A)	≤ 3/≤ 3/≤ 2 (randomly selected)		
(P)revious 2 exams	≥ 1/≥ 1/≥ 1		
(R)CA			
(S)imulator			

Facility: <u>Millstone 3</u>		Date of Examination: <u>9/9/19 – 9/16/19</u>
Exam Level: RO <input type="checkbox"/>	SRO-I <input checked="" type="checkbox"/>	SRO-U <input type="checkbox"/>
Operating Test Number: <u>2019 NRC</u>		
<b>REV. 1</b>		
Control Room Systems: 8 for RO, 7 for SRO-I, and 2 or 3 for SRO-U		
System/JPM Title	Type Code*	Safety Function
a. S.1/ Respond to a Loss of All Charging Pumps (Overcurrent) K/A Number: 004.A4.08 K/A Rating: 3.8/3.4 APE:022 AA2.02; K/A Rating: 3.2/3.7	M, S, A	1-004
b. S.2/ Transfer to Cold Leg Recirculation K/A Number: 006-A4.05; K/A Rating: 3.9/3.8 EPE 011-EA1.11 K/A Rating: 4.2/4.2	D, S, A	2-006
c. S.3/ Depressurize the RCS During a SG Tube Rupture K/A Number: 010-A2.03 K/A Rating: 4.1 / 4.2	P, S, E, A	3-010
d.		
e. S.5/ Dump Steam Using Atmospheric Relief Valve K/A Number: 041-A4.06 K/A Rating: 2.9/3.1	N, S	4.2-039
f. S.6/ Respond To An Inadvertent Containment Isolation Phase 'A' K/A Number: 103-A2.03; K/A Rating: 4.3/4.4	D, P, EN, S	5-103
g. S.7/ Energizing Bus 34A And 34C After Fault K/A Number: 062-A2.05; K/A Rating: 2.9/3.3 EPE 055 EA1.07 K/A Rating: 4.3/4.5	N, S, A	6-062
h. S.8/ Respond to RMS-41/42 Alarm K/A Number: 072-A3.01; K/A Rating: 2.9/3.1 APE 061 AA1.01 K/A Rating: 3.6/3.6	N, S, L	7-072
In-Plant Systems: 3 for RO, 3 for SRO-I, and 3 or 2 for SRO-U		
i. P.1/ Cross-Connect Service Water To East Switchgear Ventilation K/A Number: 076-K1.19; K/A Rating: 3.6/3.7 APE 068 AA1.21 K/A Rating: 3.9/4.1	D, E, L, P	4.2 – 076
j. P.2/ Locally Starting An Emergency Diesel Generator K/A Number: EPE-055-EA1.024; K/A Rating: 4.3/4.4	D, E, A	6-064
k. P.3/ Establish Feed and Bleed on SI Pump Cooling K/A Number: APE-056-AA1.11; K/A Rating: 3.7/3.7	D, E, L, R	8-008
* All RO and SRO-I control room (and in-plant) systems must be different and serve different safety functions, all five SRO-U systems must serve different safety functions, and in-plant systems and functions may overlap those tested in the control room.		
* Type Codes	Criteria for R /SRO-I/SRO-U	
(A)lternate path (C)ontrol room (D)irect from bank (E)mergency or abnormal in-plant (EN)gineered safety feature (L)ow-Power/Shutdown (N)ew or (M)odified from bank including 1(A) (P)revious 2 exams (R)CA (S)imulator	4-6/4-6 /2-3  ≤ 9/≤ 8/≤ 4 ≥ 1/≥ 1/≥ 1 ≥ 1/≥ 1/≥ 1 (control room system) ≥ 1/≥ 1/≥ 1 ≥ 2/≥ 2/≥ 1 ≤ 3/≤ 3/≤ 2 (randomly selected) ≥ 1/≥ 1/≥ 1	

