Changes to the Initial K/A Random Selections

RO

During the process of checking the selected K/As for balance of coverage across the three tiers, as described in ES-401 section D.1.e. (Rev 8 supplemental) it was discovered that the initial random selection resulted in the selection of 13 K/As that were related in some fashion to detection, monitoring and operation of radiation monitors. In order to correct this imbalance, the following was implemented:

For E/APE and systems for which a K/A was selected that was related to radiation, but the major function was not radioactive waste, radiation control or monitoring, the K/A for that system was randomly reselected. This resulted in the following changes.

E/APE or System	Original K/A	Reselected K/A
000026 Loss of Component Cooling Water	AA1.05 Ability to operate and / or monitor the following as they apply to the Loss of Component Cooling Water: The CCWS surge tank, including level control and level alarms, and radiation alarm	AK3.02 Knowledge of the reasons for the following responses as they apply to the loss of Component Cooling Water: The automatic actions (alignments) within the CCWS resulting from the actuation of the ESFAS
000076 High Reactor Coolant Activity	AK2.01 Knowledge of the interrelations between the High Reactor Coolant Activity and the following: Process radiation monitors	AA2.02 Ability to determine and interpret the following as they apply to the High Reactor Coolant Activity Corrective actions required for high fission product activity in RCS.
# 055 Condenser Air Removal	K1.06 Knowledge of the physical connections and/or cause-effect relationships between the CARS and the following systems: PRM system	A3.03 Ability to monitor automatic operation of the CARS, including: Automatic diversion of CARS exhaust.

Two of the 13 related K/As had essentially the same wording of the knowledge statements. One of the two was randomly deselected and a previously deselected E/APE from the same tier/group was selected. This resulted in the following change:

Deselected	# 000060 Accidental Gaseous Radwaste Rel. / 9	AA1.01 Knowledge of the interrelations between the Area Radiation Monitoring (ARM) System Alarms and the following: Detectors at each ARM system location
replaced with	000022 Loss of reactor Coolant Makeup	AA2.04 Ability to determine and interpret the following as they apply to the Loss of Reactor Coolant Pump Makeup: How long PZR level can remain within limits.

The final reduction in the number of radiation related K/A was to randomly eliminate one of the two K/As which had been selected for the only system that had two K/As. This resulted in the following change:

deselected	# 068 Liquid Radwaste	K6.10 Knowledge of the effect of a loss or malfunction on the following will have on the Liquid Radwaste System: Radiation
replaced with	013 Engineered Safety Features Actuation System (ESFAS)	K3.03 Knowledge of the effect that a loss or malfunction of the ESFAS will have on the following: Containment.

Other changes from the original random selection process include:

E/APE or System	Original K/A	Reselected K/a	Reason
022 Containment Cooling	2.2.25 Knowledge of bases in technical specifications for limiting conditions for operations and safety limits.	A4.04 Ability to manually operate and/or monitor in the control room: Valves in the CCS	Technical Specification bases are outside knowledge requirements according to facility SAT results.
Generic	2.3.6 Knowledge of the requirements for reviewing and approving release permits.	2.3.4 Knowledge radiation exposure limits and contamination control, including permissible levels in excess of those authorized.	Examination of 2.3.6 is performed in an Admin JPM.

Changes made 7/16/2000 as result of the NRC Exam Review

E/APE or System	Original K/A	Replacement K/A	Reason
074 Inadequate Core Cooling	EA2.08	055 Station blackout EA2.02	The KA for E/APE 074 was deselected as a result of NRC Exam review. It was determined that the question for E/APE 074 was very similar to the question used for E/APE 024 in the SRO exam. Therefore, it was logical to delete the KA and question for E/APE 074. The question for E/APE 074 had also been used on the RO exam, where it was also deleted. The question for E/APE 074 was replaced with the question associated with E/APE 055. The question for E/APE had previously been designated as an SRO level question. However, after discussion with the NRC, it was determined that it could be used at the RO level and placed on both the RO and SRO exam.
072 Area Radiation Monitoring	K5.02	001 Control Rod Drive K5.04	NRC Exam review revealed the question for this KA was inadequate. There was an adequate number of radiation related questions. Therefore, this KA was deselected and replaced with a question from the SRO exam that was deemed to be at the RO level. That question was linked to System KA 001 K5.04

Changes to the Initial K/A Random Selections

SRO

During the process of checking the selected K/As for balance of coverage across the three tiers, as described in ES-401 section D.1.e. (Rev 8 supplemental) it was discovered that the initial random selection resulted in the selection of 13 K/As that were related in some fashion to detection, monitoring and operation of radiation monitors. In order to correct this imbalance, the following was implemented:

For E/APE and systems for which a K/A was selected that was related to radiation, but the major function was not radioactive waste, radiation control or monitoring, the K/A for that system was randomly reselected. This resulted in the following changes.

E/APE or System	Original K/A	Reselected K/A
000026 Loss of Component Cooling Water	AA1.05 Ability to operate and / or monitor the following as they apply to the Loss of Component Cooling Water: The CCWS surge tank, including level control and level alarms, and radiation alarm	AK3.02 Knowledge of the reasons for the following responses as they apply to the loss of Component Cooling Water: The automatic actions (alignments) within the CCWS resulting from the actuation of the ESFAS
000076 High Reactor Coolant Activity	AK2.01 Knowledge of the interrelations between the High Reactor Coolant Activity and the following: Process radiation monitors	AA2.02 Ability to determine and interpret the following as they apply to the High Reactor Coolant Activity Corrective actions required for high fission product activity in RCS.
# 055 Condenser Air Removal	K1.06 Knowledge of the physical connections and/or cause-effect relationships between the CARS and the following systems: PRM system	A3.03 Ability to monitor automatic operation of the CARS, including: Automatic diversion of CARS exhaust.

Two of the 13 related K/As had essentially the same wording of the knowledge statements. One of the two was randomly deselected and a previously deselected E/APE from the same tier/group was selected. This resulted in the following change:

Deselected	# 000060 Accidental Gaseous Radwaste Rel. / 9	AA1.01 Knowledge of the interrelations between the Area Radiation Monitoring (ARM) System Alarms and the following: Detectors at each ARM system location
replaced with	000022 Loss of reactor Coolant Makeup	AA2.04 Ability to determine and interpret the following as they apply to the Loss of Reactor Coolant Pump Makeup: How long PZR level can remain within limits.

The final reduction in the number of radiation related K/A was to randomly eliminate one of the two K/As which had been selected for the only system that had two K/As. This resulted in the following change:

deselected	# 068 Liquid Radwaste	K6.10 Knowledge of the effect of a loss or malfunction on the following will have on the Liquid Radwaste System: Radiation
replaced with	022 Containment Cooling	A4.04 Ability to manually operate and/or monitor in the control room: Valves in the CCS

Other changes from the original random selection process include:

E/APE or System	Original K/A	Replacement K/A	Reason
022 Containment Cooling	2.2.25 Knowledge of bases in technical specifications for limiting conditions for operations and safety limits.	A4.04 Ability to manually operate and/or monitor in the control room: Valves in the CCS	A4.04 added to RO exam and is used here to replace 068-K6.
Generic	2.1.17 Ability to make accurate, clear and concise verbal reports."	2.1.1 Knowledge of conduct of operations requirements	2.1.17 deselected from written exam because Part C is a better environment for examination of this ability.

Changes on 7/17/2000 made as result of NRC Exam review.

E/APE or System	Original K/A	Replacement K/A	Reason
013 ESFAS	A2.05	A2.04	NRC Exam review: Changed to ensure SRO Level Concept
064 ED/G	A2.19	A2.18	NRC Exam review: Changed to ensure SRO Level Concept
074 Inadequate Core Cooling	EA2.08	055 Station Blackout EA2.02	The KA for E/APE 074 was deselected as a result of NRC Exam review. It was determined that the question for E/APE 074 was very similar to the question used for E/APE 024 in the SRO exam. Therefore, it was logical to delete the KA and question for E/APE 074. The question for E/APE 074 had also been used on the RO exam, where it was also deleted. The question for E/APE 074 was replaced with the question associated with E/APE 055. The question for E/APE had previously been designated as an SRO level question. However, after discussion with the NRC, it was determined that it could be used at the RO level and placed on both the RO and SRO exam.

Millstone Unit 2: Changes to the Examination Plan

The following changes were made to the examination plan submitted to the NRC on May 5, 2000.

Written Exam

- SRO and RO Tier 2/Group 1 System 004. Changed K6.17 to K6.05. Changed because the question was very similar to a JPM which had been developed for emergency boration. Limited a random redraw to K6 category and drew K6.05

- SRO and RO Tier 2/Group 2 System 006. Changed A3.04 to A3.03. Changed to eliminate conflict with other RBCCW questions on the exam. Limited selection to the A3 category and selected the first topic that could be used on the exam.

Operating Test Part B JPMs.

- Operating Test 1: Deleted "Respond to Loss of RBCCW" because there were not enough critical tasks. Replaced with "Placing RBCCW Heat Exchanger "B" in Service and Removing RBCCW Heat Exchanger "A". Modified this JPM by eliminating the pump start to reduce time requirements for the JPM.

- Operating Test 2: As a result of NRC feedback, deleted "Dropped CEA Recovery" to eliminate testing two Safety Function #1 categories and replaced it with "Placing RBCCW Heat Exchanger "B" in Service and Removing RBCCW Heat Exchanger "A".

- Operating Test 1 and 2: Swapped "Pumping the Containment Sump" from Test 2 to Test 1 and swapped "Manually Placing EBFS in Operation on the Enclosure Building Filtration Region" from Test 1 to Test 2. Swap was made to meet the number of alternative path JPMs on each exam. "Pumping the Containment Sump" was modified to make an alternative path.

