

RO Administrative JPM Changes

JPM-A1.1R

- Added comments to assist examiner in determining the correct sequence for tagging each component.
- Provided better guidance for examiner cues; i.e., when handouts are required.
- Revised to show Initial Conditions first and Initiating Cue last. Better for examinees.

JPM-A2R

- Appropriately annotated which steps are critical and which steps are NOT critical.
- Provided guidance to examiners as to why 2 different times are both correct.
- Revised to show Initial Conditions first and Initiating Cue last. Better for examinees.

JPM-A3R

- Appropriately annotated which steps are critical and which steps are NOT critical.
- Corrected the stay time based on RWP Dose Alarm.
- Revised to show Initial Conditions first and Initiating Cue last. Better for examinees.

JPM-A4R

- Appropriately annotated which steps are critical and which steps are NOT critical.
- Provided a wider band for the correct answer. Examinees that use the Xenon Curve are more likely to pick a higher Xenon concentration than examinees that use the Xenon table.
- Revised to show Initial Conditions first and Initiating Cue last. Better for examinees.

SRO Administrative JPM Changes

JPM-A1.1S

- Deleted original JPM-1.1S, Determine RCS Leakage Action Level and replaced with JPM-1.3S, Shift Staffing Based on Administrative Requirements (Now labeled as JPM-1.1S)
 - Revised Operator Responses to ensure each has a different reason for NOT being available.
 - Revises Operator Schedule handout to match Operator Responses.
 - Inserted the three Questions into the body of the JPM.
- Revised to show Initial Conditions first and Initiating Cue last. Better for examinees.

JPM-A1.2S

- Added cues for examiners
- Revised to provide examinee with a manual clearance form vs. requiring examinee to fill in a copy of a blank automated form.
- Revised to show Initial Conditions first and Initiating Cue last. Better for examinees.

JPM-A2S

- Added another critical step if examinee incorrectly applies TSAS 3.1.3.3 or 3.0.3.
- Revised to show Initial Conditions first and Initiating Cue last. Better for examinees.

JPM-A3S

- Under the Initiating Cue, Added requirement for examinee to determine the dose each individual will receive. Also included this as a Critical Step.
- Revised to show Initial Conditions first and Initiating Cue last. Better for examinees.

JPM-A4S

- Under the Initiating Cue, added a requirement to complete the attached IRF and identify any PARs.
- Added requirement to inform examinee that this is a time critical JPM.
- Added examiner cues for when the clock starts and stops.
- Provided additional Radiation data for determining whether Federal Release Limits were exceeded.
- Modified Critical Plant Parameters.

SRO Administrative JPM Changes

JPM-A1.1S

- Revised Operator Schedule for Student handout to match JPM Operator Schedule.

JPM-A1.2S

- Determined that SRO should be provided with an automated clearance form versus a manual form. Development time for a new manual form would be needed and is unnecessary. The SROs are accustomed to reviewing automated forms.

JPM-A4S

- Changed from non-time critical to time critical.

Simulator JPM Changes

Note: All JPMs were modified to have the “Initial Conditions” precede the “Initiating Cue”.

1. JPM-S1.1, Align Alternate Charging Discharge Path;
 - a. Changed initial setup to start with CH-429 closed.
 - b. Changed direction to restore charging flow per AOP-2512, Loss Of All Charging.
 - c. Added to Initial Conditions that another operator would deal with non-related alarms.
2. JPM-S2.1, Blended Makeup to the VCT;
 - a. Corrected section referred to in OP 2304C from “4.21” to 4.22”.
 - b. Fixed alignments and selections of Critical “Y/N” designations.
 - c. Added PMW and Boric Acid settings to Comments of step 11.
3. JPM-S3.1, Fill #1 SIT;
 - a. Added note to inform examinee of requested PEO in-plant verifications to Cue of steps 6 and 7.
 - b. Added to Comments of step 13 that fill process may be terminated at examiner’s discretion.
 - c. Truncated JPM to eliminate redundant, non-critical steps, of venting all four SIT fill headers to venting just one header.
4. JPM-S4s.1, Failure of #2 SG ADV, MS-190B, Controller;
 - a. Added the initial required steps for manual operation of the ADV controller on C05.
 - b. Added Cue to step 4, where ADV fails, for examiner to direct examinee to continue to use both ADVs for the RCS cooldown to force action be taken on ADV failure.
 - c. Removed evaluation check of error-prevention, human performance tools.
5. JPM-S5.1, CTMT Isolation due to Fuel Handling Accident;
 - a. Modified JPM to have examinee notified of the accident in the Initial Conditions.
 - b. Added specifics of the ventilation lineup to the simulator setup requirements.
 - c. Modified Critical step annotations per NRC comments.
 - d. Added additional guidance on Critical step annotations to step 8, ventilation lineup verification.
 - e. Added Comment of required action to place CRAC in Recirc.
 - f. Added Critical guidance to step 9, requiring at least one train of CRAC be placed in “Recirc”.

Simulator JPM Changes

6. JPM-S6.1, Restoring Bus 24C to Unit 2 RSST with the "A" D/G Supplying;
 - a. Added to Required Materials, procedure ARP 2590F-117 (C08, A-30), EDG Beaker Trip alarm.
 - b. Changed initial step to state specific procedure to be given the examinee.
 - c. Added actuation of EDG Beaker Trip alarm, C08, A-30, to simulator cue of step 12.
 - d. Added JPM step for examinee check of EDG Beaker Trip alarm, C08, A-30, and renumbered JPM steps accordingly.
7. JPM-S7.1, Actuation Test of ESAS Component – Facility 1;
 - a. Added notation to the Required Materials to ensure applicable surveillance is pre-authorized and to verify the setup of the PMW & Boric Acid controllers.
 - b. Modified Critical step annotations per NRC comments.
 - c. Removed evaluation check of error-prevention, human performance tools.
8. JPM replacement due to incorrect simulator modeling of the applicable radiation monitor;
 - a. JPM-S9.1, Response to Vent Stack Rad Monitor Alarm, was replaced by JPM-S4p.1, Shifting LPSI Pumps During SDC Operation.
 - b. NUREG-1021 form ES-301-2 updated to reflect the change in JPMs and exam week.

Simulator JPM Changes

Note: All JPMs were modified to have the “Initial Conditions” precede the “Initiating Cue”.

1. JPM-S1.1, Align Alternate Charging Discharge Path;
 - a. Deleted reference to CH-429 closure (As recommended).
 - b. Minor modifications to Simulator Requirements. To ensure the simulator is properly set up for the JPM.
2. JPM-S2.1, Blended Makeup to the VCT;
 - a. Corrected section referred to in OP 2304C from “4.21” to 4.22”. Op 2304C changed. Added new Section 4.11 so all subsequent sections changed. All referenced to Section 4.21 have been replaced with 4.22.
 - b. Changed step 4 from 2500 psia to 2250 psia.
 - c. Minor modifications to Simulator Requirements and Cues. To ensure the simulator is properly set up for the JPM and to ensure the cues are clear.
3. JPM-S3.1, Fill #1 SIT;
 - a. Minor modifications to Simulator Requirements. To ensure the simulator is properly set up for the JPM.
4. JPM-S4p.1 replacement due to incorrect simulator modeling of the applicable radiation monitor;
 - a. New JPM is Shifting LPSI Pumps During SDC Operation (Alt. Path) and is selected as RO ONLY. Original JPM could not be performed on the simulator due to a modeling difference with the plant.
 - b. Minor modifications to Simulator Requirements of original JPM. To ensure the simulator is properly set up for the JPM.
5. JPM-S4s.1, Failure of #2 SG ADV, MS-190B, Controller;
 - a. Minor modifications to Simulator Requirements. To ensure the simulator is properly set up for the JPM.
6. JPM-S5.1, CTMT Isolation due to Fuel Handling Accident;
 - a. Minor modifications to Simulator Requirements. To ensure the simulator is properly set up for the JPM.