Facility: <u>Millstone 3</u>		Date of Examination: <u>9/9/19 – 9/16/19</u>	
Exam Level: RO <input type="checkbox"/>		SRO-I <input type="checkbox"/>	SRO-U <input checked="" type="checkbox"/>
Operating Test Number: <u>2019 NRC</u>			
<b>REV. 1</b>			
Control Room Systems: 8 for RO, 7 for SRO-I, and 2 or 3 for SRO-U			
System/JPM Title	Type Code*	Safety Function	
a. S.1/ Respond to a Loss of All Charging Pumps (Overcurrent) K/A Number: 004-A4.08 K/A Rating: 3.8/3.4 APE:022 AA2.02; K/A Rating: 3.2/3.7	M, S, A	1-004	
b.			
c.			
d.			
e.			
f. S.6/ Respond To An Inadvertent Containment Isolation Phase 'A' K/A Number: 103-A2.03; K/A Rating: 4.3/4.4	D, P, EN, S	5-103	
g.			
h. S.8/ Respond to RMS-41/42 Alarm K/A Number: 072-A3.01; K/A Rating: 2.9/3.1 APE 061 AA1.01 K/A Rating: 3.6/3.6	N, S, L	7-072	
In-Plant Systems: 3 for RO, 3 for SRO-I, and 3 or 2 for SRO-U			
i.			
j. P.2/ Locally Starting An Emergency Diesel Generator K/A Number: EPE-055-EA1.024; K/A Rating: 4.3/4.4	D, E, A	6-064	
k. P.3/ Establish Feed and Bleed on SI Pump Cooling K/A Number: APE-056-AA1.11; K/A Rating: 3.7/3.7	D, E, L, R	8-008	
* All RO and SRO-I control room (and in-plant) systems must be different and serve different safety functions, all five SRO-U systems must serve different safety functions, and in-plant systems and functions may overlap those tested in the control room.			
* Type Codes	Criteria for R /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/≥ 1/≥ 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			

Facility: Millstone 3 Scenario No.: 2K19 NRC-01 (Rev 1) Op-Test No.: 2K19

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

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

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

Turnover: The plant is at 100% power.. Additionally, Control Rods are in manual for repair of the automatic rod control circuitry (which is not functional due to Tavg / Tref circuit card failure). 'B' MDAFW pp is RTO.

Critical Tasks: 1. Manually trip turbine (CT-13) 2. Bleed and Feed (CT-44)

Event No.	Malf. No	Event Type*	Event Description
1	MS09C MS11C	US C,TS BOP C	'C' Atmospheric Relief Valve Fails Open. (AOP 3581, AOP 3582)
2	CC01A	US C,TS RO C BOP C	Loss of 'A' Reactor Plant Component Cooling Water (RPCCW) Pump requires several actions to avoid a reactor trip. (AOP 3581, AOP 3561)
3	FW16C	US R RO R BOP N	'C' Heater Drain Pump trips requiring a 7% downpower (Annunciator response) .
4	FW39 FW18A FW19 ED02B RP08A / B	ALL M	Main Feedwater Pipe Break in the Turbine Building generates a Reactor Trip with a loss of heat sink. Complications include a transformer fault de-energizing all non-safety 4kv and 6kv buses. No Aux feed will present on the Reactor Trip (E-0, FR-H.1).
5	TC03 TC06A TC07B	BOP C	On the Reactor Trip, the Main Turbine will not trip and the BOP must close the MSIV's.
6	RC08B	US C RO C	During Bleed and Feed (FR-H.1), one PORV doesn't open requiring the RO to align head vent letdown.

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

**REVISION 1**

Facility: Millstone 3 Scenario No.: 2K19 NRC-02 (Rev 0) Op-Test No.: 2K19

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

Initial Conditions: IC-92, 75% Power, Beginning of life, Equilibrium Xe

Turnover: The plant is at 75% power and at the beginning of life. The 'B' Emergency Diesel is out of service for emergent maintenance. Additionally, the 'B' Condensate Pump is tagged for motor repair.

Critical Tasks: 1.Energize at least one ac emergency bus (CT-24) 2.Manually actuate SI (CT-2)  
 3. Establish Aux Feed Flow (CT-4)