Operating Test Part C Simulator Scenarios

- Scenario 1:
  - ◊ Event 1 As result of NRC feedback, replaced with an event that causes operator to take definitive action.
  - ◊ Events 3, 4, and 6: Adjusted malfunction severity to improve scenario.
  - ◊ Event 6. Added malfunction FW20B to ensure operator action.

- Scenario 2
  - ◊ Event 6. Deleted RX13B because the scenario may not cause operator action for this event.
  - ◊ Added a new event 3 to ensure a component failure for the BOP.

- Scenario 3:
  - ◊ Event 3. As a result of NRC feedback, replaced a component failure with an instrumentation failure for the BOP.
  - ◊ Event 6: As a result of NRC feedback, reclassified EG09B and ES03G from an instrument failure to a component failure
  - ◊ Event 6: Added additional FW malfunctions to get desired response.

Scenario 5: Event 5 Replaced the "RCS leak to RBCCW" with a LOCA because of inadequate simulator response during scenario development.

Facility: Millstone Unit 2	8/2000 NRC EXAM	Exam Level: SRO

Tier	Group	K/A Category Points											Point Total
		K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G	
1. Emergency & Abnormal Plant Evolutions	1	3	3	3				3	6			6	24
	2	3	2	1				1	5			4	16
	3	1							2				3
	Tier Totals	7	5	4				4	13			10	43
2. Plant Systems	1	2	1	1	1	1	1	1	6	1	3	1	19
	2		1	2	1	1	1	1	4	2	1	3	17
	3	1			1					1	1		4
	Tier Totals	3	2	3	3	2	2	2	10	4	5	4	40

3. Generic Knowledge and Abilities	Cat 1	Cat 2	Cat 3	Cat 4	
	6	4	3	4	17

Note:

1. Ensure that at least two topics from every K/A category are sampled within each tier (i.e., the "Tier Totals" in each K/A category shall not be less than two).
2. Actual point totals must match those specified in the table.
3. Select topics from many systems; avoid selecting more than two or three K/A topics from a given system unless they relate to plant-specific priorities
4. Systems/evolutions within each group are identified on the associated outline.
5. The shaded areas are not applicable to the category/tier.
6. * 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.
7. On the following pages, enter the K/A numbers, a brief description of each topic, the topics' importance ratings for the RO license level, and the point totals for each system and category. K/As below 2.5 should be justified on the basis of plant-specific priorities. Enter the tier totals for each category in the table above.

ES-401	PWR SRO Examination Outline Emergency and Abnormal Plant Evolutions - Tier 1/Group 1	Form ES-401-3

Q ID	Tier 1/Group 1 E/APE / Name / Safety Function	K1	K2	K3	A1	A2	G	K/A Topic(s)	Imp.	Pts
1000004	000001 Continuous Rod Withdrawal / 1				X			AA1.02 Ability to operate and / or monitor the following as they apply to the Continuous Rod Withdrawal: Rod in-out-hold switch	3.6/3.4	1
155142	000003 Dropped Control Rod / 1					X		AA2.04 Ability to determine and interpret the following as they apply to the Dropped Control Rod: Rod motion stops due to dropped rod	4.2/4.3	1
171892	000005 Inoperable/Stuck Control Rod / 1	X						AK1.03 Knowledge of the operational implications of the following concepts as they apply to Inoperable / Stuck Control Rod: Xenon transient	3.2/3.6	1
171902 SRO	000005 Inoperable/Stuck Control Rod / 1						X	2.4.50 Ability to verify system alarm setpoints and operate controls identified in the alarm response manual.	3.3/3.3	1
56804	000011 Large Break LOCA / 3				X			EA1.10 Ability to operate and monitor the following as they apply to a Large Break LOCA: AFW and SWS pumps	4.1/3.8	1
	W/E04 LOCA Outside Containment / 3									
	W/E02&E02 Rediagnosis SI Termination / 3									
154039	000015/17 RCP Malfunctions / 4				X			AA1.16 Ability to operate and / or monitor the following as they apply to the Reactor Coolant Pump Malfunctions (Loss of RC Flow): Low-power reactor trip block status lights	3.2/3.5	1
55194	BW/E09; CE/A13; W/E09&E10 Natural Circ. / 4						X	2.4.48 "Ability to interpret control room indications to verify the status and operation of system, and understand how operator actions and directives affect plant and system conditions."	3.5/3.8	1
156794 SRO	000024 Emergency Boration / 1						X	2.4.7 Knowledge of event based EOP mitigation strategies.	3.1/3.8	1
166021	000026 Loss of Component Cooling Water / 8			X				AK3.02 Knowledge of the reasons for the following responses as they apply to the loss of Component Cooling Water: The automatic actions (alignments) within the CCWS resulting from the actuation of the ESFAS	3.6/3.9	1
154390	000029 Anticipated Transient w/o Scram / 1			X				EK3.12 Knowledge of the reasons for the following responses as the apply to the ATWS: Actions contained in EOP for ATWS	4.4/4.7	1

Q ID	Tier 1/Group 1 E/APE / Name / Safety Function	K1	K2	K3	A1	A2	G	K/A Topic(s)	Imp.	Pts
54316	000040 (BW/E05; CE/E05; W/E12) Steam Line Rupture - Excessive Heat Transfer / 4					X		AA2.05 Ability to determine and interpret the following as they apply to the Steam Line Rupture: When ESFAS systems may be secured	4.1/4.5	1
159999 SRO	000040 (BW/E05; CE/E05; W/E12) Steam Line Rupture - Excessive Heat Transfer / 4						X	2.4.9 Knowledge of low power / shutdown implications in accident (e.g. LOCA or loss of RHR) mitigation strategies.	3.3/3.9	1
54362	CE/A11; W/E08 RCS Overcooling - PTS / 4					X		AA2.1 Ability to determine and interpret facility conditions and selection of appropriate procedures during abnormal and emergency operations as they apply to the RCS Overcooling.	3.2/4.4	1
155945	000051 Loss of Condenser Vacuum / 4			X				AK3.01 Knowledge of the reasons for the following responses as they apply to the Loss of Condenser Vacuum: Loss of steam dump capability upon loss of condenser vacuum	2.8/3.1	1
156296	000055 Station Blackout / 6	X						EK1.02 Knowledge of the operational implications of the following concepts as they apply to the Station Blackout: Natural circulation cooling	4.1/4.4	1
155243	000057 Loss of Vital AC Elec. Inst. Bus / 6						X	2.4.10 Knowledge of annunciator response procedures.	3.3/4.0	1
55166	000059 Accidental Liquid RadWaste Rel. / 9		X					AK2.02 Knowledge of the interrelations between the Accidental Liquid Radwaste Release and the following: Radioactive-gas monitors	2.7/2.7	1
71544	000062 Loss of Nuclear Service Water / 4					X		AA2.04 Ability to determine and interpret the following as they apply to the Loss of Nuclear Service Water: The normal values and upper limits for the temperatures of the components cooled by SWS	2.5/2.9	1
54070 SRO	000062 Loss of Nuclear Service Water / 4						X	2.4.35 Knowledge of local auxiliary operator tasks during emergency operations including system geography and system implications.	3.3/3.5	1
171736	000067 Plant Fire On-Site / 9	X						AK1.02 Knowledge of the operational implications of the following concepts as they apply to Plant Fire on Site: Fire fighting	3.1/3.9	1
153964	000068 (BW/A06) Control Room Evac. / 8		X					AK2.01 Knowledge of the interrelations between the Control Room Evacuation and the following: Auxiliary shutdown panel layout	3.9/4.0	1
55532	000069 (W/E14) Loss of CTMT Intregrity / 5		X					AK2.03 Knowledge of the interrelations between the Loss of Containment Integrity and the following: Personnel access hatch and emergency access hatch	2.8/2.9	1

Q ID	Tier 1/Group 1 E/APE / Name / Safety Function	K1	K2	K3	A1	A2	G	K/A Topic(s)	Imp.	Pts
54015	000074 (W/E06&E07) Inad. Core Cooling / 4					X		EA2.08 Ability to determine or interpret the following as they apply to a Inadequate Core Cooling: The effect of turbine bypass valve operation on RCS temperature and pressure	3.8/4.6	1
	BW/E03 Inadeqaute Subcooling Margin / 4									
153394	000076 High Reactor Coolant Activity / 9					X		AA2.02 Ability to determine and interpret the following as they apply to the High Reactor Coolant Activity Corrective actions required for high fission product activity in RCS	2.8/3.4	1
	BW/A02&A03 Loss of NNI-X/Y / 7									
	K/A Category Totals:	3	3	3	3	6	6	Group Point Total:		24

ES-401	PWR SRO Examination Outline Emergency and Abnormal Plant Evolutions - Tier 1/Group 2	Form ES-401-3