Simulator JPM Changes

7. JPM-S6.1, Restoring Bus 24C to Unit 2 RSST with the “A” D/G Supplying;
 - a. Original JPM, Energize Bus 24C from the RSST, replaced due to overlap with Simulator Scenario #3.
 - b. Minor modifications to Simulator Requirements. To ensure the simulator is properly set up for the JPM.
8. JPM-S7.1, Actuation Test of ESAS Component – Facility 1;
 - a. Minor modifications to Simulator Requirements. To ensure the simulator is properly set up for the JPM.

Simulator Guide Changes

Note: The NUREG-1021 ES-D-1 forms for the applicable simulator scenarios were also modified, as necessary, to incorporate the below listed changes.

ES11LI1

- Added 2 new malfunctions, RP28D and RP28E to prevent an automatic Reactor trip on low S/G level. This ensures the manual Reactor trip is safety significant.
- Added new Component malfunction, CH01A, Loss of "A" CAR Fan to ensure the RO would have an adequate number of Instrument or Component malfunctions.
- Revised Initial Conditions for the scenario to Beginning of Life. Previously written and validated using an older simulator model.
- Provided cues for each event.
- Provided cue for event classification for SRO.
- Numerous editorial changes

ES11LI2

- Changed report of "A" Service Water Strainer from 28 psid to 'pegged high'. Maximum reading is 10 psid.
- Included actions from AOP 2565, Loss of Service Water. If the crew decides to use the AOP instead of OP 2326S, Service Water System.
- Deleted the ramp of the Pressurizer pressure transmitter failure. Crew should be able to address the malfunction in time to prevent a plant trip.
- Added cue for the insertion of malfunction ES04F, Actuation Cabinet deenergizes. Unable to insert malfunction automatically due to the need for it to be inserted between two events.
- Changed the insertion time of the ESD (earlier) to save time. As a result, a critical task was eliminated (Perform a plant cooldown).
- Corrected the priorities of Safety Functions based on validation.
- Provided cues for each event.
- Provided cue for event classification for SRO.
- Numerous editorial changes

ES11LI3

- Changed Initial Conditions to include the "A" D/G out of service to allow restoration of Bus 24C from the RSST.
- Changed electrical malfunction from a fault on 24C to a fault on 24A to allow for the restoration of 24C.
- Modified guide for the changes in crew actions due to the change in above electrical malfunction.
- Added events to activate remote components to simplify control of the scenario.
- Added explanations to various crew actions to assist the examiners' understanding of the actions taken.
- Added specific Alarm Response Procedure actions expected to be taken by the crew.
- Modified actuation and severity of the Small-Break LOCA to automate actuation, ensure mitigating actions are required, and that the crew does not start the actions until entry into the event specific procedure.

Simulator Guide Changes

Note: The NUREG-1021 ES-D-1 forms for the applicable simulator scenarios were also modified, as necessary, to incorporate the below listed changes.

ES11LI1

- Corrected typo. Scenario summary listed TS 3.7.4.1 in two places. Now appropriately lists TS 3.7.3.1.
- Scenario incorrectly stated that steam flow transmitter failed low. Correct to fail high.
- Scenario summary incorrectly stated the reason for swapping RBCCW Pumps as PMs. Corrected to state reason for swap is to allow maintenance to perform vibration analysis.
- Originally listed Train A as protected facility. Corrected to Train B.
- Malfunction Summary corrected to match the scenario guide (numerous corrections).
- Verified all triggers numbers are correct for each scenario.
- Corrected Critical Task 1 wording to agree in all locations.
- Changed Steam Dumps to Atmospheric Dumps. Steam dumps are not available due to loss of Condenser vacuum.
- All turnover parameters are consistent throughout the guide.

Corrections as a result of SBT (Validation)

- Corrected typo on page 8. 9119D to 6119D.
- Corrected typo on page 25. on Condensate to one Condensate.

ES11LI2

- Added 3rd Critical Task (renumbered as CT1) to manually trip the Reactor following ATWS.
- Deleted the word 'develops' from Event 3 on Form D-1.
- Malfunction Summary corrected to match the scenario guide (numerous corrections).
- Verified all triggers numbers are correct.
- Deleted the word 'gradually' from malfunction on Pressurizer pressure transmitter failure. Failure is sudden.
- Added better guidance on specifically when to enter the ESD malfunction..

Corrections as a result of SBT (Validation)

- Page 10, changed malfunction ED06B to I/O to open 24B to 22B tie Breaker. ED06B is a bus fault and would not allow the bus to be reenergized. I/O allows reenergization.
- Changed some event severities from % to actual gpm values.
- Deleted remote for closing the disconnect for MS-202. Valve is already closed and does not need to be reenergized.

ES11LI3

- Turnover sheet has B Train as protected. (Previously omitted)
- Turnover sheet show A D/G OOS.
- (OK to have 24E aligned to either bus regardless of Protected Facility)
- Malfunction Summary corrected to match the scenario guide (numerous corrections).
- Verified all triggers numbers are correct.
- All references to "A" RCP have been changed to "B" RCP.
- Added explanations to various crew actions to assist the examiners' understanding of the actions taken.

Facility: Millstone Unit 2														Date of Exam: 03/21/2011						
Tier	Group	RO K/A Category Points												SRO-Only Points						
		K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G *	Total	A2	G*	Total				
1. Emergency & Abnormal Plant Evolutions	1	3	2	6	N/A			2	3	N/A			2	18			6			
	2	0	2	2				1	1				3	9						4
	Tier Totals	3	4	8				3	4				5	27						10
2. Systems Plant	1	3	2	3	2	1	1	2	4	3	3	4	28				5			
	2	2	0	0	1	2	1	0	1	2	1	0	10						3	
	Tier Totals	5	2	3	3	3	2	2	5	5	4	4	38						8	
3. Generic Knowledge and Abilities Categories					1		2		3		4		10	1	2	3	4	7		
					3		3		2		2									
<p>Note:</p> <ol style="list-style-type: none"> Ensure that at least 2 topics from every K/A category are sampled within each tier of the RO and SRO 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 2). The point total for each group and tier in the proposed outline must match those 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. 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 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. 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. Absent a plant specific, 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 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 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-40103. Limit SRO selections to K/As that are linked to 10 CFR 55.43. 																				