Event No.	Malf. No	Event Type*	Event Description
1	RX16A	US T/S, I RO I BOP I	Turbine Impulse pressure instrument (3MSS-PT505) fails low. (AOP 3581, AOP 3571)
2		US R RO R BOP N	ISO – NE requested emergency load reduction of 200 MWe. (AOP 3575, 3% per min).
3	RC26	US T/S,C RO C	16 gpm RCS leak (packing leak) to the Containment Drains Transfer Tank (AOP 3555)
4	RC02C FW19 FW20A	ALL M	Loss of offsite power with a SBLOCA developing on the Reactor Trip.
5	ED01 EG13A	BOP C US C	The BOP must start 'A' EDG to power up a 4kv emergency bus.
6	RP07A/B	RO C	The RO must manually actuate SI.
7	CV23A	RO C	While performing actions of E-0, the RO responds to a failure of the 'A' Charging Pump to start on the SI ('B' Charging Pump has no power).
8	FW20A FW19	BOP C	While performing actions of E-0, the BOP starts the only available 'A' AFW Pump. Given the reduced aux feed, a short duration transition to FR-H.1 is needed to verify adequate heat sink.
9	RC26 RC02C		In E-1, the crew mitigates the SBLOCA concurrent with the loss of offsite power. A transition is made to ES-1-2, Post LOCA Cooldown and Depressurization.

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

Facility: Millstone 3 Scenario No.: 2K19 NRC-03 (Rev 1) Op-Test No.: 2K19

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

Initial Conditions: IC-92, 60% Power, Beginning of life, Equilibrium Xe

Turnover: The plant is at 60% power at the beginning of life. 'A' TDMFP has a 1 gpm outboard seal leak. The Motor Driven Feed Water Pump is tagged out to repair an oil leak. Additionally, the Control Rods are in manual for repair of auto circuitry.

Critical Tasks:

1. Insert negative reactivity into the core prior to dispatching operators to locally trip the reactor. (CT-52)
2. Isolate faulted SG before transition out of E-2 (or FR-S.1) (CT-17)

Event No.	Malf. No	Event Type*	Event Description
1	RX10B	US T/S, I RO I	Back-up Pressurizer Level Channel fails low causing letdown to isolate.
2	RX11D	US T/S, I BOP I	'D' SG pressure channel (3MSS-PT544) fails low requiring manual control of 'D' Feed Reg Valve and the Master Speed Controller.
3	CV10A	US I RO I	VCT level instrument, CHS*LT112, fails high causing a letdown divert to Boron Recovery. Annunciator response actions are required.
4		US R RO R BOP N	Based upon worsening seal leakage on the 'A' Turbine Driven Main Feed Pump (TDMFP), the OMOC directs a downpower to 45% power at 1% / min. (AOP 3575)
5	MS02C RP09A/B RP10A/B	ALL M	Steam line break in the Main Steam Valve Building generates an ATWS (FR-S.1). 'C' SG remains faulted following a Main Steam Isolation.
6	RP11K	BOP C US C	While performing actions of E-0, the BOP identifies / corrects the failure of Containment Isolation Phase 'A' to actuate.
7	MS07C		In E-2, the crew isolates the faulted 'C' SG.
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor			



Facility: Millstone Unit 3		Date of Exam: 2019															
Tier	Group	RO K/A Category Points											SRO-Only Points				
		K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G*	Total	A2	G*	Total	
1. Emergency and Abnormal Plant Evolutions	1	3	3	3	N/A			3	3	N/A			3	18	3	3	6
	2	1	2	1	N/A			2	2	N/A			1	9	2	2	4
	Tier Totals	4	5	4	N/A			5	5	N/A			4	27	5	5	10
2. Plant Systems	1	3	2	3	3	1	3	3	2	3	3	2	28	2	3	5	
	2	1	1	1	1	1	1	1	1	1	1	0	10	0	1	2	3
	Tier Totals	4	3	4	4	2	4	4	3	4	4	2	38	3	5	8	
3. Generic Knowledge and Abilities Categories					1	2	3	4				10	1	2	3	4	7
					3	2	2	3					1	2	2	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 outline sections (i.e., except for one category in Tier 3 of the SRO-only section, the "Tier Totals" in each K/A category shall not be less than two). (One Tier 3 radiation control K/A is allowed if it is replaced by a K/A from another Tier 3 category.)
2. The point total for each group and tier in the proposed outline must match that specified in the table. The final point total for each group and tier may deviate by ±1 from that specified in the table based on NRC revisions. The final RO exam must total 75 points, and the SRO-only exam must total 25 points.
3. Systems/evolutions within each group are identified on the outline. Systems or evolutions that do not apply at the facility should be deleted with justification. 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' 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 a category 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.

G\* Generic K/As

- \* These systems/evolutions must be included as part of the sample (as applicable to the facility) when Revision 3 of the K/A catalog is used to develop the sample plan. They are not required to be included when using earlier revisions of the K/A catalog.
- \*\* These systems/evolutions may be eliminated from the sample (as applicable to the facility) when Revision 3 of the K/A catalog is used to develop the sample plan.