Q ID	Tier 1/Group 2 E/APE / Name / Safety Function	K1	K2	K3	A1	A2	G	K/A Topic(s)	Imp.	Pts
171497	000007 (BW/E02&E10; CE/E02) Reactor Trip - Stabilization - Recovery / 1						X	2.4.45 Ability to prioritize and interpret the significance of each annunciator or alarm.	3.3/3.6	1
	BW/A01 Plant Runback / 1									
	BW/A04 Turbine Trip / 4									
153615	000008 Pressurizer Vapor Space Accident / 3	X						AK1.02 Knowledge of the operational implications of the following concepts as they apply to a Pressurizer Vapor Space Accident: Change in leak rate with change in pressure	3.1/3.7	1
153334	000009 Small Break LOCA / 3	X						EK1.02 Knowledge of the operational implications of the following concepts as they apply to the small break LOCA: Use of steam tables	3.5/4.2	1
	BW/E08; W/E03 LOCA Cooldown - Depress. / 4									
	W/E11 Loss of Emergency Coolant Recirc. / 4									
1000020	000022 Loss of Reactor Coolant Makeup / 2					X		AA2.04 Ability to determine and interpret the following as they apply to the Loss of Reactor Coolant Pump Makeup: How long PZR level can remain within limits.	2.9/3.8	1
1000019 SRO	000025 Loss of RHR System / 4					X		AA2.05 Ability to determine and interpret the following as they apply to the Loss of Residual Heat Removal System: Limitations on LPI flow and temperature rates of change	2.4/2.5	1
167070	000027 Pressurizer Pressure Control System Malfunction / 3		X					AK2.03 knowledge of the interrelationships between the pressurizer Pressure control malfunctions and the following: controllers and positioners.	2.6/2.8	1
153748 SRO	000027 Pressurizer Pressure Control System Malfunction / 3					X		AA2.16Ability to determine and interpret the following as they apply to the Pressurizer Pressure Control Malfunctions: Actions to be taken if PZR pressure instrument fails low	3.6/3.9	1
155773	000032 Loss of Source Range NI / 7					X		AA2.03 Ability to determine and interpret the following as they apply to the Loss of Source Range Nuclear Instrumentation: Expected values of source range indication when high voltage is automatically removed	2.8/3.1	1

Q ID	Tier 1/Group 2 E/APE / Name / Safety Function	K1	K2	K3	A1	A2	G	K/A Topic(s)	Imp.	Pts
166910	000033 Loss of Intermediate Range NI / 7					X		AA2.02 Ability to determine and interpret the following as they apply to the Loss of Intermediate Range Nuclear Instrumentation: Indications of unreliable intermediate-range channel operation	3.3/3.6	1
55424	000037 Steam Generator Tube Leak / 3						X	2.4.11 Knowledge of abnormal condition procedures.	3.4/3.6	1
153546	000038 Steam Generator Tube Rupture / 3						X	2.4.9 Knowledge of low power / shutdown implications in accident (e.g. LOCA or loss of RHR) mitigation strategies.	3.3/3.9	1
171249	000054 (CE/E06) Loss of Main Feedwater / 4	X						AK1.02 Knowledge of the operational implications of the following concepts as they apply to Loss of Main Feedwater (MFW): Effects of feedwater introduction on dry S/G	4.1/4.3	1
	BW/E04; W/E05 Inadeqaute Heat Transfer - Loss of Secondary Heat Sink / 4									
154999	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	4.0/4.2	1
	~~000060 Accidental Gaseous Radwaste Rel. / 9~~							Revised random deselection		
53448	000061 ARM System Alarms / 7		X					AK2.01 Knowledge of the interrelations between the Area Radiation Monitoring (ARM) System Alarms and the following: Detectors at each ARM system location	2.5/2.6	1
	W/E16 High Containment Radiation / 9									
153290 SRO	000065 Loss of Instrument Air / 8						X	2.4.30 Knowledge of which events related to system operations/status should be reported to outside agencies	2.2/3.6	1
153572	CE/E09 Functional Recovery				X			EA1.3 Ability to operate and/or monitor desired operating results during abnormal and emergency situations as they apply to the Functional Recovery.	3.6/3.8	1
	K/A Category Point Totals:	3	2	1	1	5	4	Group Point Total:		16

ES-401	PWR SRO Examination Outline Emergency and Abnormal Plant Evolutions - Tier 1/Group 3	Form ES-401-3

Q ID	Tier 1/Group 3 E/APE / Name / Safety Function	K1	K2	K3	A1	A2	G	K/A Topic(s)	Imp.	Pts
1000006	000028 Pressurizer Level Malfunction / 2					X		AA2.14 Ability to determine and interpret the following as they apply to the Pressurizer Level Control Malfunctions: The effect on indicated PZR levels, given a change in ambient pressure and temperature of reflux boiling	2.6/2.8	1
154074	000036 (BW/A08) Fuel Handling Accident / 8	X						AK1.02 Knowledge of the operational implications of the following concepts as they apply to Fuel Handling Incidents : SDM	3.4/3.8	1
153881 SRO	000056 Loss of Off-site Power / 6					X		AA2.88 Ability to determine and interpret the following as they apply to the Loss of Offsite Power: Necessary S/G water level for natural circulation	4.1/4.2	1
	BW/E13&E14 EOP Rules and Enclosures									
	BW/A05 Emergency Diesel Actuation / 6									
	BW/A07 Flooding / 8									
	~~CE/A16 Excess RCS Leakage / 2~~							Deleted via token selection		
	W/E13 Steam Generator Over-pressure / 4									
	W/E15 Containment Flooding / 5									
	K/A Category Point Totals:	1				2		Group Point Total:		3

ES-401	PWR SRO Examination Outline Plant Systems - Tier 2/Group 1	Form ES-401-3

Q ID	Tier 2/Group 1 System / Name	K1	K2	K3	K4	K5	K 6	A 1	A 2	A 3	A 4	G	K/A Topic(s)	Imp.	Pts
1000003	001 Control Rod Drive	X											K1.03 Knowledge of the physical connections and/or cause -effect relationships between the CRDS and the following systems: CRDM	3.4/3.6	1
153415	003 Reactor Coolant Pump		X										K2.02 Knowledge of bus power supplies to the following: CCW pumps	2.5/2.6	1
1000023	004 Chemical and Volume Control						X						K6.05 Knowledge of the effect of a loss or malfunction on the following CVCS components: Sensors and Detectors	2.5/2.5	1
155434 SRO	013 Engineered Safety Features Actuation								X				A2.05 Ability to (a) predict the impacts of the following malfunctions or operations on the ESFAS; and (b) based Ability on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations; Loss of dc control power	3.7/4.2	1
71157 SRO	014 Rod Position Indication								X				A2.06 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: Loss of LVDT	3.4/3.7	1
154444	015 Nuclear Instrumentation	X											K1.01 Knowledge of the physical connections and/or cause- effect relationships between the NIS and the following systems: RPS	4.1/4.2	1
54862	017 In-core Temperature Monitor							X					A1.01Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the ITM system controls including: Core exit temperature	3.7/3.9	1

Q ID	Tier 2/Group 1 System / Name	K1	K2	K3	K4	K5	K 6	A 1	A 2	A 3	A 4	G	K/A Topic(s)	Imp.	Pts
1000009	017 In-core Temperature Monitor								X				A2.01 Ability to (a) predict the impacts of the following malfunctions or operations on the ITM system; and (b) based on those predictions, use procedures to correct, control or mitigate the consequences of those malfunctions or operations: Thermocouple open and short circuits	3.1/3.5	1
156991 SRO	022 Containment Cooling											X	2.2.25 Knowledge of bases in technical specifications for limiting conditions for operations and safety limits	3.1/3.2	1
153466	022 Containment Cooling										X		A4.04 Ability to manually operate and/or monitor in the control room: Valves in the CCS	2.5/3.7	1
	025 Ice Condenser														
155326	026 Containment Spray				X								K4.02 Knowledge of CSS design feature(s) and/or interlock(s) which provide for the following: Neutralized boric acid to reduce corrosion and remove inorganic fission product iodine from steam (NAOH) in containment spray	3.1/3.6	1
1000007	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	2.6/2.8	1
154212 SRO	059 Main Feedwater								X				A2.03 Ability to (a) predict the impacts of the following malfunctions or operations on the MFW; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Overfeeding event	2.7/3.1	1
1000008	059 Main Feedwater			X									K3.04 Knowledge of the effect that a loss or malfunction of the MFW will have on the following: RCS	3.6/3.8	1
154752	061 Auxiliary/Emergency Feedwater									X			A3.03 Ability to monitor automatic operation of the AFW, including: AFW S/G level control on automatic start	3.9/3.9	1

Q ID	Tier 2/Group 1 System / Name	K1	K2	K3	K4	K5	K 6	A 1	A 2	A 3	A 4	G	K/A Topic(s)	Imp.	Pts
153683	063 DC Electrical Distribution										X		A4.02 Ability to manually operate and/or monitor in the control room: Battery voltage indicator	2.8/2.9	1
153375 SRO	068 Liquid Radwaste								X				A2.04 Ability to (a) predict the impacts of the following malfunctions or operations on the Liquid Radwaste System ; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Failure of automatic isolation	3.3/3.3	1
155013	071 Waste Gas Disposal										X		A4.06 Ability to manually operate and/or monitor in the control room: Meteorological charts and recorders, along with the stop-time and waste-gas release number	2.8/3.3	1
1000024	072 Area Radiation Monitoring					X							K5.02 Ability to manually operate and/or monitor in the control room: Alarm and interlock setpoint checks and adjustments	2.5/3.2	1
	K/A Category Point Totals:	2	1	1	1	1	1	1	6	1	3	1	Group Point Total:		19

ES-401	PWR SRO Examination Outline Plant Systems - Tier 2/Group 2	Form ES-401-3

Q ID	Tier 2/Group 2 System / Name	K1	K2	K3	K4	K5	K 6	A 1	A 2	A 3	A 4	G	K/A Topic(s)	Imp.	Pts
54119 SRO	002 Reactor Coolant								X				A2.01 Ability to (a) predict the impacts of the following malfunctions or operations on the RCS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Loss of coolant inventory	4.3/4.4	1
53550	006 Emergency Core Cooling									X			A3.03 Ability to monitor automatic operation of the ECCS, including: ESFAS operated valves	4.1/4.1	1
1000005	010 Pressurizer Pressure Control					X							K5.01 Knowledge of the operational implications of the following concepts as the apply to the PZR PCS: Determination of condition of fluid in PZR, using steam tables	3.5/4.0	1
170314	011 Pressurizer Level Control						X						K6.03 Knowledge of the effect of a loss or malfunction on the following will have on the PZR LCS: Relationship between PZR level and PZR heater control circuit	2.9/3.3	1
155348	012 Reactor Protection		X										K2.01 Knowledge of bus power supplies to the following: RPS channels, components, and interconnections	3.3/3.7	1
54508	016 Non-nuclear Instrumentation										X		A4.02 Ability to manually operate and/or monitor in the control room: Recorders	2.7/2.6	1
	027 Containment Iodine Removal														
	~~028 Hydrogen Recombiner and Purge Control~~												deselected by Token		
156262	029 Containment Purge			X									K3.01 Knowledge of the effect that a loss or malfunction of the Containment Purge System will have on the following: Containment parameters	2.9/3.1	1