ES-401		PWR Examination Outline Emergency and Abnormal Plant Evolutions – Tier 1/Group 1 (RO/SRO)						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	#
000007 (BW/E02&E10; CE/E02) Reactor Trip - Stabilization - Recovery / 1							EA2.2; Ability to determine and interpret the following as they apply to the (Reactor Trip Recovery): Adherence to appropriate procedures and operation within the limitations in the facility's license and amendments.	3.0	1
000008 Pressurizer Vapor Space Accident / 3			X				AK3.02; Knowledge of the reasons for the following responses as they apply to the Pressurizer Vapor Space Accident: Why PORV or code safety exit temperature is below RCS or PZR temperature.	3.6	1
000009 Small Break LOCA / 3		X					EK2.03; Knowledge of the interrelations between the small break LOCA and the following: S/Gs.	3.0	1
000011 Large Break LOCA / 3			X				EK3.08; Knowledge of the reasons for the following responses as they apply to the Large Break LOCA: Flowpath for sump recirculation.	3.9	1
000015/17 RCP Malfunctions / 4		X					AK2.07; Knowledge of the interrelations between the Reactor Coolant Pump Malfunctions (Loss of RC Flow) and the following: RCP seals.	2.9	1
000022 Loss of Rx Coolant Makeup/ 2	X						AK1.03; Knowledge of the operational implications of the following concepts as they apply to Loss of Reactor Coolant Makeup: Relationship between charging flow and PZR level.	3.0	1
000025 Loss of RHR System / 4			X				AK3.02; Knowledge of the reasons for the following responses as they apply to the Loss of Residual Heat Removal System: Isolation of RHR low-pressure piping prior to pressure increase above specified level.	3.3	1
000026 Loss of Component Cooling Water / 8							AA2.03; Ability to determine and interpret the following as they apply to the Loss of Component Cooling Water: The valve lineups necessary to restart the CCWS while bypassing the portion of the system causing the abnormal condition.	2.6	1
000027 Pressurizer Pressure Control System Malfunction / 3				X			AA1.04; Ability to operate and / or monitor the following as they apply to the Pressurizer Pressure Control Malfunctions: Pressure recovery, using emergency-only heaters.	3.9	1
000029 ATWS / 1	X						EK1.02; Knowledge of the operational implications of the following concepts as they apply to the ATWS: Definition of reactivity.	2.6	1
000038 Steam Gen. Tube Rupture / 3							2.4.18; Emergency Procedures / Plan: Knowledge of the specific bases for EOPs.	3.3	1
000040 (BW/E05; CE/E05; W/E12) Steam Line Rupture - Excessive Heat Transfer / 4			X				EK3.2; Knowledge of the reasons for the following responses as they apply to the (Excess Steam Demand): Normal, abnormal and emergency operating procedures associated with (Excess Steam Demand).	3.3	1

ES-401		PWR Examination Outline Emergency and Abnormal Plant Evolutions – Tier 1/Group 1 (RO/SRO)						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	#
000054 (CE/E06) Loss of Main Feedwater / 4			X				EK3.4; Knowledge of the reasons for the following responses as they apply to the (Loss of Feedwater): RO or SRO function within the control room team as appropriate to the assigned position, in such a way that procedures are adhered to and the limitations in the facilities license and amendments are not violated.	3.2	1
000055 Station Blackout / 6	-	-	-	-			Randomly Deselected	---	--
000056 Loss of Off-site Power / 6							AA2.32; Ability to determine and interpret the following as they apply to the Loss of Offsite Power: Transient trend of coolant temperature toward no-load T-ave.	4.3	1
000057 Loss of Vital AC Inst. Bus/ 6				X			AA1.03; Ability to operate and / or monitor the following as they apply to the Loss of Vital AC Instrument Bus: Feedwater pump speed to control pressure and level in S/G.	3.6	1
000058 Loss of DC Power / 6			X				AK3.02; Knowledge of the reasons for the following responses as they apply to the Loss of DC Power: Actions contained in EOP for loss of dc power.	4.0	1
000062 Loss of Nuclear Svc Water / 4	-	-	-	-			Randomly Deselected	---	--
000065 Loss of Instrument Air / 8							2.4.47; Emergency Procedures / Plan: Ability to diagnose and recognize trends in an accurate and timely manner utilizing the appropriate control room reference material.	4.2	1
000077 Generator Voltage and Electric Grid Disturbances / 6	X						AK1.02; Knowledge of the operational implications of the following concepts as they apply to Generator Voltage and Electric Grid Disturbances: Over-excitation.	3.3	1
K/A Category Totals:	3	2	6	2			Group Point Total:		18

ES-401		PWR Examination Outline					FORM ES-401-2	
		Emergency and Abnormal Plant Evolutions - Tier 1/Group 2 (RO / SRO)						
E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1		K/A Topic(s)	IR	#
000001 Continuous Rod Withdrawal / 1	-	-	-	-		Randomly Deselected	--	--
000003 Dropped Control Rod / 1				X		AA1.03; Ability to operate and / or monitor the following as they apply to the Dropped Control Rod: Rod control switches	3.6	1
000005 Inoperable/Stuck Control Rod / 1		X				AK2.01; Knowledge of the interrelations between the Inoperable / Controllers and positioners- Rejected; No controllers or positioners are used to diagnose or recover from an inoperable/stuck control rod.	2.5	4
000005 Inoperable/Stuck Control Rod / 1		X				AK2.03; Knowledge of the interrelations between the Inoperable / Metroscope.	3.1	1
000024 Emergency Boration / 1	-	-	-	-		Randomly Deselected	--	--
000028 Pressurizer Level Malfunction / 2			X			AK3.03; Knowledge of the reasons for the following responses as they apply to the Pressurizer Level Control Malfunctions:- False indication of PZR level when PORV or spray valve is open and RCS saturated. Rejected; No credible postulated event will cause a false Pressurizer level indication at saturation conditions with an open PORV or spray valve.	3.5	4
000028 Pressurizer Level Malfunction / 2			X			AK3.05; Knowledge of the reasons for the following responses as they apply to the Pressurizer Level Control Malfunctions: Actions contained in EOP for PZR level malfunction.	3.7	1
000032 Loss of Source Range NI / 7	-	-	-	-		Randomly Deselected	--	--
000033 Loss of Intermediate Range NI / 7	-	-	-	-		Randomly Deselected	--	--
000036 (BW/A08) Fuel Handling Accident / 8	-	-	-	-		Randomly Deselected	--	--
000037 Steam Generator Tube Leak / 3	-	-	-	-		Randomly Deselected	--	--
000051 Loss of Condenser Vacuum / 4	-	-	-	-		Randomly Deselected	--	--
000059 Accidental Liquid RadWaste Rel. / 9						2.1.23; Conduct of Operations: Ability to perform specific system and integrated plant procedures during all modes of plant operation.	4.3	1
000060 Accidental Gaseous Radwaste Rel. / 9	-	-	-	-		Randomly Deselected	--	--
000061 ARM System Alarms / 7	-	-	-	-		Randomly Deselected	--	--
000067 Plant Fire On-site / 8			X			AK3.04; Knowledge of the reasons for the following responses as they apply to the Plant Fire on Site: Actions contained in EOP for plant fire on site.	3.3	1
000068 (BW/A06) Control Room Evac. / 8	-	-	-	-		Randomly Deselected	--	--
000069 (W/E14) Loss of CTMT Integrity / 5	-	-	-	-		Randomly Deselected	--	--