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	K1	K2	K3	A1	A2	G*	K/A Topic(s)	IR	#
000007 (EPE 7; BW E02&E10; CE E02) Reactor Trip, Stabilization, Recovery / 1	5						Decay power as a function of time	3.3	1
000008 (APE 8) Pressurizer Vapor Space Accident / 3	1						Thermodynamics and flow characteristics of open or leaking valves	3.2	2
000015 (APE 15) Reactor Coolant Pump Malfunctions / 4				9			RCS temperature detection subsystem	3.1	3
000025 (APE 25) Loss of Residual Heat Removal System / 4		3					Service water or closed cooling water pumps	2.7	4
000026 (APE 26) Loss of Component Cooling Water / 8			1				The conditions that will initiate the automatic opening and closing of the SWS isolation valves to the CCWS coolers	3.2	5
000027 (APE 27) Pressurizer Pressure Control System Malfunction / 3				1			PZR heaters, sprays, and PORVs	4.0	6
000038 (EPE 38) Steam Generator Tube Rupture / 3			9				Criteria for securing/throttling ECCS	4.1	7
000054 (APE 54; CE E06) Loss of Main Feedwater / 4						2.1.32	Ability to explain and apply all system limits and precautions.	3.8	8
000055 (EPE 55) Station Blackout / 6						2.1.20	Ability to interpret and execute procedure steps.	4.6	9
000056 (APE 56) Loss of Offsite Power / 6				18			Control room normal ventilation supply fan	3.2	10
000057 (APE 57) Loss of Vital AC Instrument Bus / 6					12		PZR level controller, instrumentation and heater indications	3.5	11
000058 (APE 58) Loss of DC Power / 6	1						Battery charger equipment and instrumentation	2.8	12
000062 (APE 62) Loss of Nuclear Service Water / 4						2.4.4	Ability to recognize abnormal indications for system operating parameters which are entry- level conditions for emergency and abnormal operating procedures.	4.5	13
000065 (APE 65) Loss of Instrument Air / 8					5		When to commence plant shutdown if instrument air pressure is decreasing	3.4	14
000077 (APE 77) Generator Voltage and Electric Grid Disturbances / 6			2				Actions contained in abnormal operating procedures for voltage and grid disturbances	3.6	15
(W E04) LOCA Outside Containment / 3		2					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.	3.8	16
(W E11) Loss of Emergency Coolant Recirculation / 4					1		Facility conditions and selection of appropriate procedures during abnormal and emergency operations.	3.4	17
(BW E04; W E05) Inadequate Heat Transfer—Loss of Secondary Heat Sink / 4		1					Components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.	3.7	18
000008 (APE 8) Pressurizer Vapor Space Accident / 3						2.1.20	Ability to interpret and execute procedure steps	4.6	76
000011 (EPE 11) Large Break LOCA / 3					14		Actions to be taken if limits for PTS are violated	4.0	77
000025 (APE 25) Loss of Residual Heat Removal System / 4					1		Proper amperage of running LPI/decay heat removal/RHR pump(s)	2.9	78

000056 (APE 56) Loss of Offsite Power / 6						2.4.45	Ability to prioritize and interpret the significance of each annunciator or alarm.	4.3	79
000065 (APE 65) Loss of Instrument Air / 8					3		Location and isolation of leaks	2.9	80
(W E04) LOCA Outside Containment / 3						2.4.4	Ability to recognize abnormal indications for system operating parameters that are entry-level conditions for emergency and abnormal operating procedures.	4.7	81
K/A Category Totals:	3	3	3	3	3/3	3/3	Group Point Total:		18/6