Q ID	Tier 2/Group 2 System / Name	K1	K2	K3	K4	K5	K 6	A 1	A 2	A 3	A 4	G	K/A Topic(s)	Imp.	Pts
53711	033 Spent Fuel Pool Cooling				X								K4.01 Knowledge of design feature(s) and/or interlock(s) which provide for the following: Maintenance of spent fuel level	2.9/3.2	1
71630	034 Fuel Handling Equipment								X				A2.01 Ability to (a) predict the impacts of the following malfunctions or operations on the Fuel Handling System and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Dropped fuel element	3.6/4.4	1
55052	035 Steam Generator								X				A2.03 Ability to (a) predict the impacts of the following malfunctions or operations on the GS [SG]; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Pressure/level transmitter failure	3.4/3.6	1
	~~039 Main and Reheat Steam~~												deselected by Token		
154817	055 Condenser Air Removal									X			A3.03 Ability to monitor automatic operation of the CARS, including: automatic diversion of CARS exhaust	2.5/2.7	1
	~~062 AC Electrical Distribution~~												deselected by Token		
1000015 SRO	064 Emergency Diesel Generator								X				A2.19 Ability to (a) predict the impacts of the following malfunctions or operations on the ED/G system; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Consequences of high VARS on ED/G integrity	2.5/2.7	1
256689 SRO	073 Process Radiation Monitoring											X	2.1.26 "Knowledge of non-nuclear safety procedures (e.g. rotating equipment, electrical, high temperature, high pressure, caustic, chlorine, oxygen and hydrogen)."	2.2/2.6	1
54780	075 Circulating Water											X	2.2.2 Ability to manipulate the console controls as required to operate the facility between shutdown and designated power levels.	4.0/3.5	1

Q ID	Tier 2/Group 2 System / Name	K1	K2	K3	K4	K5	K 6	A 1	A 2	A 3	A 4	G	K/A Topic(s)	Imp.	Pts
155248	079 Station Air											X	2.1.28 Knowledge of the purpose and function of major system components and controls	3.9/4.0	1
153383	086 Fire Protection			X									K3.01 Knowledge of the effect that a loss or malfunction of the Fire Protection System will have on the following: Shutdown capability with redundant equipment	2.7/3.2	1
56738	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	3.7/4.1	1
	K/A Category Point Totals:	0	1	2	1	1	1	1	4	2	1	3	Group Point Total:		17

ES-401	PWR SRO Examination Outline Plant Systems - Tier 2/Group 3	Form ES-401-3

Q ID	Tier 2/Group 3 System / Name	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G	K/A Topic(s)	Imp.	Pts
55557	005 Residual Heat Removal	X											K1.11 Knowledge of the physical connections and/or cause-effect relationships between the RHRS and the following systems: RWST	3.5/3.6	1
	~~007 Pressurizer Relief/Quench Tank~~												Deselected by Token		
	~~008 Component Cooling Water~~												Deselected by Token		
	~~041 Steam Dump/Turbine Bypass Control~~												Deselected by Token		
71941	045 Main Turbine Generator										X		A4.02 Ability to manually operate and/or monitor in the control room: T/G controls, including breakers	2.7/2.6	1
55381	076 Service Water				X								K4.03 Knowledge of SWS design feature(s) and/or interlock(s) which provide for the following: Automatic opening features associated with SWS isolation valves to CCW heat exchanges	2.9/3.4	1
155635	078 Instrument Air									X			A3.01 Ability to monitor automatic operation of the IAS, including: Air pressure	3.1/3.2	1
	K/A Category Point Totals:	1			1					1	1		Group Point Total:		4

Plant-Specific Priorities			
System / Topic	Recommended Replacement for	Reason	Points
Plant-Specific Priority Total: (limit 10)			

ES-401 Generic Knowledge and Abilities Outline (Tier 3) Form ES-401-5

Facility: Millstone Unit 2			Date of Exam:		Exam Level: **SRO**
Category	K/A		Topic	Imp.	Pts
Conduct of Operations	1000011 SRO	2.1.20	Ability to execute procedure steps.	4.3/4.2	1
	1000014	2.1.16	"Ability to operate plant phone, paging system, and two-way radio."	2.9/2.8	1
	54192	2.1.12	Ability to apply technical specifications for a system.	2.9/4.0	1
	1000017 SRO	2.1.22	Ability to determine Mode of Operation.	2.8/3.3	1
	56833	2.1.29	Knowledge of how to conduct and verity valve linups.	3.4/3.3	1
	54312 SRO	2.1.1	Knowledge of conduct of operations requirements	3.7/3.8	1
	Total				6
Equipment Control	55985	2.2.23	Ability to track limiting conditions for operations.	2.6/3.8	1
	56644	2.2.11	Knowledge of the process for controlling temporary changes.	2.5/3.4	1
	156586 SRO	2.2.9	"Knowledge of the process for determining if the proposed change, test or experiment increases the probability of occurrence or consequences of an accident during the change, test or experiment."	2.0/3.3	1
	155871 SRO	2.2.6	Knowledge of the process for making changes in procedures as described in the safety analysis report.	2.3/3.3	1
	Total				4
Radiation Control	54733	2.3.11	Ability to control radiation releases.	2.7/3.2	1
	1000018 SRO	2.3.4	Knowledge radiation exposure limits and contamination control, including permissible levels in excess of those authorized.	2.5/2.9	1
	1000021 SRO	2.3.10	Ability to perform procedures to reduce excessive levels of radiation and guard against personnel exposure.	2.9/3.3	1
	Total				3
Emergency Procedures and Plan	54366 SRO	2.4.12	Knowledge of general operating crew responsibilities during emergency operations.	3.4/3.9	1
	154054	2.4.15	Knowledge of communications procedures associated with EOP implementation.	3.0/3.5	1
	56520	2.4.21	Knowledge of the parameters and logic used to assess the status of safety functions including: 1. Reactivity control 2. Core cooling and heat removal 3. Reactor coolant system integrity 4. Containment conditions 5. Radioactivity release control.	3.7/4.3	1
	156762 SRO	2.4.8	Knowledge of how the event-based emergency/abnormal operating procedures are used in conjunction with the symptom-based EOPs.	3.0/3.7	1
	Total				4
Tier 1 Target Point Total ~~(RO~~/SRO)					~~13~~/17

Facility: Millstone Unit 2		8/2000 NRC EXAM											Exam Level: RO
Tier	Group	K/A Category Points											Point Total
		K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G	
1. Emergency & Abnormal Plant Evolutions	1	3	3	2				1	5			2	16
	2	3	2	2				3	4			3	17
	3			1				1	1				3
	Tier Totals	6	5	5				5	10			5	36
2. Plant Systems	1	2	2	4	2	2	1	2	2	2	3	1	23
	2	2	1	2	3	1	1	1	3	2	2	2	20
	3	2			1			1	1	1	2		8
	Tier Totals	7	3	6	6	3	2	3	7	5	6	3	51
3. Generic Knowledge and Abilities					Cat 1		Cat 2		Cat 3		Cat 4		
					5		2		2		4		13

Note:

1. Ensure that at least two topics from every K/A category are sampled within each tier (i.e., the "Tier Totals" in each K/A category shall not be less than two).
2. Actual point totals must match those specified in the table.
3. Select topics from many systems; avoid selecting more than two or three K/A topics from a given system unless they relate to plant-specific priorities
4. Systems/evolutions within each group are identified on the associated outline.
5. The shaded areas are not applicable to the category/tier.
6. * 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.
7. On the following pages, enter the K/A numbers, a brief description of each topic, the topics' importance ratings for the RO license level, and the point totals for each system and category. K/As below 2.5 should be justified on the basis of plant-specific priorities. Enter the tier totals for each category in the table above.

Q ID	Tier 1/Group 1 E/APE / Name / Safety Function	K1	K2	K3	A1	A2	G	K/A Topic(s)	Imp.	Points
171892	000005 Inoperable/Stuck Control Rod / 1	X						AK1.03 Knowledge of the operational implications of the following concepts as they apply to Inoperable / Stuck Control Rod: Xenon transient	3.2/3.6	1
154039	000015/17 RCP Malfunctions / 4				X			AA1.16 Ability to operate and / or monitor the following as they apply to the Reactor Coolant Pump Malfunctions (Loss of RC Flow): Low-power reactor trip block status lights	3.2/3.5	1
55194	BW/E09; CE/A13; W/E09&E10 Natural Circ. / 4						X	2.4.48" Ability to interpret control room indications to verify the status and operation of system, and understand how operator actions and directives affect plant and system conditions."	3.5/3.8	1
	~~000024 Emergency Boration / 1~~							Random Deselection		
166021	000026 Loss of Component Cooling Water / 8			X				AK3.02 Knowledge of the reasons for the following responses as they apply to the loss of Component Cooling Water: The automatic actions (alignments) within the CCWS resulting from the actuation of the ESFAS	3.6/3.9	1
167070	000027 Pressurizer Pressure Control System Malfunction / 3		X					AK2.03 Knowledge of the interrelations between the Pressurizer Pressure Control Malfunctions and the following: Controllers and positioners	2.6/2.8	1
54316	000040 (BW/E05; CE/E05; W/E12) Steam Line Rupture Excessive Heat Transfer / 4					X		AA2.05 Ability to determine and interpret the following as they apply to the Steam Line Rupture: When ESFAS systems may be secured	4.1/4.5	1
54362	CE/A11; W/E08 RCS Overcooling - PTS / 4					X		AA2.1 Ability to determine and interpret facility conditions and selection of appropriate procedures during abnormal and emergency operations as they apply to the RCS Overcooling.	3.2/4.4	1
155945	000051 Loss of Condenser Vacuum / 4			X				AK3.01 Knowledge of the reasons for the following responses as they apply to the Loss of Condenser Vacuum: Loss of steam dump capability upon loss of condenser vacuum	2.8/3.1	1
156296	000055 Station Blackout / 6	X						EK1.02 Knowledge of the operational implications of the following concepts as they apply to the Station Blackout: Natural circulation cooling	4.1/4.4	1
155243	000057 Loss of Vital AC Elec. Inst. Bus / 6						X	2.4.10 Knowledge of annunciator response procedures.	3.3/4.0	1