ES-401		PWR Examination Outline					FORM ES-401-2	
		Emergency and Abnormal Plant Evolutions - Tier 1/Group 2 (RO / SRO)						
E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1		K/A Topic(s)	IR	#
000074 (W/E06&E07) Inad. Core Cooling / 4						2.4.9; Emergency Procedures / Plan: Knowledge of low power/shutdown implications in accident (e.g., loss of coolant accident or loss of residual heat removal) mitigation strategies.	3.8	1
000076 High Reactor Coolant Activity / 9						2.1.19; Conduct of Operations: Ability to use plant computers to evaluate system or component status.	3.9	1
BW/E09; CE/A13; W/E09&E10 Natural Circ. / 4	-	-	-	-		Randomly Deselected	--	--
CE/A11; W/E08 RCS Overcooling - PTS / 4						AA2.1; Ability to determine and interpret the following as they apply to the (RCS Overcooling): Facility conditions and selection of appropriate procedures during abnormal and emergency operations.	2.9	1
CE/A16 Excess RCS Leakage / 2		X				AK2.1; Knowledge of the interrelations between the (Excess RCS Leakage) and the following: Components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.	3.2	1
CE/E09 Functional Recovery	-	-	-	-		Randomly Deselected	--	--
K/A Category Point Totals:	0	2	2	1		Group Point Total:		9

ES-401		PWR Examination Outline Plant Systems - Tier 2/Group 1 (RO) 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	K/A Topic(s)	IR	#
003 Reactor Coolant Pump					X						K5.02; Knowledge of the operational implications of the following concepts as they apply to the RCPS: Effects of RCP coastdown on RCS parameters.	2.8	1
003 Reactor Coolant Pump									X		A3.03; Ability to monitor automatic operation of the RCPS, including: Seal D/P.	3.2	1
004 Chemical and Volume Control											2.1.7; Conduct of Operations: Ability to evaluate plant performance and make operational judgments based on operating characteristics, reactor behavior, and instrument interpretation.	4.4	1
005 Residual Heat Removal											A2.04; Ability to (a) predict the impacts of the following malfunctions or operations on the RHRS, and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: RHR valve malfunction.	2.9	1
006 Emergency Core Cooling										X	A4.05; Ability to manually operate and/or monitor in the control room: Transfer of ECCS flowpaths prior to recirculation.	3.9	1
007 Pressurizer Relief/Quench Tank	X										K1.03; Knowledge of the physical connections and/or cause-effect relationships between the PRTS and the following systems: RCS	3.0	1
008 Component Cooling Water		X									K2.02; Knowledge of bus power supplies to the following: CCW pump, including emergency backup.	3.0	1
008 Component Cooling Water	X										K1.02; Knowledge of the physical connections and/or cause-effect relationships between the CCWS and the following systems: Loads cooled by CCWS.	3.3	1
010 Pressurizer Pressure Control				X							K4.01; Knowledge of PZR PCS design feature(s) and/or interlock(s) which provide for the following: Spray valve warm-up.	2.7	1
012 Reactor Protection						X					K6.07; Knowledge of the effect of a loss or malfunction of the following will have on the RPS: Core protection calculator.	2.9	1
013 Engineered Safety Features Actuation											2.4.2; Emergency Procedures / Plan: Knowledge of system set points, interlocks and automatic actions associated with EOP entry conditions.	4.5	1

ES-401		PWR Examination Outline Plant Systems - Tier 2/Group 1 (RO) 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	K/A Topic(s)	IR	#
022 Containment Cooling										X	A4.01; Ability to manually operate and/or monitor in the control room: CCS fans.	3.6	1
022 Containment Cooling								X			A2.03; Ability to (a) predict the impacts of the following malfunctions or operations on the CCS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Fan motor thermal overload/high-speed operation	2.6	1
026 Containment Spray			X								K3.01; Knowledge of the effect that a loss or malfunction of the CSS will have on the following: CCS.	3.9	1
039 Main and Reheat Steam											A2.01; Ability to (a) predict the impacts of the following malfunctions or operations on the MRSS; and (b) based on predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Flow paths of steam during a LOCA.	3.1	1
039 Main and Reheat Steam											2.1.32; Conduct of Operations: Ability to explain and apply system limits and precautions.	3.8	1
059 Main Feedwater				X							K4.08; Knowledge of MFW design feature(s) and/or interlock(s) which provide for the following: Feedwater regulatory valve operation (on basis of steam flow, feed flow mismatch).	2.5	1
061 Auxiliary/Emergency Feedwater	X										K1.03; Knowledge of the physical connections and/or cause-effect relationships between the AFW and the following systems: Main steam system.	3.5	1
061 Auxiliary/Emergency Feedwater							X				A1.01; Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the AFW controls including: S/G level.	3.9	1
062 AC Electrical Distribution								X			A2.05; Ability to (a) predict the impacts of the following malfunctions or operations on the ac distribution system; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Methods for energizing a dead bus.	2.9	1

ES-401 PWR Examination Outline Form ES-401-2													Plant Systems - Tier 2/Group 1 (RO) SRO)		
System # / Name	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	A 5	A 6	K/A Topic(s)	IR	#
063 DC Electrical Distribution			X										K3.01; Knowledge of the effect that a loss or malfunction of the DC electrical system will have on the following: ED/G.	3.7	1
064 Emergency Diesel Generator									X				A3.13; Ability to monitor automatic operation of the ED/G system, including: Rpm controller/megawatt load control (breaker-open/ breaker-closed effects).	3.0	1
073 Process Radiation Monitoring										X			A4.02; Ability to manually operate and/or monitor in the control room: Radiation monitoring system control panel	3.7	1
076 Service Water			X										K3.01; Knowledge of the effect that a loss or malfunction of the SWS will have on the following: Closed cooling water.	3.4	1
076 Service Water		X											K2.04; Knowledge of bus power supplies to the following: Reactor building closed cooling water.	2.5	1
078 Instrument Air									X				A3.01; Ability to monitor automatic operation of the IAS, including: Air pressure.	3.1	1
103 Containment							X						A1.01; Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the containment system controls including: Containment pressure, temperature, and humidity.	3.7	1
103 Containment													2.2.44; Equipment Control: 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.	4.2	1
K/A Category Point Totals:	3	2	3	2	1	1	2		3	3			Group Point Total:		28

ES-401		PWR Examination Outline Plant Systems - Tier 2/Group 2 (RO 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	K/A Topic(s)	IR	#
001 Control Rod Drive				X							K4.07; Knowledge of CRDS design feature(s) and/or interlock(s) which provide for the following: Rod stops.	3.7	1
002 Reactor Coolant	-	-	-	-	-	-	-		-	-	Randomly Deselected	--	--
011 Pressurizer Level Control	-	-	-	-	-	-	-		-	-	Randomly Deselected	--	--
014 Rod Position Indication	-	-	-	-	-	-	-		-	-	Randomly Deselected	--	--
015 Nuclear Instrumentation	-	-	-	-	-	-	-		-	-	Randomly Deselected	--	--
016 Non-nuclear Instrumentation									X		A3.02; Ability to monitor automatic operation of the NNIS, including: Relationship between meter readings and actual parameter value	2.9	1
017 In-core Temperature Monitor						X					K6.01; Knowledge of the effect of a loss or malfunction of the following ITM system components: Sensors and detectors.	2.7	1
027 Containment Iodine Removal	-	-	-	-	-	-	-		-	-	Randomly Deselected	--	--
028 Hydrogen Recombiner and Purge Control										X	A4.02; Ability to manually operate and/or monitor in the control room: Location and interpretation of containment pressure indications.	3.7	1
029 Containment Purge	-	-	-	-	-	-	-		-	-	Randomly Deselected	--	--
033 Spent Fuel Pool Cooling	X										K1.05; Knowledge of the physical connections and/or cause-effect relationships between the Spent Fuel Pool Cooling System and the following systems: RWST.	2.7	1
034 Fuel Handling Equipment											Randomly Deselected	--	--
035 Steam Generator					X						K5.01; Knowledge of operational implications of the following concepts as the apply to the S/GS: Effect of secondary parameters, pressure, and temperature on reactivity.	3.4	1
041 Steam Dump/Turbine Bypass Control	-	-	-	-	-	-	-		-	-	Randomly Deselected	--	--
045 Main Turbine Generator					X						K5.17; Knowledge of the operational implications of the following concepts as the apply to the MT/B System: Relationship between moderator temperature coefficient and boron concentration in RCS as T/G load increases.	2.5	1