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	K1	K2	K3	A1	A2	G*	K/A Topic(s)	IR	#	
000001 (APE 1) Continuous Rod Withdrawal / 1 (W E13) Steam Generator Overpressure / 4				1			Bank select switch	3.2	19	
					2		Adherence to appropriate procedures and operation within the limitations in the facility's license and amendments.	3.0	20	
000037 (APE 37) Steam Generator Tube Leak / 3	1						Use of steam tables	2.9	21	
000051 (APE 51) Loss of Condenser Vacuum / 4						2.4.47	Ability to diagnose and recognize trends in an accurate and timely manner utilizing the appropriate control room reference material.	4.2	22	
AOP 3577, Loss of a 4kV Bus		1					Knowledge of the interrelations between the Loss of a 4kV bus and following: Major system loads	3.5	23	
(W E06) Degraded Core Cooling / 4			3				Manipulation of controls required to obtain desired operating results during abnormal, and emergency situations.	4.0	24	
(W E15) Containment Flooding / 5				1			Components and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes and automatic and manual features.	2.9	25	
(BW E08; W E03) LOCA Cooldown—Depressurization / 4		2					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.	3.7	26	
(CE A11**; W E08) RCS Overcooling—Pressurized Thermal Shock / 4					2		Adherence to appropriate procedures and operation within the limitations in the facility's license and amendments.	3.5	27	
000028 (APE 28) Pressurizer (PZR) Level Control Malfunction / 2						2.2.12	Knowledge of surveillance procedures.	4.1	82	
000068 (APE 68; BW A06) Control Room Evacuation / 8					6		RCS Pressure	4.3	83	
000076 (APE 76) High Reactor Coolant Activity / 9						2.2.25	Knowledge of the bases in Technical Specifications for limiting conditions for operations and safety limits.	4.2	84	
(BW E09; CE A13**; W E09 & E10) Natural Circulation/4					1		Facility conditions and selection of appropriate procedures during abnormal and emergency operations.	3.8	85	
K/A Category Point Totals:	1	2	1	2	2/2	1/2	Group Point Total:		9/4	

ES-401		PWR Examination Outline Plant Systems—Tier 2/Group 1 (RO/SRO)											Form ES-401-2	
System # / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G*	K/A Topic(s)	IR	#
003 (SF4P RCP) Reactor Coolant Pump									1			Seal injection flow	3.3	28
004 (SF1; SF2 CVCS) Chemical and Volume Control									3			Ion exchange bypass	2.9	29
004 (SF1; SF2 CVCS) Chemical and Volume Control										6		Letdown isolation and flow control valves	3.6	30
005 (SF4P RHR) Residual Heat Removal						3						RHR heat exchanger	2.5	31
006 (SF2; SF3 ECCS) Emergency Core Cooling							14					Reactor vessel level	3.6	32
007 (SF5 PRTS) Pressurizer Relief/Quench Tank							2					RHR flow rate	3.3	33
007 (SF5 PRTS) Pressurizer Relief/Quench Tank			1									Containment	3.3	34
008 (SF8 CCW) Component Cooling Water				9								The "standby" feature for the CCW pumps	2.7	35
010 (SF3 PZR PCS) Pressurizer Pressure Control						3						PZR sprays and heaters	3.2	36
010 (SF3 PZR PCS) Pressurizer Pressure Control						1						Pressure detection systems	2.7	37
012 (SF7 RPS) Reactor Protection										4		Bistable, trips, reset and test switches	3.3	38
013 (SF2 ESFAS) Engineered Safety Features Actuation					2							Safety system logic and reliability	2.9	39
022 (SF5 CCS) Containment Cooling										5		Containment readings of temperature, pressure and humidity system	3.8	40
026 (SF5 CSS) Containment Spray										1		Pump starts and correct MOV positioning	4.3	41
026 (SF5 CSS) Containment Spray			2									Recirculation spray system	4.2	42
039 (SF4S MSS) Main and Reheat Steam											2.1.31	Ability to locate control room switches, controls and indications and to determine that they are correctly reflecting the desired plant lineup.	4.6	43
039 (SF4S MSS) Main and Reheat Steam				7								Reactor building isolation	3.4	44
059 (SF4S MFW) Main Feedwater				16								Automatic trips for MFW pumps	3.1	45
061 (SF4S AFW) Auxiliary/Emergency Feedwater							1					S/G level	3.9	46
061 (SF4S AFW) Auxiliary/Emergency Feedwater		2										AFW electric drive pumps	3.7	47
062 (SF6 ED AC) AC Electrical Distribution		1										Major system loads	3.3	48
063 (SF6 ED DC) DC Electrical Distribution								1				Grounds	2.5	49
063 (SF6 ED DC) DC Electrical Distribution	3											Battery charger and battery	2.9	50
064 (SF6 EDG) Emergency Diesel Generator								8				Consequences of opening/closing breaker between buses (VARS, out-of-phase, voltage)	2.7	51