Q ID	Tier 1/Group 1 E/APE / Name / Safety Function	K1	K2	K3	A1	A2	G	K/A Topic(s)	Imp.	Points
71544	000062 Loss of Nuclear Service Water / 4					X		AA2.04 Ability to determine and interpret the following as they apply to the Loss of Nuclear Service Water: The normal values and upper limits for the temperatures of the components cooled by SWS	2.5/2.9	1
171736	000067 Plant Fire On-Site / 9	X						AK1.02 Knowledge of the operational implications of the following concepts as they apply to Plant Fire on Site: Fire fighting	3.1/3.9	1
153964	000068 (BW/A06) Control Room Evac. / 8		X					AK2.01 Knowledge of the interrelations between the Control Room Evacuation and the following: Auxiliary shutdown panel layout	3.9/4.0	1
55532	000069 (W/E14) Loss of CTMT Intregrity / 5		X					AK2.03 Knowledge of the interrelations between the Loss of Containment Integrity and the following: Personnel access hatch and emergency access hatch	2.8/2.9	1
54015	000074 (W/E06&E07) Inad. Core Cooling / 4					X		EA2.08 Ability to determine or interpret the following as they apply to a Inadequate Core Cooling: The effect of turbine bypass valve operation on RCS temperature and pressure	3.8/4.6	1
	BW/E03 Inadeqaute Subcooling Margin / 4									
153394	000076 High Reactor Coolant Activity / 9					X		AA2.02 Ability to determine and interpret the following as they apply to the High Reactor Coolant Activity Corrective actions required for high fission product activity in RCS	2.8/3.4	1
	BW/A02&A03 Loss of NNI-X/Y / 7									
	K/A Category Totals:	3	3	2	1	5	2	Group Point Total		16

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Q ID	Tier 1/Group 2 E/APE / Name / Safety Function	K1	K2	K3	A1	A2	G	K/A Topic(s)	Imp.	Pts
1000004	000001 Continuous Rod Withdrawal / 1				X			AA1.02 Ability to operate and / or monitor the following as they apply to the Continuous Rod Withdrawal: Rod in-out-hold switch	3.6/3.4	1
155142	000003 Dropped Control Rod / 1					X		AA2.04 Ability to determine and interpret the following as they apply to the Dropped Control Rod: Rod motion stops due to dropped rod	4.2/4.3	1
171497	000007 (BW/E02&E10; CE/E02) Reactor Trip - Stabilization - Recovery / 1						X	2.4.45 Ability to prioritize and interpret the significance of each annunciator or alarm.	3.3/3.6	1
	BW/A01 Plant Runback / 1									
	BW/A04 Turbine Trip / 4									
153615	000008 Pressurizer Vapor Space Accident / 3	X						AK1.02 Knowledge of the operational implications of the following concepts as they apply to a Pressurizer Vapor Space Accident: Change in leak rate with change in pressure	3.1/3.7	1
153334	000009 Small Break LOCA / 3	X						EK1.02 Knowledge of the operational implications of the following concepts as they apply to the small break LOCA: Use of steam tables	3.5/4.2	1
56804	000011 Large Break LOCA / 3				X			EA1.10 Ability to operate and monitor the following as they apply to a Large Break LOCA: AFW and SWS pumps	4.1/3.8	1
	W/E04 LOCA Outside Containment / 3									
	BW/E08; W/E03 LOCA Cooldown/Depress. / 4									
	W/E11 Loss of Emergency Coolant Recirc. / 4									
	W/E01&E02 Rediagnosis & SI Termination / 3									
1000020	000022 Loss of Reactor Coolant Makeup / 2					X		AA2.04 Ability to determine and interpret the following as they apply to the Loss of Reactor Coolant Pump Makeup: How long PZR level can remain within limits.	2.9/3.8	1
	~~000025 Loss of RHR System / 4~~							Random Deselection		
154390	000029 Anticipated Transient w/o Scram / 1			X				EK3.12 Knowledge of the reasons for the following responses as the apply to the ATWS: Actions contained in EOP for ATWS	4.4/4.7	1
155773	000032 Loss of Source Range NI / 7					X		AA2.03 Ability to determine and interpret the following as they apply to the Loss of Source Range Nuclear Instrumentation: Expected values of source range indication when high voltage is automatically removed	2.8/3.1	1

Q ID	Tier 1/Group 2 E/APE / Name / Safety Function	K1	K2	K3	A1	A2	G	K/A Topic(s)	Imp.	Pts
166910	000033 Loss of Intermediate Range NI / 7					X		AA2.02 Ability to determine and interpret the following as they apply to the Loss of Intermediate Range Nuclear Instrumentation: Indications of unreliable intermediate-range channel operation	3.3/3.6	1
55424	000037 Steam Generator Tube Leak / 3						X	2.4.11 Knowledge of abnormal condition procedures.	3.4/3.6	1
153546	000038 Steam Generator Tube Rupture / 3						X	2.4.9 Knowledge of low power / shutdown implications in accident (e.g. LOCA or loss of RHR) mitigation strategies.	3.3/3.9	1
171249	000054 (CE/E06) Loss of Main Feedwater / 4	X						AK1.02 Knowledge of the operational implications of the following concepts as they apply to Loss of Main Feedwater (MFW): Effects of feedwater introduction on dry S/G	4.1/4.3	1
	BW/E04; W/E05 Inadequate Heat Transfer - Loss of Secondary Heat Sink / 4									
154999	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	4.0/4.2	1
55166	000059 Accidental Liquid RadWaste Rel. / 9		X					AK2.02 Knowledge of the interrelations between the Accidental Liquid Radwaste Release and the following: Radioactive-gas monitors	2.7/2.7	1
	~~000060 Accidental Gaseous Radwaste Rel. / 9~~							Random deselected	2.8/3.0	
53448	000061 ARM System Alarms / 7		X					AK2.01 Knowledge of the interrelations between the Area Radiation Monitoring (ARM) System Alarms and the following: Detectors at each ARM system location	2.5/2.6	1
	W/E16 High Containment Radiation / 9									
153572	CE/E09 Functional Recovery				X			EA1.3 Ability to operate and/or monitor desired operating results during abnormal and emergency situations as they apply to the Functional Recovery.	3.6/3.8	1
	K/A Category Point Totals:	3	2	2	3	4	3	Group Point Total:		17

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Q ID	Tier 1/Group 3 E/APE / Name / Safety Function	K1	K2	K3	A1	A2	G	K/A Topic(s)	Imp.	Pts
1000006	000028 Pressurizer Level Malfunction / 2					X		AA2.14 Ability to determine and interpret the following as they apply to the Pressurizer Level Control Malfunctions: The effect on indicated PZR levels, given a change in ambient pressure and temperature of reflux boiling	2.6/2.8	1
154074	000036 (BW/A08) Fuel Handling Accident / 8	X						AK1.02 Knowledge of the operational implications of the following concepts as they apply to Fuel Handling Incidents : SDM	3.4/3.8	1
	~~000056 Loss of Off-site Power / 6~~							Deleted via token selection		
54915 RO	000065 Loss of Instrument Air / 8				X			AA1.02 Ability to operate and / or monitor the following as they apply to the Loss of Instrument Air: Components served by instrument air to minimize drain on system	2.6/2.8	1
	BW/E13&E14 EOP Rules and Enclosures									
	BW/A05 Emergency Diesel Actuation / 8									
	BW/A07 Flooding / 8									
	~~CE/A16 Excess RCS Leakage / 2~~							Deleted via token selection		
	W/E13 Steam Generator Over-pressure / 4									
	W/E15 Containment Flooding / 5									
	K/A Category Point Totals:			1	1	1		Group Point Total:		3

ES-401	PWR RO Examination Outline Plant Systems - Tier 2/Group 1	Form ES-401-4

Q ID	Tier 2/Group 1 System / Name	K1	K2	K3	K4	K5	K 6	A 1	A 2	A 3	A 4	G	K/A Topic(s)	Imp.	Pts
1000003	001 Control Rod Drive	X											K1.03 Knowledge of the physical connections and/or cause -effect relationships between the CRDS and the following systems: CRDM	3.4/3.6	1
153415	003 Reactor Coolant Pump		X										K2.02 Knowledge of bus power supplies to the following: CCW pumps	2.5/2.6	1
55505 RO	003 Reactor Coolant Pump			X									K3.03 Knowledge of the effect that a loss or malfunction of the RCPS will have on the following: Feedwater and emergency feedwater	2.8/3.1	1
156330 RO	004 Chemical and Volume Control			X									K3.07 Knowledge of the effect that a loss or malfunction of the CVCS will have on the following: PZR level and pressure	3.8/4.1	1
1000023	004 Chemical and Volume Control						X						K6.05 Knowledge of the effect of a loss or malfunction on the following: Sensors and Detectors	4.4/4.6	1
56301 RO	013 Engineered Safety Features Actuation		X										K2.01 Knowledge of bus power supplies to the following: ESFAS/safeguards equipment control	3.6/3.8	1
154974 RO	013 Engineered Safety Features Actuation			X									K3.03 Knowledge of the effect that a loss or malfunction of the ESFAS will have on the following: Containment.	4.3/4.7	1
154968	015 Nuclear Instrumentation	X											K1.01 Knowledge of the physical connections and/or cause- effect relationships between the NIS and the following systems: RPS	4.1/4.2	1
53749 RO	015 Nuclear Instrumentation											X	2.2.26 Knowledge of refueling administrative requirements	2.5/3.7	1
54862	017 In-core Temperature Monitor							X					A1.01Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the ITM system controls including: Core exit temperature	3.7/3.9	1