ES-401		PWR Examination Outline Plant Systems - Tier 2/Group 2 (RO, 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	C	K/A Topic(s)	IR	#
055 Condenser Air Removal									X			A3.03; Ability to monitor automatic operation of the CARS, including: Automatic diversion of CARS exhaust.	2.5	1
056 Condensate								X				A2.04; Ability to (a) predict the impacts of the following malfunctions or operations on the Condensate System; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Loss of condensate pumps.	2.6	1
068 Liquid Radwaste	-	-	-	-	-	-	-		-	-		Randomly Deselected	--	--
071 Waste Gas Disposal	-	-	-	-	-	-	-		-	-		Randomly Deselected	--	--
072 Area Radiation Monitoring	-	-	-	-	-	-	-		-	-		Randomly Deselected	--	--
075 Circulating Water			X									K3.07; Knowledge of the effect that a loss or malfunctions of the circulating water system will have on the following: ESFAS Rejected; No relationship between Circulating Water and ESFAS.	3.4	4
075 Circulating Water	X											K1.08; Knowledge of the physical connections and/or cause- effect relationships between the circulating water system and the following systems: Emergency/essential SWS	3.2	1
079 Station Air	-	-	-	-	-	-	-		-	-		Randomly Deselected	--	--
086 Fire Protection	-	-	-	-	-	-	-		-	-		Randomly Deselected	--	--
K/A Category Point Totals:	2	0	0	1	2	1	0	1	2	1	0	Group Point Total:		10

Facility: Millstone Unit 2			Date of Exam: 03/21/11			
Category	K/A #	Topic	RO		SRO	
			IR	#	IR	#
1. Conduct of Operations	2.1.19	Ability to use plant computers to evaluate system or component status.	3.9	1		
	2.1.23	Ability to perform specific system and integrated plant procedures during all modes of plant operation.	4.3	1		
	2.1.25	Ability to interpret reference materials, such as graphs, curves, tables, etc.	3.9	1		
	Subtotal			3		
2. Equipment Control	2.2.12	Knowledge of surveillance procedures.	3.7	1		
	2.2.14	Knowledge of the process for controlling equipment configuration or status.	3.9	1		
	2.2.22	Knowledge of limiting conditions for operations and safety limits.	4.0	1		
	Subtotal			3		
3. Radiation Control	2.3.12	Knowledge of radiological safety principles pertaining to licensed operator duties, such as containment entry requirements, fuel handling responsibilities, access to locked high radiation areas, aligning filters, etc. Rejected: This is general employee knowledge; therefore, it does not distinguish between a competent and incompetent licensed operator.	3.2	4		
	2.3.14	Knowledge of radiation or contamination hazards that may arise during normal, abnormal, or emergency conditions or activities.	3.4	1		
	2.3.15	Knowledge of radiation monitoring systems, such as fixed radiation monitors and alarms, portable survey instruments, personnel monitoring equipment, etc.	2.9	1		
	Subtotal			2		
4. Emergency Procedures and Plan	2.4.25	Knowledge of fire protection procedures.	3.3	1		
	2.4.35	Knowledge of local auxiliary operator tasks during an emergency and the resultant operational effects.	3.8	1		
	Subtotal			2		
Tier 3 Point Total				10		

Facility: Millstone Unit 2		Date of Exam: 03/21/2011																			
Tier	Group	RO K/A Category Points											SRO-Only Points								
		K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G *	Total	A2	G*	Total					
1. Emergency & Abnormal Plant Evolutions	1												18	1	5	6					
	2					N/A				N/A			9	3	1	4					
	Tier Totals												27	4	6	10					
2. Systems Plant	1												28	1	4	5					
	2												10	N/A	2	1	3				
	Tier Totals												38	3	5	8					
3. Generic Knowledge and Abilities Categories		1				2				3				4							
																		10			
																		7			

Note:

1. Ensure that at least 2 topics from every K/A category are sampled within each tier of the RO and SRO 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 2).
2. The point total for each group and tier in the proposed outline must match those specified in the table. The final point total for each group and tier may deviate by ± 1 from that specified in the table based on NRC revisions. The final RO exam must total 75 points and the SRO-only exam must total 25 points.
3. Systems/evolutions within each group are identified on the associated outline; systems or evolutions that do not apply at the facility should be deleted and justified; operationally important, site-specific systems/evolutions that are 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, 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 K/As in Tiers 1 and 2 shall be selected from Section 2 of the K/A Catalog, but the topics must be relevant to the applicable evolution or system. Refer to Section D.1.b of ES-401 for the applicable K/As.
8. On the following pages, enter the K/A numbers, a brief description of each topic, the topics' importance ratings (IRs) for the applicable license level, and the point totals (#) for each system and category. Enter the group and tier totals for each category in the table above; if fuel handling equipment is sampled in other than 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-40103. Limit SRO selections to K/As that are linked to 10 CFR 55.43.

ES-401		PWR Examination Outline						Form ES-401-2	
		Emergency and Abnormal Plant Evolutions – Tier 1/Group 1 (RO (SRO))							
E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	G	K/A Topic(s)	IR	#
000007 (BW/E02&E10; CE/E02) Reactor Trip - Stabilization - Recovery / 1	-	-	-	-			Randomly Deselected	---	--
000008 Pressurizer Vapor Space Accident / 3	-	-	-	-			Randomly Deselected	---	--
000009 Small Break LOCA / 3	-	-	-	-			Randomly Deselected	---	--
000011 Large Break LOCA / 3							2.4.6; Emergency Procedures / Plan: Knowledge of EOP mitigation strategies.	4.7	1
000015/17 RCP Malfunctions / 4							AA2.09; Ability to determine and interpret the following as they apply to the Reactor Coolant Pump Malfunctions (Loss of RC Flow): When to secure RCPs on high stator temperatures.	3.5	1
000022 Loss of Rx Coolant Makeup / 2	-	-	-	-			Randomly Deselected	---	--
000025 Loss of RHR System / 4	-	-	-	-			Randomly Deselected	---	--
000026 Loss of Component Cooling Water / 8	-	-	-	-			Randomly Deselected	---	--
000027 Pressurizer Pressure Control System Malfunction / 3	-	-	-	-			Randomly Deselected	---	--
000029 ATWS / 1	-	-	-	-			Randomly Deselected	---	--
000038 Steam Gen. Tube Rupture / 3							2.4.35; Emergency Procedures / Plan: Knowledge of local auxiliary operator tasks during an emergency and the resultant operational effects.	4.0	1
000040 (BW/E05; CE/E05; W/E12) Steam Line Rupture - Excessive Heat Transfer / 4	-	-	-	-			Randomly Deselected	---	--
000054 (CE/E06) Loss of Main Feedwater / 4	-	-	-	-			Randomly Deselected	---	--
000055 Station Blackout / 6	-	-	-	-			Randomly Deselected	---	--
000056 Loss of Off-site Power / 6	-	-	-	-			2.4.6; Emergency Procedures / Plan: Knowledge of EOP mitigation strategies.	4.7	1
000057 Loss of Vital AC Inst. Bus / 6							2.4.47; Emergency Procedures / Plan: Ability to diagnose and recognize trends in an accurate and timely manner utilizing the appropriate control room reference material.	4.2	1
000058 Loss of DC Power / 6	-	-	-	-			Randomly Deselected	---	--
000062 Loss of Nuclear Svc Water / 4							2.4.11; Emergency Procedures / Plan: Knowledge of abnormal condition procedures.	4.2	1
000065 Loss of Instrument Air / 8							2.1.25; Conduct of Operations: Ability to interpret reference materials, such as graphs, curves, tables, etc. Rejected: There are NO graphs, curves, or tables associated with the Instrument Air System	4.2	1