073 (SF7 PRM) Process Radiation Monitoring													2.2.22	Knowledge of limiting conditions for operations and safety limits.	4.0	52
076 (SF4S SW) Service Water	5													Diesel Generator	3.8	53
078 (SF8 IAS) Instrument Air		2												Systems having pneumatic valves and controls	3.4	54
103 (SF5 CNT) Containment	2													Containment isolation/containment integrity	3.9	55
005 (SF4P RHR) Residual Heat Removal								3						RHR pump/motor malfunction	3.1	86
012 (SF7 RPS) Reactor Protection													2.4.50	Ability to verify system alarm setpoints and operate controls identified in the alarm response manual.	4.0	87
022 (SF5 CCS) Containment Cooling													2.2.37	Ability to determine operability and/or availability of safety related equipment.	4.6	88
003 (SF4P RCP) Reactor Coolant Pump								2						Conditions which exist for an abnormal shutdown of an RCP in comparison to a normal shutdown of an RCP	3.9	89
062 (SF6 ED AC) AC Electrical Distribution													2.2.40	Ability to apply Technical Specifications for a system.	4.7	90
K/A Category Point Totals:	3	2	3	3	1	3	3	2/2	3	3	2/3			Group Point Total:		28/5

ES-401	PWR Examination Outline Plant Systems—Tier 2/Group 2 (RO/SRO)											Form ES-401-2		
System # / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G*	K/A Topic(s)	IR	#
001 (SF1 CRDS) Control Rod Drive										11		Determination of SDM	3.5	56
011 (SF2 PZR LCS) Pressurizer Level Control		2										PZR heaters	3.1	57
015 (SF7 NI) Nuclear Instrumentation			2									CRDS	3.3	58
016 (SF7 NNI) Nonnuclear Instrumentation								1				Detector failure	3.0	59
035 (SF 4P SG) Steam Generator						1						MSIVs	3.2	60
041 (SF4S SDS) Steam Dump/Turbine Bypass Control							2					Steam pressure	3.1	61
071 (SF9 WGS) Waste Gas Disposal					4							Relationship of hydrogen/oxygen concentrations to flammability	2.5	62
002 (SF2; SF4P RCS) Reactor Coolant									3			Pressure, temperatures, and flows	4.4	63
SBO Diesel	1											Knowledge of the physical connections and/or cause-effect relationships between the SBO Diesel System and the following system: SBO support system	3.0	64
086 Fire Protection				6								CO2	3.0	65
034 (SF8 FHS) Fuel-Handling Equipment								1				Dropped fuel element	4.4	91
072 (SF7 ARM) Area Radiation Monitoring											2.1.7	Ability to evaluate plant performance and make operational judgments based on operating characteristics, reactor behavior and instrument interpretation.	4.7	92
035 (SF 4P SG) Steam Generator											2.2.44	Ability to interpret control room indications to verify the status and operation of a system, and understand how operator actions and directives affect plant and system conditions	4.4	93
K/A Category Point Totals:	1	1	1	1	1	1	1	1/1	1	1	0/2	Group Point Total:		10/3

Facility:		Date of Exam:				
Category	K/A #	Topic	RO		SRO-only	
			IR	#	IR	#
1. Conduct of Operations	2.1.39	Knowledge of conservative decision making practices.	3.6	66		
	2.1.43	Ability to use procedures to determine the effects on reactivity of plant changes.	4.1	67		
	2.1.14	Knowledge of criteria or conditions that require plant-wide announcements, such as pump starts, reactor trips, mode changes, etc.	3.1	70		
	2.1.3	Knowledge of shift or short term relief turnover practices.			3.9	94
	Subtotal				3	1
2. Equipment Control	2.2.17	Knowledge of the process for managing maintenance activities during power operations.	2.6	68		
	2.2.18	Knowledge of the process for managing maintenance activities during shutdown operations.	2.6	69		
	2.2.1	Ability to perform pre-startup procedures for the facility, including operating those controls associated with plant equipment that could affect reactivity.			4.4	95
	2.2.15	Ability to determine the expected plant configuration using design and configuration control documentation.			4.3	96
	Subtotal				2	2
	2.3.13	Knowledge of radiological safety procedures pertaining to licensed operator duties.	3.4	71		
	2.3.4	Knowledge of radiation exposure limits under normal and emergency conditions.	3.2	72		
	2.3.11	Ability to control radiation releases.			4.3	97
2.3.5	Ability to use radiation monitoring systems, such as fixed radiation monitors and alarms, portable survey instruments, personnel monitoring equipment, etc.			2.9	98	
Subtotal				2	2	
4. Emergency Procedures/Plan	2.4.11	Knowledge of abnormal condition procedures.	4.0	73		
	2.4.31	Knowledge of annunciators alarms, indications or response procedures.	4.2	74		
	2.4.32	Knowledge of operator response to loss of all annunciators.	3.6	75		
	2.4.35	Knowledge of local auxiliary operator tasks during emergency and the resultant operational effects			4.0	99
	2.4.38	Ability to take actions called for in the facility emergency plan, including supporting or acting as emergency coordinator.			4.4	100
Subtotal				3	2	