Q ID	Tier 2/Group 1 System / Name	K1	K2	K3	K4	K5	K 6	A 1	A 2	A 3	A 4	G	K/A Topic(s)	Imp.	Pts
1000009	017 In-core Temperature Monitor								X				A2.01 Ability to (a) predict the impacts of the following malfunctions or operations on the ITM system; and (b) based on those predictions, use procedures to correct, control or mitigate the consequences of those malfunctions or operations: Thermocouple open and short circuits	3.1/3.5	1
154223 RO	022 Containment Cooling				X								K4.04 Knowledge of CCS design feature(s) and/or interlock(s) which provide for the following: Cooling of control rod drive motors	2.8/3.1	1
153466	022 Containment Cooling										X		A4.04 Ability to manually operate and/or monitor in the control room: Valves in the CCS	3.1/3.2	1
	025 Ice Condenser														
55197 RO	056 Condensate	X											K1.03 Knowledge of the physical connections and/or cause-effect relationships between the Condensate system and the following systems: MFW	2.6/2.6	1
1000007	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	2.6/2.8	1
1000025 RO	059 Main Feedwater								X				A2.11 Ability to (a) predict the impacts of the following malfunctions or operations on the MFW; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Failure of feedwater control system	3.0/3.3	1
1000008	059 Main Feedwater			X									K3.04 Knowledge of the effect that a loss or malfunction of the MFW will have on the following: RCS	3.6/3.8	1
1000012 RO	061 Auxiliary/Emergency Feedwater				X								K4.07 Knowledge of AFW design feature(s) and/or interlock(s) which provide for the following: Turbine trip, including overspeed	3.1/3.3	1

Q ID	Tier 2/Group 1 System / Name	K1	K2	K3	K4	K5	K 6	A 1	A 2	A 3	A 4	G	K/A Topic(s)	Imp.	Pts
154752	061 Auxiliary/Emergency Feedwater									X			A3.03 Ability to monitor automatic operation of the AFW, including: AFW S/G level control on automatic start	3.9/3.9	1
56581 RO	068 Liquid Radwaste									X			A3.02 Ability to monitor automatic operation of the Liquid Radwaste System including: Automatic isolation	3.6/3.6	1
156689 RO	071 Waste Gas Disposal					X							K5.04 Knowledge of the operational implication of the following concepts as they apply to the Waste Gas Disposal System: Relationship of hydrogen/oxygen concentrations to flammability	2.5/3.1	1
155013	071 Waste Gas Disposal										X		A4.06 Ability to manually operate and/or monitor in the control room: Meteorological charts and recorders, along with the stop-time and waste-gas release number	2.8/3.3	1
1000024	072 Area Radiation Monitoring					X							K5.02 Ability to manually operate and/or monitor in the control room: Alarm and interlock setpoint checks and adjustments	2.5/3.2	1
	K/A Category Point Totals:	3	2	4	2	2	1	1	3	2	2	1	Group Point Total:		23

ES-401	PWR RO Examination Outline Plant Systems - Tier 2/Group 2	Form ES-401-4

Q ID	Tier 2/Group 2 System / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	K/A Topic(s)	Imp.	Pts
56098 RO	002 Reactor Coolant	X											K1.01Knowledge of the physical connections and/or cause-effect relationships between the RCS and the following systems: RWST	3.7/3.9	1
53550	006 Emergency Core Cooling									X			A3.03 Ability to monitor automatic operation of the ECCS, including: ESFAS operated valves	3.8/3.8	1
1000005	010 Pressurizer Pressure Control					X							K5.01 Knowledge of the operational implications of the following concepts as the apply to the PZR PCS: Determination of condition of fluid in PZR, using steam tables	3.5/4.0	1
170314	011 Pressurizer Level Control						X						K6.03 Knowledge of the effect of a loss or malfunction on the following will have on the PZR LCS: Relationship between PZR level and PZR heater control circuit	2.9/3.3	1
155348	012 Reactor Protection		X										K2.01 Knowledge of bus power supplies to the following: RPS channels, components, and interconnections	3.3/3.7	1
1000022 RO	014 Rod Position Indication				X								K4.06 Knowledge of RPIS design feature(s) and/or interlock(s) which provide for the following: Individual and group misalignment	3.4/3.7	1
54508	016 Non-nuclear Instrumentation										X		A4.02 Ability to manually operate and/or monitor in the control room: Recorders	2.7/2.6	1
155326	026 Containment Spray				X								K4.02 Knowledge of CSS design feature(s) and/or interlock(s) which provide for the following: Neutralized boric acid to reduce corrosion and remove inorganic fission product iodine from steam (NAOH) in containment spray	3.1/3.6	1
156262	029 Containment Purge			X									K3.01 Knowledge of the effect that a loss or malfunction of the Containment Purge System will have on the following: Containment parameters	2.9/3.1	1

Q ID	Tier 2/Group 2 System / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	K/A Topic(s)	Imp.	Pts
53711	033 Spent Fuel Pool Cooling				X								K4.01 Knowledge of design feature(s) and/or interlock(s) which provide for the following: Maintenance of spent fuel level	2.9/3.2	1
55052	035 Steam Generator								X				A2.03 Ability to (a) predict the impacts of the following malfunctions or operations on the GS [SG]; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Pressure/level transmitter failure	3.4/3.6	1
154438 RO	039 Main and Reheat Steam									X			A3.02 Ability to moni tor automatic operation of the MRSS, including: Isolation of the MRSS	3.1/3.5	1
154817	055 Condenser Air Removal									X			A3.03 Ability to monitor automatic operation of the CARS, including: automatic diversion of CARS exhaust	2.5/2.7	1
53588 RO	062 AC Electrical Distribution								X				A2.08 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: Consequences of exceeding voltage limitations	2.7/3.0	1
153683	063 DC Electrical Distribution										X		A4.02 Ability to manually operate and/or monitor in the control room: Battery voltage indicator	2.8/2.9	1
53376 RO	064 Emergency Diesel Generator										X		A4.06 Ability to manually operate and/or monitor in the control room: Manual start, loading, and stopping of the ED/G	3.9/3.9	1
55426 RO	073 Process Radiation Monitoring							X					A1.01 Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the PRM system controls including: Radiation levels	3.2/3.5	1
54780	075 Circulating Water											X	2.2.2 Ability to manipulate the console controls as required to operate the facility between shutdown and designated power levels.	4.0/3.5	1
155248	079 Station Air											X	2.1.28 Knowledge of the purpose and function of major system components and controls	3.9/4.0	1

Q ID	Tier 2/Group 2 System / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	K/A Topic(s)	Imp.	Pts
153383	086 Fire Protection			X									K3.01 Knowledge of the effect that a loss or malfunction of the Fire Protection System will have on the following: Shutdown capability with redundant equipment	2.7/3.2	1
	K/A Category Point Totals:	1	1	2	3	1	1	1	2	3	3	2	Group Point Total:		20

ES-401	PWR RO Examination Outline Plant Systems - Tier 2/Group 3	Form ES-401-4

Q ID	Tier 2/Group 3 System / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	K/A Topic(s)	Imp.	Pts
55557	005 Residual Heat Removal	X											K1.11 Knowledge of the physical connections and/or cause-effect relationships between the RHRS and the following systems: RWST	3.5/3.6	1
	~~007 Pressurizer Relief/Quench Tank~~												Randomly Deselected		
53369 RO	008 Component Cooling Water	X											K1.04 Knowledge of the physical connections and/or cause-effect relationships between the CCWS and the following systems: RCS, in order to determine source(s) of RCS leakage into the CCWS	3.3/3.3	1
	027 Containment Iodine Removal														
	~~028 Hydrogen Recombiner and Purge Control~~												Randomly Deselected		
71630	034 Fuel Handling Equipment								X				A2.01 Ability to (a) predict the impacts of the following malfunctions or operations on the Fuel Handling System and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Dropped fuel element	3.6/4.4	1
155746 RO	041 Steam Dump/Turbine Bypass Control										X		A4.08 Ability to manually operate and/or monitor in the control room: Steam dump valves	3.0/3.1	1
71941	045 Main Turbine Generator										X		A4.02 Ability to manually operate and/or monitor in the control room: T/G controls, including breakers	2.7/2.6	1
55381	076 Service Water				X								K4.03 Knowledge of SWS design feature(s) and/or interlock(s) which provide for the following: Automatic opening features associated with SWS isolation valves to CCW heat exchanges	2.9/3.4	1

Q ID	Tier 2/Group 3 System / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	K/A Topic(s)	Imp.	Pts
155635	078 Instrument Air									X			A3.01 Ability to monitor automatic operation of the IAS, including: Air pressure	3.1/3.2	1
56738	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	3.7/4.1	1
	K/A Category Point Totals:	2			1			1	1	1	2		Group Point Total:		8

Plant-Specific Priorities			
System / Topic	Recommended Replacement for	Reason	Points
Plant-Specific Priority Total: (limit 10)			