ES-401		PWR Examination Outline						Form ES-401-2	
		Emergency and Abnormal Plant Evolutions – Tier 1/Group 1 (RO / <u>SRO</u>)							
E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	G	K/A Topic(s)	IR	#
000065 Loss of Instrument Air / 8							2.1.32; Conduct of Operations: Ability to explain and apply system limits and precautions. Rejected: There are NO procedural actions associated with a Loss of Instrument Air that can be evaluated at the SRO level.	4.0	4
000077 Generator Voltage and Electric Grid Disturbances / 6	-	-	-	-			Randomly Deselected	---	--
K/A Category Totals:							Group Point Total:		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	K 1	K 2	K 3	A 1	A 2	K/A Topic(s)	IR	#
000001 Continuous Rod Withdrawal / 1	-	-	-	-		Randomly Deselected	---	--
000003 Dropped Control Rod / 1						AA2.04; Ability to determine and interpret the following as they apply to the Dropped Control Rod: Rod motion stops due to dropped rod.	3.6	1
000005 Inoperable/Stuck Control Rod / 1	-	-	-	-		Randomly Deselected	---	--
000024 Emergency Boration / 1	-	-	-	-		Randomly Deselected	---	--
000028 Pressurizer Level Malfunction / 2	-	-	-	-		Randomly Deselected	---	--
000032 Loss of Source Range NI / 7	-	-	-	-		Randomly Deselected	---	--
000033 Loss of Intermediate Range NI / 7	-	-	-	-		Randomly Deselected	---	--
000036 (BW/A08) Fuel Handling Accident / 8	-	-	-	-		Randomly Deselected	---	--
000037 Steam Generator Tube Leak / 3	-	-	-	-		Randomly Deselected	---	--
000051 Loss of Condenser Vacuum / 4	-	-	-	-		Randomly Deselected	---	--
000059 Accidental Liquid RadWaste Rel. / 9	-	-	-	-		Randomly Deselected	---	--
000060 Accidental Gaseous Radwaste Rel. / 9	-	-	-	-		Randomly Deselected	---	--
000061 ARM System Alarms / 7	-	-	-	-		Randomly Deselected	---	--
000067 Plant Fire On-site / 8						AA2.15; Ability to determine and interpret the following as they apply to the Plant Fire on Site: Requirements for establishing a fire watch.	3.9	1
000068 (BW/A06) Control Room Evac. / 8	-	-	-	-		Randomly Deselected	---	--
000069 (W/E14) Loss of CTMT Integrity / 5	-	-	-	-		Randomly Deselected	---	--
000074 (W/E06&E07) Inad. Core Cooling / 4						EA2.01; Ability to determine or interpret the following as they apply to a Inadequate Core Cooling: Subcooling margin.	4.9	1
000076 High Reactor Coolant Activity / 9	-	-	-	-		Randomly Deselected	---	--
BW/E09; CE/A13; W/E09&E10 Natural Circ. / 4	-	-	-	-		Randomly Deselected	---	--
CE/A11; W/E08 RCS Overcooling - PTS / 4	-	-	-	-		Randomly Deselected	---	--
CE/A16 Excess RCS Leakage / 2	-	-	-	-		Randomly Deselected	---	--

ES-401

PWR Examination Outline

FORM ES-401-2

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

E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	K/A Topic(s)	IR	#
CE/E09 Functional Recovery					2.2.44; Equipment Control: 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	1
K/A Category Point Totals:					Group Point Total:		4

ES-401	PWR Examination Outline Plant Systems - Tier 2/Group 1 (RO/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	K/A Topic(s)	IR	#
003 Reactor Coolant Pump	-	-	-	-	-	-	-	-	-	-	Randomly Deselected	--	--
004 Chemical and Volume Control								X			A2.27; Ability to (a) predict the impacts of the following malfunctions or operations on the CVCS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Improper RWST boron concentration.	4.2	1
005 Residual Heat Removal	-	-	-	-	-	-	-	-	-	-	Randomly Deselected	--	--
006 Emergency Core Cooling	-	-	-	-	-	-	-	-	-	-	Randomly Deselected	--	--
007 Pressurizer Relief/Quench Tank	-	-	-	-	-	-	-	-	-	-	Randomly Deselected	--	--
008 Component Cooling Water	-	-	-	-	-	-	-	-	-	-	Randomly Deselected	--	--
010 Pressurizer Pressure Control	-	-	-	-	-	-	-	-	-	-	Randomly Deselected	--	--
012 Reactor Protection	-	-	-	-	-	-	-	-	-	-	Randomly Deselected	--	--
013 Engineered Safety Features Actuation											2.2.36; Equipment Control: Ability to analyze the effect of maintenance activities, such as degraded power sources, on the status of limiting conditions for operations.	4.2	1
022 Containment Cooling	-	-	-	-	-	-	-	-	-	-	Randomly Deselected	--	--
026 Containment Spray											2.4.1; Emergency Procedures / Plan: Knowledge of EOP entry conditions and immediate action steps.	4.8	1
039 Main and Reheat Steam	-	-	-	-	-	-	-	-	-	-	Randomly Deselected	--	--
059 Main Feedwater	-	-	-	-	-	-	-	-	-	-	Randomly Deselected	--	--
061 Auxiliary/Emergency Feedwater	-	-	-	-	-	-	-	-	-	-	Randomly Deselected	--	--
062 AC Electrical Distribution	-	-	-	-	-	-	-	-	-	-	Randomly Deselected	--	--
063 DC Electrical Distribution											2.2.25; Equipment Control: Knowledge of the bases in Technical Specifications for limiting conditions for operations and safety limits.	4.2	1
064 Emergency Diesel Generator	-	-	-	-	-	-	-	-	-	-	Randomly Deselected	--	--
073 Process Radiation Monitoring	-	-	-	-	-	-	-	-	-	-	Randomly Deselected	--	--
076 Service Water	-	-	-	-	-	-	-	-	-	-	Randomly Deselected	--	--

ES-401

PWR Examination Outline
Plant Systems - Tier 2/Group 1 (RO/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	K/A Topic(s)	IR	#
078 Instrument Air	-	-	-	-	-	-	-	-	-	-	Randomly Deselected	--	--
103 Containment											2.1.23; Conduct of Operations: Ability to perform specific system and integrated plant procedures during all modes of plant operation.	4.4	1
K/A Category Point Totals:								1		4	Group Point Total:		5