Tier 3 Point Total		10		7
--------------------	--	----	--	---

Tier / Group	Randomly Selected K/A	Reason for Rejection
1/2		Rejected Emergency and Abnormal Plant Evolutions associated with Babcock and Wilcox (BW) and Combustion Engineering (CE) reactors - Millstone Unit 3 is a Westinghouse design.
2/1		Rejected 025 (SF5 ICE) Ice Condenser - Millstone Unit 3 does not have an ice condenser installed.
2/1		Rejected 053 (SF1; SF4P ICS*) Integrated Control - Millstone Unit 3 does not have ICS. This topic has no operational significance but similar topics are covered in MSRs.
1/2		RO Question #23: The licensee requested to add 6 items to the Tier 1, Group 2 list of E/APEs to be available for random selection in accordance with ES-401 Attachment 1. AOP 3577, "Loss of a 4kV Bus," was randomly selected for Question 23.
2/2		RO Question #64: The licensee added 2 items to the Tier 2, Group 2 list of Plant Systems to be available for random selection in accordance with ES-401 Attachment 1. "SBO Diesel; SBO support system" was randomly selected for Question 64.
ALL		Rejected generics 2.2.3 and 2.2.4 as Millstone 3 is a single unit site
1/1	K2.02 RO Question #4	Overlap with SRO question #78. Randomly reselected K2.03
1/1	G2.4.49 SRO Question #76	This K/A is more suited for RO level questions. Randomly reselected G2.1.20.
1/1	A2.08 SRO Question #77	Cannot write a discriminating, SRO level question for this K/A. Randomly reselected A2.14.
1/1	A2.04 SRO Question #80	K/A is RO system level knowledge. Randomly reselected A2.03
1/1	G2.4.35 SRO Question #81	There are no PEO tasks in LOCA outside containment. Randomly reselected 2.4.4
1/2	K3.01 RO Question #19	This action does not exist at Millstone 3. Randomly reselected A1.01
1/2	K3.03 RO Question #24	The E/APE specific to Westinghouse (WE06, Degraded Core Cooling) will be used in lieu of Inadequate Core Cooling. K3.03 was randomly selected.

2/1	K6.04 RO Question #37	K/A overlaps with Question #36. Randomly reselected K6.01
2/2	A3.01 RO Question #63	K/A overlaps with JPMs in Operating Test. Randomly reselected new system "002 RCS", A3.03.
2/2	079 Station Air 2.2.44 SRO Question #93	System is not well suited for this specific K/A for writing a discriminating SRO level question. Randomly reselected "035, Steam Generator" as a new system.
3	G2.3.12 RO Question #70	This K/A overlaps with RO Question #71. Randomly reselected 2.1.14 for Conduct of Operations Tier 3 section.
3	G2.3.7 SRO Question #98	Cannot write a discriminating SRO level question. Randomly reselected G2.3.5
2/1	A2.01 RO Question #20	This E/APE and K/A overlap with SRO question #91. Randomly reselected W E13, Steam Generator Overpressure, A2.02 for RO question #20.
2/1	A1.03 RO Question #33	Questions on this K/A are fairly trivial, nondiscriminating and minutia. Randomly reselected A1.02
2/1	K4.02 RO Question #45	Not applicable to Millstone Unit 3 Randomly reselected K4.16
3	2.4.46 RO Question #75	Questions written tend to be too system specific for a Tier 3 topic. Randomly reselected 2.4.32
2/1	A2.02 SRO Question #86	K/A is not conducive to writing a discriminating question at an SRO level. Randomly reselected A2.03