Facility:			Date of Exam:		Exam Level: **RO**
Category	Q ID	K/A	Topic	Imp.	Pts
Conduct of Operations	53423 RO	2.1.2	Knowledge of operator responsibilities during all modes of plant operation.	3.0/4.0	1
	1000014	2.1.16	"Ability to operate plant phone, paging system, and two-way radio."	2.9/2.8	1
	54192	2.1.12	Ability to apply technical specifications for a system.	2.9/4.0	1
	56833	2.1.29	Knowledge of how to conduct and verify valve lineups.	3.4/3.3	1
	54311 RO	2.1.14	Knowledge of system status criteria which require the notification of plant personnel.	2.5/3.3	1
	Total				5
Equipment Control	55985	2.2.23	Ability to track limiting conditions for operations.	2.6/3.8	1
	56644	2.2.11	Knowledge of the process for controlling temporary changes.	2.5/3.4	1
	Total				2
Radiation Control	54733	2.3.11	Ability to control radiation releases.	2.7/3.2	1
	1000010 RO	2.3.9	Knowledge of the process for performing a containment purge.	2.5/3.4	1
	Total				2
Emergency Procedures	56641 RO	2.4.50	Ability to verify system alarm setpoints and operate controls identified in the alarm response manual.	3.3/3.3	1
	154054	2.4.15	Knowledge of communications procedures associated with EOP implementation.	3.0/3.5	1
	56520	2.4.21	Knowledge of the parameters and logic used to assess the status of safety functions including: 1. Reactivity control 2. Core cooling and heat removal 3. Reactor coolant system integrity 4. Containment conditions 5. Radioactivity release control.	3.7/4.3	1
	155657 RO	2.4.24	Knowledge of loss of cooling water procedures.	3.3/3.7	1
	Total				4
Tier 1 Target Point Total (RO/~~SRO~~)				13/~~17~~	

Facility: Millstone Unit 2 Date of Examination: August 7, 2000

Examination Level (circle one): (RO) / ~~SRO~~ Operating Test Number: 1

Administrative Topic/Subject Description		Describe method of evaluation: 1. ONE Administrative JPM, OR 2. TWO Administrative Questions
A.1	2.1.3	JPM to perform a review of the documents that the oncoming RO licensed operator should review prior to conducting the control board walk down during shift-relief. The documents provided will have a clearly definable error that will elicit a measurable discussion of concern.
	2.1.25	JPM to perform a shutdown margin determination.
A.2	2.2.13	JPM Given an approved clearance, hang safety tags. The documents provided will have a clearly definable error that will elicit a measurable discussion of concern.
A.3	2.3.11	JPM to calculate new SG Blowdown RM setpoint.
A.4	2.4.29	Question to test knowledge of the four NRC levels of activation for the emergency plan.
		Question to test actions required when exiting a contaminated area, in full PCs, during an emergency evacuation.

Facility: Millstone Unit 2 Date of Examination: August 7 2000

Examination Level (circle one): ~~RO~~ / (SRO) Operating Test Number: 1

Administrative Topic/Subject Description		Describe method of evaluation: 1. ONE Administrative JPM, OR 2. TWO Administrative Questions
A.1	2.1.3	JPM to perform a review of the documents that the oncoming SRO licensed operator should review prior to conducting the control board walk down during shift-relief. The documents provided will have a clearly definable error that will elicit a measurable discussion of concern.
	2.1.4	JPM for the SRO (acting SM) to perform the action required in the event that an RO becomes incapacitated (can not perform licensed activities) while on shift, with the crew presently at the minimum shift staffing requirements.
A.2	2.2.13	JPM for the Work Control SRO to review and authorize for issue a Safety Tagging (clearance) that contains a clearly definable error that will elicit a measurable discussion of concern.
A.3	2.3.4	JPM to approve a radioactive liquid waste release permit. The documents provided will have a clearly definable error that will elicit a measurable discussion of concern.
A.4	2.4.41	JPM to Classify an event.

Facility: Millstone Unit 2	Date of Examination: 08/07/2000
Exam Level (circle one): RO / SRO(I) ~~/ SRO(U)~~	Operating Test No.: 1

B.1 Control Room Systems			
	System / JPM Title	Type Code*	Safety Function
a.	Emergency boration - Alternate Path Using HPSI header and RWST	N,A,S	1
b.	LPSI Pump Operability Test	D,A,S	2
c.	Initiate boron Precipitation Control	A,M,S	4
d.	Pumping the Containment Sump	A,M,S	5
e.	Energize Bus 24C from the RSST	D,S	6
f.	Power Range Safety Channel and Delta T Power Channel Calibration	D,A,S	7
g.	RBCCW Heat Exchanger "B" in Service and Removing RBCCW Heat Exchanger "A"	M,S	8
B.2 Facility Walk-Through			
a.	Supplying Emergency Backup Air to 2-CH-192	D,R	2
b	Local Manual Airstart of the "A" Diesel Generator	D,R	6
c.	Display Inadequate Core Cooling System Parameters	D	7
*Type Codes: (D)irect from bank, (M)odified from bank, (N)ew, (A)lternate path, (C)ontrol room, (S)imulator, (L)ow-Power, (R)CA			

Facility: Millstone Unit 2	Date of Examination: 08/07/2000
Exam Level (circle one): RO / SRO(I) ~~/ SRO(U)~~	Operating Test No.: 2

B.1 Control Room Systems

	System / JPM Title	Type Code*	Safety Function
a.	Dropped CEA Recovery	A,M,S	1
b	Manual Makeup to the VCT	D,A,S	2
c	Respond to PORV Key Lock Switch Failure While Performing Once Through Cooling	D,A,S	3
d	Initiate boron Precipitation Control	A,M,S	4
e	Manually Placing EBFS in Operation on the Enclosure Building Filtration Region	D,S	5
f.	Unload and Shutdown the "A" Diesel Generator	D,S	6
g.	RBCCW Heat Exchanger "B" in Service and Removing RBCCW Heat Exchanger "A"	M,S	8

B.2 Facility Walk-Through

a.	Supplying Emergency Backup Air to 2-CH-192	D,R	2
b.	Local Manual Airstart of the "A" Diesel Generator	D,R	6
c..	Display Inadequate Core Cooling System Parameters	D	7
*Type Codes: (D)irect from bank, (M)odified from bank, (N)ew, (A)lternate path, (C)ontrol room, (S)imulator, (L)ow-Power, (R)CA			

Facility: Millstone Unit 2	Scenario No.:1	Op-Test No.:1 (2)
Examiners:	Operators:	

Objectives: To evaluate the applicants' ability to implement the AOPs for a RCS leak, to reduce power using the AOP for rapid power reduction, and to implement the EOPs to respond to a LOCA and ESDE with conditions that require entry to the Functional Recovery EOPs and contingency actions to be taken within the EOP.

Initial Conditions: IC 24; 100% power at MOL.

Turnover: The plant is at 100% power at MOL. Boron is at 568 ppm. BLEND RATIO:BAST 9.5 :1 The following equipment is out of service: SJAE Radiation Monitor.

Event No.	Malf. No.	Event Type*	Event Description
1	RX04B@ 80%	I(RO)	The in-service Pressurizer level transmitter failure results in diagnosis and implementation of ARP to take manual control of letdown and shift to the good level control channel. Technical Specifications will need to be referenced.
2	RC04 @(3%), 120 Sec Ramp	R(RO) N(BOP)	12 GPM RCS leak results in implementation of AOP for RCS Leak, use of Technical Specifications, and implementation of AOP for Rapid Downpower.
3	FW10A 95%	I(BOP)	After power has been reduced to about 98% power, cause an oscillation of the main feed regulating valve which can be controlled by shifting the valve control to manual. This is a failure of the control circuit which will cause the BOP to diagnose SG level, steam flow, and feed flow to determine need to shift to manual. Power reduction initiated in Event 2 should continue during this event.
4	RC03A @ 0.1% 300 sec ramp MS07A@ 100% BT-1	M(All)	970 GPM Small Break LOCA occurs leading to reactor trip. At time of trip, a main steam safety valve fails open leading to an excess steam demand. The SPTA diagnostics determines 2 events in progress, which leads to implementation of EOP 2540 Functional Recovery.
5	SI04A SI04C	C(RO)	'A' HPSI and 'C' HPSI pump breakers fail to close at time of SIAS resulting in HPSI not available for injection. After SIAS has initiated the simulator operator will remove SI04C, which will allow the RO to start the 'C' HPSI pump. Alternatively, the RO may start 'B' HPSI pump.
6	FW20B FW30 @70%	C(BOP)	'B' AFW pump trips and 'A' AFW pump is degraded which will require the BOP to take contingency actions to start the turbine driven AFW pump

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

Facility: Millstone Unit 2	Scenario No.:2	Op-Test No.: 1
Examiners:	Operators:	

Objectives: Objectives: To evaluate the applicants' abilities to diagnose and take corrective actions for a failed pressurizer pressure control channel and failed main steam flow input to the steam generator level control system. Following the failed instrumentation, a dropped rod will require the plant be stabilized and then power reduced. During the power reduction, a second rod slips in which will require the plant be manually tripped. The initial response will be uncomplicated. However after the initial diagnosis and transition to the reactor trip recovery EOP, a SGTR will occur which will require a rediagnoses and entry to the SGTR EOP. Alternatively functional recovery EOP could be entered. A component failure will require contingency actions to be taken.

Initial Conditions: The plant is at 100% power at MOL.

Turnover: The plant is at 100% power at MOL. Boron is at 568 ppm. BLEND RATIO:BAST 9.5 :1. 'A' Service Water Pump is out of service.

Event No.	Malf. No.	Event Type*	Event Description
1	RX03B@ 0% 120sec	I(RO)	Pressurizer pressure control failure results in implementation of ARP to manually control pressure and shift controlling channel.
2	RX11A@ 0% 600 sec	I(BOP)	Failure of a main steam flow transmitter leads to a SG level transient and deselecting the failed transmitter as an input to the steam generator level control system.
3	CW01C	C(BOP)	The 'C' Circulating Water pump trips which results in the BOP cross tying the water boxes.
4	RD0126	R(RO) N(BOP)	Dropped rod results in implementation of AOP for rod Malfunctions and also requires use of the Technical Specifications. Following the initial diagnosis and plant stabilization, a plant power reduction is performed.
5	RD0114 RP04A-D	C(RO)	Second rod drops in leading to a manual reactor trip and implementation of EOP for Standard Post Trip Actions (SPTA). An ATWS occurs which requires the RO to take contingency actions to trip the plant.
6	SG02B@ 15% 120sec	M(All)	After the EOP for SPTA has been completed and crew has entered the EOP for Reactor Trip recovery, a SG tube rupture will occur which will cause the crew to re-diagnose and enter the EOP for SGTR or the functional recovery EOP.

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

Facility: Millstone Unit 2	Scenario No.:3	Op-Test No.: 2
Examiners:	Operators:	

Objectives: To evaluate the applicants' ability to reduce plant power while implementing alarm response procedures and AOPs related to pressurizer pressure control instrumentation, a leaking PORV and a tripped SW pump. After a 5% downpower has been completed, a non-recoverable MFW pump trip will occur which will lead to a plant trip and implementation of the Standard Post Trip Actions (SPTA) EOP. At time of trip, the RSST will fail, causing a loss of off site power. One of the EDGs output breaker will fail to automatically close onto the bus, which requires operator action. When AFW is initiated, a non-isolable rupture of the AFW system occurs, leading to a LOAF. The failure of one of the PORVs to open (its block valve is failed closed after it had been shut to isolate the leaking PORV) will lead to a decision to initiate once through cooling (OTC) early.

Initial Conditions: 100% Power MOL .4 gpm unidentified leakage.

Turnover: The plant is at 100% power at MOL. Boron is at 568 ppm. BLEND RATIO:BAST 9.5 :1 The Engineering Department has determined that we are very subject to stress corrosion cracking of the Control Element Drive Motor (CEDM) housing due to a combination of the CEDM housing manufacturing process and recently identified long term RCS chemistry problems. Management has decided to shutdown the plant power at 25% per hour so that the CEDM housings can be examined. There is an identified RCS leak of .4 GPM on the PORV isolation valve RC-403. Use OP 2204 for the shutdown. AOP for RCS leak has been completed. Ready to commence a downpower. SP 2610E "MSIV Closure and Mainsteam Valve Operational Readiness Testing" is available.

Event No.	Malf. No.	Event Type*	Event Description
1		R(RO) N(BOP)	Management decision to shutdown at 25%/hour
2	RX04A@ 0% 120 sec	I(RO)	The non-selected pressurizer level transmitter slowly fails in the low direction which requires ARP implementation and diagnosis that the RCS leak rate has not risen. Action must be taken to de-select the low level heater cutout.
3	RX12C@ 0% 300sec ramp	I(BOP)	Failure of a SG #2 level transmitter leads to a SG level transient and deselecting the failed transmitter as an input to the steam generator level control system.
4	RC06A @ 2%	C(RO)	Leaking Pressurizer PORV requires diagnosis and isolation of PORV and use of Technical Specifications. After the block valve is closed, a circuit failure will prevent the valve from being reopened.
5	FW06A ED02	M(All)	Trip of 'A' MFW pump leads to a plant trip. Upon the plant trip, the RSST fails, causing a loss of off-site power.
	EG09B	C(BOP)	Failure of the 'B' EDG output breaker to close will require BOP to take contingency action to manually closing the output breaker.
	ES03G	C(RO)	Failure of Boric acid valves to reposition will require RO to recognize and take contingency action to manually position valves.
	FW36A & FW36B@ 100%	C(BOP)	An AFW non-isolable leak leads to a total loss of all feed and transition from the SPTA to the EOP for LOAF and subsequent transition to the Functional Recovery procedures.
	FW20C		Turbine Driven AFW pump trip inserted after it is started to ensure that pump capacity cannot overcome leak flow rate enough to provide adequate AFW flow at low SG pressures.

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

Facility: Millstone Unit 2	Scenario No.:4	Op-Test No.: Contingency
Examiners:	Operators:	

Objectives:. To evaluate the applicants' ability to implement alarm response procedures for a failure of a temperature input to the reactor regulating system which causes a pressurizer level upset. To evaluate the applicants ability to implement the AOP and use of Technical Specifications for a loss of the 'C' RBCCW pump. Following those malfunctions a feedwater pump problem results in a decision to perform a rapid down power to a power level which can be sustained with one feed pump. After a power reduction of about 5% the feed pump trips and a decision is made to trip the plant. The applicants' ability to execute the EOPs is evaluated by the following events: On the plant trip, the 6.9 kv buses fail to automatically transfer which results in a transition to the Loss of Offsite Power (LOOP) EOP. Just before reenergizing busses 25A and B, a failure of the AFW system occurs which results in a Loss of All Feedwater (LOAF). The crew should transfer to the LOAF EOP and determine that the success path is to depressurize the SG to below condensate pump shutoff head, reenergize bus 25A or B and use a condensate pump for the feed source. An alternate success path is to go to OTC.

Initial Conditions: IC 24 100% power middle of life conditions. The following equipment is out of service: B HPSI pump; Main Steam Flow main transmitter.

Turnover: The plant is at 100% power at MOL. Boron is at 568 ppm. BLEND RATIO:BAST 9.5 :1 The following equipment is out of service: B HPSI pump; The Main-Main Steam Flow main transmitter for #1 SG

Event No.	Malf. No.	Event Type*	Event Description
1	RX07A @10%	I(RO)	RCS Control Channel Hot Leg Temperature Transmittal Failure causes the average calculated temperature within both RRS units to decrease. This decrease will cause a decrease in Pressurizer level setpoint with a resultant change in letdown flow. The RO will take action in accordance with the alarm response procedures to stabilize pressurizer level.
2	CC01C	C(BOP)	The 'C' RBCCW pump will trip which will lead to temperature and flow alarms and a requirement to trip the plant if flow cannot be reestablished. The BOP will be able to restore flow using the 'B' RBCCW pump per the AOP for loss of RBCCW. Technical Specification 3.0.3 is entered.
3	CV04C	C(RO)	Running charging pump trips resulting in the use of alarm response procedures and possible use of operating procedure to restore letdown.
4	**I/O** HS7140A STR True "I/O C06/7*A41	R(RO) N(BOP)	A 'A' SGFP LO leak occurs which will cause the US to make a decision to reduce plant power to 70% so the 'A' SGFP pump may be shutdown. The SGFP LO leak will be simulated by using pump handswitch and annunciator overrides. This will cause an automatic start of the standby lube oil pump and a low oil reservoir level. Investigation reveals a non-isolable oil leak which is wetting the outer insulation on some nearby steam piping.
5	FW06B CC01B BT1 ED08A FW36A & FW36B @100% FW30 @100%	M (All)	After power has been reduced to about 95%, the 'A' MFW pump trips which will lead to a decision to trip the plant. At time of the trip, The 'B' RBCCW pump trips and 6.9 Kv bus 25A fails to transfer to the RSST. This leads to a decision to trip the B and D RCPs, and a loss of the A&C RCPs . After the standard post trip actions have been completed the LOOP EOP will be entered. After the LOOP EOP has been entered and just before the 6.9kV bus 25A is energized, a loss of all AFW flow occurs. This should lead to a transition to the LOAF EOP. The best success path would be to depressurize the SG to allow use of the a condensate pump. However, OTC is also a success path.

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

Facility: Millstone Unit 2	Scenario No.:5	Op-Test No.: Contingency
Examiners:	Operators:	

Objectives: To evaluate the applicants ability to evaluate operation of the RCP seals and make a decision to shutdown the plant. Following a 5% power reduction, further degradation of the RCP seal will require a decision to trip the plant and implementation of the EOPs for a LOCA.

Initial Conditions: IC 24; 100% power at MOL.

Turnover: The plant is at 100% power at MOL. Boron is at 568 ppm. BLEND RATIO:BAST 9.5 :1 The 'B' RCP lower seal has failed several weeks ago. The turbine driven AFW pump is out of service. #1 ADV being kept in manual because of inadvertent opening in automatic.

Event No.	Malf. No.	Event Type*	Event Description
0	RC07B @100)	na	Initial condition: 'B' RCP lower seal failure
1	RX12C @0% 120 sec ramp	I(BOP)	Failure of a SG level transmitter for feed water control system causes the feed regulating valve to open and raise SG level. The BOP must diagnose the failure, deselect the failed channel and possibly take manual control of the feed water regulating valve.
2	RX01A @20% 120 sec ramp	I(RO)	Failure of the pressurizer spray controller results in the RO taking manual control of the controller and closing the spray valve. When the RO takes manual control, the simulator operator will set the malfunction severity to 0% to allow successful operator action. Subsequently, on a unrelated power reduction, forcing sprays will require some diagnostic process to determine why pressurizer pressure is higher than expected and should take action to lower the pressure to normal.
3	RC08B @ 2.5%	C(RO)	RO must evaluate seal failure by taking reading and filling out a work sheet to determine the 'B' RCP upper seal failure which then results in a decision to shutdown plant.
4		R(RO) N(BOP)	Normal plant shutdown due to RCP seal failure
5	RC09B @30% RC04 @ 75%	M(All) C(BOP)	Failure of 'B' third seal causes decision to be made to trip the plant. At time of trip, a 300 GPM Small Break LOCA occurs. The EOP diagnosis should cause the EOP for LOCA to be entered.

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