ES-401

PWR Examination Outline
Plant Systems - Tier 2/Group 2 (RO/ 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	K/A Topic(s)	IR	#
001 Control Rod Drive	-	-	-	-	-	-	-	-	-	-	Randomly Deselected	--	--
002 Reactor Coolant	-	-	-	-	-	-	-	-	-	-	Randomly Deselected	--	--
011 Pressurizer Level Control	-	-	-	-	-	-	-	-	-	-	Randomly Deselected	--	--
014 Rod Position Indication								X			A2.04; Ability to (a) predict the impacts of the following malfunctions or operations on the RPIS; and (b) based on those on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Misaligned rod.	3.9	1
015 Nuclear Instrumentation	-	-	-	-	-	-	-	-	-	-	Randomly Deselected	--	--
016 Non-nuclear Instrumentation											2.4.11; Emergency Procedures / Plan: Knowledge of abnormal condition procedures.	4.2	1
017 In-core Temperature Monitor	-	-	-	-	-	-	-	-	-	-	Randomly Deselected	--	--
028 Hydrogen Recombiner and Purge Control	-	-	-	-	-	-	-	-	-	-	Randomly Deselected	--	--
029 Containment Purge	-	-	-	-	-	-	-	-	-	-	Randomly Deselected	--	--
033 Spent Fuel Pool Cooling	-	-	-	-	-	-	-	-	-	-	Randomly Deselected	--	--
034 Fuel Handling Equipment											Randomly Deselected	--	--
035 Steam Generator	-	-	-	-	-	-	-	-	-	-	Randomly Deselected	--	--
041 Steam Dump/Turbine Bypass Control	-	-	-	-	-	-	-	-	-	-	Randomly Deselected	--	--
045 Main Turbine Generator	-	-	-	-	-	-	-	-	-	-	Randomly Deselected	--	--
055 Condenser Air Removal	-	-	-	-	-	-	-	-	-	-	Randomly Deselected	--	--
056 Condensate	-	-	-	-	-	-	-	-	-	-	Randomly Deselected	--	--
068 Liquid Radwaste	-	-	-	-	-	-	-	-	-	-	Randomly Deselected	--	--
071 Waste Gas Disposal	-	-	-	-	-	-	-	-	-	-	Randomly Deselected	--	--
072 Area Radiation Monitoring	-	-	-	-	-	-	-	-	-	-	Randomly Deselected	--	--

ES-401

PWR Examination Outline
 Plant Systems - Tier 2/Group 2 (RO/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	K/A Topic(s)	IR	#
075 Circulating Water											A2.02; Ability to (a) predict the impacts of the following malfunctions or operations on the circulating water system; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Loss of circulating water pumps.	2.7	1
079 Station Air	-	-	-	-	-	-	-	-	-	-	Randomly Deselected	--	--
086 Fire Protection	-	-	-	-	-	-	-	-	-	-	Randomly Deselected	--	--
K/A Category Point Totals:								2			Group Point Total:		3

Facility: Millstone Unit 2			Date of Exam: 03/21/11			
Category	K/A #	Topic	RO		SRO	
			IR	#	IR	#
1. Conduct of Operations	2.1.32	Ability to explain and apply system limits and precautions.			4.0	1
	2.1.41	Knowledge of the refueling process.			3.7	1
	Subtotal					2
2. Equipment Control	2.2.42	Ability to recognize system parameters that are entry-level conditions for Technical Specifications.			4.6	1
	-----	Randomly Deselected			---	--
						1
3. Radiation Control	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	1
	2.3.11	Ability to control radiation releases.			4.3	1
						2
4. Emergency Procedures and Plan	2.4.6	Knowledge of EOP mitigation strategies.			4.7	1
	2.4.40	Knowledge of SRO responsibilities in emergency plan implementation.			4.5	1
	Subtotal					2
Tier 3 Point Total						7

Facility: **Millstone Unit 2**Date of Examination: Week of 10/03/2011Examination Level: RO ☒ SRO ☐Operating Test Number: 1

Administrative Topic	Type Code*	Describe method of evaluation:
Conduct of Operations	R, N	Determine a Clearance Boundary [JPM-A1.1R] At the completion of this JPM, the examinee has determined the required configuration of system components to provide boundary isolation for maintenance on 2-FW-8B.
Equipment Control	R, M	Calculate SPF Heatup Time to 150°F [JPM-A2R] At the completion of this JPM the examinee will have successfully determined SFP Heatup Rate and time to reach 150°F.
Radiation Control	R, M	Review an RWP and a Survey Map [JPM-A3R] At the completion of this JPM, the examinee has determined all of the requested radiological requirements for entering the CLRW filter skid area to assist the Radwaste Coordinator.
Emergency Procedures/Plan	R, N	Determine Shutdown Margin for a Station Blackout [JPM-A4R] At the completion of this JPM the examinee has successfully determined whether SDM is being satisfied for a postulated SBO event.

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, (S)imulator, or Class(R)oom
 (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)

Facility: **Millstone Unit 2**Date of Examination: Week of 10/03/2011Examination Level: RO ☐ SRO ☒Operating Test Number: 1

Administrative Topic	Type Code*	Describe method of evaluation:
Conduct of Operations	R, M	Shift Staffing Based on Administrative Requirements [JPM-A1.1S] At the completion of this JPM, the examinee will determine who is fit for duty and can be called in for shift coverage when the on shift RO becomes incapacitated (cannot perform licensed activities).
Conduct of Operations	R, N	Approve a Tagging Clearance [JPM-A1.2S] At the completion of this JPM, the examinee will determine whether the Tag Clearance can be approved and authorized, and if not, why.
Equipment Control	R, D	Tech Spec Applicability with Embedded Surveillance [JPM-A2S] At the completion of this JPM, the examinee will analyze the given conditions and state the required Tech. Spec. entry and surveillance.
Radiation Control	R, N	Radiological Assessment and Task Supervision [JPM-A3S] At the completion of this JPM, the examinee will analyze the given conditions and designate which PEO should perform each of the two specified tasks, based on the radiological concerns of each.
Emergency Procedures/Plan	R, M	Determine EAL and PAR [JPM-A4S] At the completion of this JPM, the examinee will correctly classify the proposed event and provide the appropriate Protective Action Recommendation.

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, (S)imulator, or Class(R)oom
 (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)

Facility: **Millstone Unit 2**Date of Examination: **Week of 10/03/2011**Exam Level: RO ☒ SRO-I ☒ SRO-U ☐Operating Test No.: 1

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

System / JPM Title	Type Code*	Safety Function
a. Align Alternate Charging Discharge Path [JPM-S1.1] At the completion of this JPM, the examinee will determine that the normal Charging flow path is not available and will align Charging to Emergency Borate through the "A" HPSI Header (Alternate Charging Flow Path).	A, L, M, S	1
b. Failure of #2 ADV, MS-190B, Controller [JPM-S4s.1] At the completion of this JPM, the examinee will attempt to operate the #2 ADV from C-05 and determine that the controller is failed. The examinee will take manual control of #2 ADV from the Foxboro Controller.	A, L, N, S	4(S)
c. Containment Isolation due to Fuel Handling Accident [JPM-S5.1] At the completion of this JPM, the examinee will take the required actions in the Control Room to isolate Containment due to a Fuel Handling Accident.	L, N, S	5
d. Actuation Test of ESAS Component – Facility 1 [JPM-S7.1] At the completion of this JPM, the examinee will have performed the required actions to test actuation of ESAS component AM-515, per surveillance procedure SP 2604T.	EN, M, S	7
e. Blended Makeup to the VCT [JPM-S2.1] At the completion of this JPM, the examinee will initiate a blended makeup to the VCT, determine that the PMW Flow Control Valve failed open, and terminate the blended makeup to prevent a Boron Dilution event.	A, M S	2
f. Restoring Bus 24C to Unit 2 RSST with the "A" D/G Supplying [JPM-S6.1] At the completion of this JPM, the examinee has paralleled the RSST with the "A" DG and then manually tripped "A" DG based on degraded conditions.	A, D, L, P, S	6
g. Fill #1 SIT [JPM-S3.1] At the completion of this JPM, the examinee will raise #1 SIT level by 2% using the "A" HPSI Pump.	M, S	3
h. (RO ONLY) Shifting LPSI Pumps During SDC Operation [JPM-S4p.1] At the completion of this JPM, the examinee has restored SDC flow with one Containment Spray Pump running in place of a LPSI (SDC) Pump.	A, D, L, P, S	4(P)

In-Plant Systems @ (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)		
j. Starting and paralleling a Second CEDM MG [JPM-013] At the completion of this JPM, the examinee has successfully started the "A" CEDM MG set and paralleled it with the "B" MG set.	D, L	1
k. Manual Operation of SW-3.2A, SW Supply to TBCCW [JPM-124] At the completion of this JPM, the examinee will have placed 2-SW-3.2A in manual operation and closed the valve.	D	8
m. Align Backup Air [JPM-P2.2] At the completion of this JPM, the examinee will have aligned a backup air supply to 2-CH-517, 2-CH-518, and 2-CH-519 per EOP 2541, Appendix 40.	A, E, L, M, R	2
@ 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:	Actual (RO/SRO-I)	Criteria for RO / SRO-I / SRO-U
(A)lternate Path	6/5	4-6 / 4-6 / 2-3
(C)ontrol room	0	
(D)irect from bank	4/3	≤ 9 / ≤ 8 / ≤ 4
(E)mergency or abnormal in-plant	1	≥ 1 / ≥ 1 / ≥ 1
(EN)gineered safety feature	1	- / - / ≥ 1 (control room system)
(L)ow-Power / Shutdown	7/6	≥ 1 / ≥ 1 / ≥ 1
(N)ew or (M)odified from bank including 1(A)	7/7	≥ 2 / ≥ 2 / ≥ 1
(P)revious 2 exams	2/1	≤ 3 / ≤ 3 / ≤ 2 (randomly selected)
(R)CA	1	≥ 1 / ≥ 1 / ≥ 1
(S)imulator	8/7	

Facility: MP2 Scenario No.: ES11LI1 Op-Test No.: 1

Examiners: _____ Operators: _____

Initial Conditions: 100% power, BOL, Eq. Xe., 1204 ppm Boron SGBD @ 40 gpm per SG, 24E aligned to 24C, "B" RBCCW Pump has just been returned to service following repairs.

Turnover: 100% power, BOL, Eq. Xe., 1204 ppm Boron, blend ratio: 3.89:1, SGBD @ 40 gpm per SG, 24E aligned to 24C, "B" RBCCW Pump has just been returned to service following repairs, no other equipment OOS and no surveillance in progress or due.

Event No.	Malf. No.	Event Type*	Event Description
1.	N/A	N (BOP/S)	Swap from "A" to "B" RBCCW Pump
2.	CH01A	C (RO/S)	Loss of "A" Containment Air Recirculation Fan (TS)
3.	RX11D	I (BOP/S)	#2 SG Alternate steam flow transmitter failure
4.	RD0368	C (BOP/S)	CEA #68 to slip 35 steps into the core. (TS)
5.	N/A	R (All)	Downpower to < 70% power for CEA recovery (Reactivity)
6.	RP24D	I (RO/S)	"D" CTMT pressure transmitter failure (TS)
7.	FW33 TC10A RP28D RP28E	M (All)	Loss of vacuum with failure of Turbine Low Vacuum Trip Manual reactor trip with loss of both Main Feed Pumps due to low vacuum Failure of the Reactor to trip on low S/G level
8.	FW30A FW20A FW20C	C (BOP/S)	Degradation/loss of the "A" AFW Pump Overspeed trip of the Turbine Driven Aux Feed Pump
9.	ED05D	M (All)	Bus 24D Fault
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor			

Facility: <u>MP2</u>	Scenario No.: <u>ES11LI2</u>	Op-Test No.: <u>2</u>
Examiners: _____ Operators: _____ _____ _____		
Initial Conditions: <u>100% power, BOL, Eq. Xe., 1204 ppm Boron SGBD @ 40 gpm. Bus 24E is aligned to Bus 24C. TDAFP is OOS for bearing replacement.</u>		
Turnover: <u>100% power, BOL, Eq. Xe., 1204 ppm Boron, blend ratio: 3.89:1 SGBD @ 40 gpm per S/G, Bus 24E aligned to Bus 24C, TDAFP is OOS for bearing replacement. In TSAS 3.7.1.2a and TRM Table 7.1.15-1, ACTIONS b.1 and b.2 for fire areas R-3, R-11, R-16 and R-17.</u>		

Event No.	Malf. No.	Event Type*	Event Description
1	SW9A	C (BOP/S)	"A" Service Water Pump degrading performance. (TS). (Swap Service Water Pumps.)
2	RX03B	I (RO/S)	Failure of in-service Pressurizer Pressure transmitter
3	CH07 I/O 06A1A3S15	C (BOP/S)	Non-Vital Bus 22B is lost due to a seismic event
4	RC04	C (RO/S)	Small RCS Leak develops. (TS)
5	N/A	R (All)	Plant shutdown due to RCS leak
6	RC04 ED06B RP04A, B, C, D RP27B	M (All)	Small Break LOCA requiring a Reactor trip. Failure of automatic Reactor trip and manual trip push buttons Loss of Actuation Cabinet 6 on the trip.
7	MS01B	C (BOP/S)	Excess Steam Demand in Containment on #2 S/G after the trip
8	RH06A	C (RO/S)	Failure of "A" Containment Spray Pump to start on CSAS
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor			

Facility: MP2 Scenario No.: ES11LI3 Op-Test No.: 3

Examiners: _____ Operators: _____

Initial Conditions: 46% power, BOL, Eq. Xe., 1338 ppm Boron SGBD @ 40 gpm per SG, 24E aligned to 24C, "A" Main Feed Water Pump in service.

Turnover: 45% power, BOL, Eq. Xe., 1338 ppm Boron, blend ratio: 3.4:1, SGBD @ 40 gpm per SG, 24E aligned to 24C, "A" Main Feed Water Pump in service, waiting for 'B' Main Feed Water Pump to come back from Maintenance, "A" EDG out for PMs, no other equipment OOS and no surveillance in progress or due.

Event No.	Malf. No.	Event Type*	Event Description
1	RM01O/CH08C	I/C (RO/S)	CRAC Rad. Monitor failure, Filter Fan "A", F-32A, trips. (TS)
2	CW04C	C (BOP/S)	Main Condenser tube leak in the "C" water box.
3	RX04B	I (RO/S)	Ch. 'Y' PZR Level transmitter, LT-110Y (selected), failure.
4	FW23	C (BOP/S)	'A' Condensate Pump Motor Winding Temperature high.
5	N/A	R (All)	Main Feed Water Pump problem requiring plant shutdown.
6	ED05A	M (All)	Loss of bus 24C requiring a plant trip.
7	RC02B	M (All)	"B" RCP Seal Cooler rupture (Intersystem SB-LOCA)
8	SI04C	C (RO/S)	'C' HPSI Pump trip (loss of SI flow).
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor			