Northeast
Nuclear Energy

Rope Ferry Rd. (Route 156), Waterford, CT 06385

Millstone Nuclear Power Station
Northeast Nuclear Energy Company
P.O. Box 128
Waterford, CT 06385-0128
(860) 447-1791
Fax (860) 444-4277

The Northeast Utilities System

JUN - 8 2000

Docket No. 50-336
B18097

10CFR55.40(b)(3)

Mr. R. J. Conte, Chief
Operational Safety Branch
U.S. Nuclear Regulatory Commission
Region 1
475 Allendale Road
King Of Prussia, PA 19406

Millstone Nuclear Power Station, Unit No. 2
Senior Reactor And Reactor Operator Initial Examinations, Millstone Unit No. 2

This letter is provided in response to the request from your office,[1] dated March 17, 2000, to furnish examination material for Senior Reactor and Reactor Operator Initial Examinations at Millstone Unit No. 2.

Pursuant to 10 CFR 55.40(b)(3), an authorized representative of the facility has approved the material contained in Attachment 1 prior to submittal to the Nuclear Regulatory Commission (NRC) for review and approval. The written examinations within Attachment 1 were developed in accordance with the guidelines contained in ES-401, Attachment 1, "Example Systematic Sampling Methodology," of NUREG 1021, Revision 8, Supplement 1. It is our belief that the enclosed materials are complete and ready-to-use.

Consistent with the guidance contained in NUREG-1021, Examiners Standard (ES) 201, Attachment 1, the examination material contained in Attachment 1 should be withheld from public disclosure until after the examination has been completed. No redacted versions are being supplied.

There are no regulatory commitments contained within this letter.

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(1) R. J. Conte letter to Stephen E. Scace, "Senior Reactor And Reactor Operator Initial Examinations Millstone Unit 2," dated March 17, 2000.

Should you have any questions regarding this submittal, please contact Mr. Michael Baughman at (860) 447-1791, extension 2647.

Very truly yours,

NORTHEAST NUCLEAR ENERGY COMPANY

Stephen E. Scace - Director
Nuclear Oversight and Regulatory Affairs

Attachment (1): Examination Material

cc: w/o attachment

H. J. Miller, Region I Administrator
J. I. Zimmerman, NRC Project Manager, Millstone Unit No. 2
D. P. Beaulieu, Senior Resident Inspector, Millstone Unit No. 2

U.S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, DC 20555

Schedule Overview

Millstone Unit 2 NRC Exam August 2000

Day 1	Day 2	Day 3	Day 4	Day 5
Written Exam	Facility Walk Through JPMs	Control Room Systems JPMs and Admin Exam	Control Room Systems JPMs and Admin Exam	Control Room Systems JPMs and Admin Exam
	1 SRO & 2RO	Note 1	Note 1	Note 1
	1 SRO & 2RO			
	1 SRO & 2RO			
	1 SRO & 2RO			

Day 6	Day 7	Day 8
Simulator Exams	Simulator Exams (Note 2)	Simulator Exams (Note 2)
Scenario 1: 2 ROs & 1 SRO-I	Scenario 2: 2 ROs	Scenario 3: 1 SRO-I as RO
Scenario 1: 2 ROs & 1 SRO-I	Scenario 2: 2 ROs	Scenario 3: 1 SRO-I as RO
Scenario 1: 2 ROs & 1 SRO-I	Scenario 2: 2 ROs	Scenario 3: 1 SRO-I as RO
Scenario 1: 2 ROs & 1 SRO-I	Scenario 2: 2 ROs	Scenario 3: 1 SRO-I as RO

Note 1:The JPMs and Admin Exams on these 3 days are sequenced and controlled such that:

- Two JPMs are performed on the simulator during the same time
- JPMs performed on the simulator at the same time do not conflict with each other
- There is no opportunity for compromise
- No JPM is repeated day to day
- While 2 candidates are performing on the simulator, a third is taking the administrative portion of the exam.
- Each candidate is administered all 3 portions of the operating exam by the same examiner.

Note 2 Remainder of crew consists of a surrogate SRO and/or RO

Option 1	Day 1 - In-plant JPMs and Administrative JPMs															
	AM								PM							
Exam #	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
Name/ Time																
S1:A	1	2	3	A2												
R2:B	2	A2	1	3												
R3:C	3	1	A2	2												
S4:B					1	2	3	A2								
R5:C					2	A2	1	3								
R6:A					3	1	A2	2								
S7:C									1	2	3	A2				
R8:A									2	A2	1	3				
R9:B									3	1	A2	2				
S10:A													1	2	3	A2
R11:B													2	A2	1	3
R12:C													3	1	A2	2

Key

S1:A S=ISRO candidate, 1 = candidates name, A= NRC examiners name

R2:B R=RO candidate, 2 = candidates name, A= NRC examiners name

A-P across the third row is the time slot

1, 2, 3, corresponds to the in plant JPM to be used

A2 is an administrative JPM

Simulator JPM matrix is provided with a similar key. The matrix block shows a number and a letter for the simulator JPM. The display of 1A = simulator JPM #1 with NRC examiner A. The display of A1A indicates an Administrative topic #1 with NRC examiner A.

Option 1	Day 2 - Simulator JPMs and Administrative Questions/JPMs																							
	AM												PM											
Exam #	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X
Name/Time																								
S1:A	1A	2A	3A	A1A	A1A																			
R2:B	5B	8B	6B	14B							A1B	A1B												
R3:C			A1C	A1C	1C	2C	3C																	
S4:B					5B	8B	6B	14B	A1B	A1B														
R5:C								A1C	1C	2C	3C	A1C												
R6:A						A1A	A1A		5A	8A	6A	14A												
S7:C													1C	2C	3C	A1C	A1C							
R8:A													5A	8A	6A	14A							A1A	A1A
R9:B															A1B	A1B	1B	2B	3B					
S10:A																	5A	8A	6A	14A	A1A	A1A		
R11:B																				A1B	1B	2B	3B	A1B
R12:C																			A1C	A1C	5C	8C	6C	14C

Option 1	Day 3- Simulator JPMs and Administrative Questions/JPMs																							
	AM												PM											
Exam #	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X
Name/Time																								
S1:A	4A	11A	10A	9A	A3A	A4A																		
R2:B	8B	12B	13B	A3B				A4B																
R3:C			A3C	A4C	4C	11C	10C	9C																
S4:B					8B	12B	13B		A3B	A4B														
R5:C									4C	11C	10C	9C					A3C	A4C						
R6:A							A3A	A4A	8A	12A	13A													
S7:C													4C	11C	10C	9C				A3C	A3C			
R8:A												A3A	8A	12A	13A	A4A								
R9:B													A3B	A4B			4B	11B	10B	9B				
S10:A																	8A	12A	13A			A3A	A4A	
R11:B															A3B	A4B					4B	11B	10B	9B
R12:C																					8C	12C	13C	A3/4C

Option 1

Day 4 Simulator Scenarios							Day 5 Simulator Scenarios					
	AM			PM			AM			PM		
Period #	I	II	III	IV	V	VI	I	II	III	IV	V	VI
Name												
S1:A	1								3			
R2:B	1				2							
R3:C	1				2.							
S4:B		1								3		
R5:C		1				2						
R6:A		1				2						
S7:C			1								3	
R8:A			1				4					
R9:B			1				4					
S10:A				1								3
R11:B				1				4				
R12:C				1				4				

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.

ES-401	PWR RO Examination Outline Emergency and Abnormal Plant Evolutions - Tier 1/Group 1	Form ES-401-4

Tier 1/Group 1 E/APE / Name / Safety Function	K1	K2	K3	A1	A2	G	K/A Topic(s)	Imp.	Pts
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
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 blóck status lights	3.2/3.5	1
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		
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
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
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
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
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
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
000057 Loss of Vital AC Elec. Inst. Bus / 6						X	2.4.10 Knowledge of annunciator response procedures.	3.3/4.0	1

Tier 1/Group 1 E/APE / Name / Safety Function	K1	K2	K3	A1	A2	G	K/A Topic(s)	Imp.	Pts
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
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
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
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
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 Inadegaute Subcooling Margin / 4									
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

ES-401	PWR RO Examination Outline Emergency and Abnormal Plant Evolutions - Tier 1/Group 2	Form ES-401-4

Tier 1/Group 2 E/APE / Name / Safety Function	K1	K2	K3	A1	A2	G	K/A Topic(s)	Imp.	Pts
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
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
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									
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
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
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									
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		
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
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

Tier 1/Group 2 E/APE / Name / Safety Function	K1	K2	K3	A1	A2	G	K/A Topic(s)	Imp.	Pts
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
000037 Steam Generator Tube Leak / 3						X	2.4.11 Knowledge of abnormal condition procedures.	3.4/3.6	1
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
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									
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
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	
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									
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

ES-401	PWR RO Examination Outline Emergency and Abnormal Plant Evolutions - Tier 1/Group 3	Form ES-401-4

Tier 1/Group 3 E/APE / Name / Safety Function	K1	K2	K3	A1	A2	G	K/A Topic(s)	Imp.	Pts
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
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		
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

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
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
003 Reactor Coolant Pump		X										K2.02 Knowledge of bus power supplies to the following: CCW pumps	2.5/2.6	1
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
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
004 Chemical and Volume Control						X						K6.17 Knowledge of the effect of a loss or malfunction on the following CVCS components: Flow paths for emergency boration	4.4/4.6	1
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
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
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
015 Nuclear Instrumentation											X	2.2.26 Knowledge of refueling administrative requirements	2.5/3.7	1
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

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
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
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
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														
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
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
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
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
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

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
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
068 Liquid Radwaste									X			A3.02 Ability to monitor automatic operation of the Liquid Radwaste System including: Automatic isolation	3.6/3.6	1
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
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
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

Tier 2/Group 2 System / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	K/A Topic(s)	Imp.	Pts
002 Reactor Coolant	X											K1.01 Knowledge of the physical connections and/or cause-effect relationships between the RCS and the following systems: RWST	3.7/3.9	1
006 Emergency Core Cooling									X			A3.04 Ability to monitor automatic operation of the ECCS, including: Cooling water systems	3.8/3.8	1
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
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
012 Reactor Protection		X										K2.01 Knowledge of bus power supplies to the following: RPS channels, components, and interconnections	3.3/3.7	1
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
016 Non-nuclear Instrumentation										X		A4.02 Ability to manually operate and/or monitor in the control room: Recorders	2.7/2.6	1
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
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

Tier 2/Group 2 System / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	K/A Topic(s)	Imp.	Pts
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
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									X			A3.02 Ability to moni tor automatic operation of the MRSS, including: Isolation of the MRSS	3.1/3.5	1
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								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
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
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
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
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
079 Station Air											X	2.1.28 Knowledge of the purpose and function of major system components and controls	3.9/4.0	1

Tier 2/Group 2 System / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	K/A Topic(s)	Imp.	Pts
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

Tier 2/Group 3 System / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	K/A Topic(s)	Imp.	Pts
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		
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		
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
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
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
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

Tier 2/Group 3 System / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	K/A Topic(s)	Imp.	Pts
078 Instrument Air									X			A3.01 Ability to monitor automatic operation of the IAS, including: Air pressure	3.1/3.2	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	3.7/4.1	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	K/A	Topic	Imp.	Pts
Conduct of Operations	2.1.2	Knowledge of operator responsibilities during all modes of plant operation.	3.0/4.0	1
	2.1.16	"Ability to operate plant phone, paging system, and two-way radio."	2.9/2.8	1
	2.1.12	Ability to apply technical specifications for a system.	2.9/4.0	1
	2.1.29	Knowledge of how to conduct and verify valve lineups.	3.4/3.3	1
	2.1.14	Knowledge of system status criteria which require the notification of plant personnel.	2.5/3.3	1
	Total			5
Equipment Control	2.2.23	Ability to track limiting conditions for operations.	2.6/3.8	1
	2.2.11	Knowledge of the process for controlling temporary changes.	2.5/3.4	1
	Total			2
Radiation Control	2.3.11	Ability to control radiation releases.	2.7/3.2	1
	2.3.9	Knowledge of the process for performing a containment purge.	2.5/3.4	1
	Total			2
Emergency Procedures	2.4.50	Ability to verify system alarm setpoints and operate controls identified in the alarm response manual.	3.3/3.3	1
	2.4.15	Knowledge of communications procedures associated with EOP implementation.	3.0/3.5	1
	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
	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~~	

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.

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

Tier 1/Group 1 E/APE / Name / Safety Function	K1	K2	K3	A1	A2	G	K/A Topic(s)	Imp.	Pts
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
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
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
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
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									
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
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						X	2.4.7 Knowledge of event based EOP mitigation strategies.	3.1/3.8	1
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
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

Tier 1/Group 1 E/APE / Name / Safety Function	K1	K2	K3	A1	A2	G	K/A Topic(s)	Imp.	Pts
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
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
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
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
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
000057 Loss of Vital AC Elec. Inst. Bus / 6						X	2.4.10 Knowledge of annunciator response procedures.	3.3/4.0	1
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
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
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
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
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
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

Tier 1/Group 1 E/APE / Name / Safety Function	K1	K2	K3	A1	A2	G	K/A Topic(s)	Imp.	Pts
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									
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

Tier 1/Group 2 E/APE / Name / Safety Function	K1	K2	K3	A1	A2	G	K/A Topic(s)	Imp.	Pts
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									
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
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									
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					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
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
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
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

Tier 1/Group 2 E/APE / Name / Safety Function	K1	K2	K3	A1	A2	G	K/A Topic(s)	Imp.	Pts
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
000037 Steam Generator Tube Leak / 3						X	2.4.11 Knowledge of abnormal condition procedures.	3.4/3.6	1
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
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									
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		
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									
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
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

Tier 1/Group 3 E/APE / Name / Safety Function	K1	K2	K3	A1	A2	G	K/A Topic(s)	Imp.	Pts
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
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					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

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
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
003 Reactor Coolant Pump		X										K2.02 Knowledge of bus power supplies to the following: CCW pumps	2.5/2.6	1
004 Chemical and Volume Control						X						K6.17 Knowledge of the effect of a loss or malfunction on the following CVCS components: Flow paths for emergency boration	4.4/4.6	1
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
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
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
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

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
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
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
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														
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
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
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
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
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

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
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
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
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
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

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
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
006 Emergency Core Cooling									X			A3.04 Ability to monitor automatic operation of the ECCS, including: Cooling water systems	3.8/3.8	1
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
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
012 Reactor Protection		X										K2.01 Knowledge of bus power supplies to the following: RPS channels, components, and interconnections	3.3/3.7	1
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		
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

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
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
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
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		
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		
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
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
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

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
079 Station Air											X	2.1.28 Knowledge of the purpose and function of major system components and controls	3.9/4.0	1
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
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

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
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		
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
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
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	2.1.20	Ability to execute procedure steps.	4.3/4.2	1
	2.1.16	"Ability to operate plant phone, paging system, and two-way radio."	2.9/2.8	1
	2.1.12	Ability to apply technical specifications for a system.	2.9/4.0	1
	2.1.22	Ability to determine Mode of Operation.	2.8/3.3	1
	2.1.29	Knowledge of how to conduct and verity valve linups.	3.4/3.3	1
	2.1.1	Knowledge of conduct of operations requirements	3.7/3.8	1
	Total			6
Equipment Control	2.2.23	Ability to track limiting conditions for operations.	2.6/3.8	1
	2.2.11	Knowledge of the process for controlling temporary changes.	2.5/3.4	1
	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
	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	2.3.11	Ability to control radiation releases.	2.7/3.2	1
	2.3.4	Knowledge radiation exposure limits and contamination control, including permissible levels in excess of those authorized.	2.5/2.9	1
	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	2.4.12	Knowledge of general operating crew responsibilities during emergency operations.	3.4/3.9	1
	2.4.15	Knowledge of communications procedures associated with EOP implementation.	3.0/3.5	1
	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
	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

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	Replacementl 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.

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.

OPERATING TEST No.: 2

Applicant Type	Evolution Type	Minimum Number	Scenario Number 1	3		
RO Candidates none	Reactivity	1				
	Normal	1				
	Instrument	2				
	Component	2				
	Major	1				
RO 2 Candidates none	Reactivity	1				
	Normal	1				
	Instrument	2				
	Component	2				
	Major	1				
SRO-I as RO Candidates A, B, C, D	Reactivity	1		1		
	Normal	0				
	Instrument	1		2, 5		
	Component	1		4		
	Major	1		5		
SRO-I as SRO Candidates A, B, C, D	Reactivity	0	2			
	Normal	1	2			
	Instrument	1	1, 3			
	Component	1	4			
	Major	1	4			

Instructions: (1) Enter the operating test number and Form ES-D-1 event numbers for each evolution type.

(2) Reactivity manipulations may be conducted under normal or controlled abnormal conditions (refer to Section D.4.d) but must be significant per Section C.2.a of Appendix D.

Author: Fred Nyard

Chief Examiner: _____

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: 'B' AFW Pump; SJAE Radiation Monitor.

Event No.	Malf. No.	Event Type*	Event Description
1	RP10C @ 0%	I(RO)	Pressurizer pressure transmitter failure (safety channel) results in diagnosis and implementation of ARP to bypass RPS, ESFAS and ATWS trip units and use of Technical Specifications
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 65%	I(BOP)	Near completion of a sufficient downpower, cause an oscillation of the main feed regulating valve which can be controlled by shifting the valve control to manual.
4	RC04 @ 75% MS07A @100% BT-1	M(All)	300 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	FW30 @100%	C(BOP)	'A' AFW pump degraded performance will cause the secondary RO 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.: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	SW01A	C(BOP)	Loss of the 'A' SW pump leads to implementation of AOP.
4	RC06A @ 0.1%	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	I(BOP)	Failure of the 'B' EDG output breaker to close will require BOP to take contingency action to manually close the output breaker.
	ES03G	I(RO)	Failure of Boric acid valves to reposition will require RO to recognize and take contingency action to manually position valves.
	FW36@ 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.

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

OPERATING TEST No.:1

Applicant Type	Evolution Type	Minimum Number	Scenario Number 1	2		
RO Candidates 1, 3, 5, 7	Reactivity	1	2			
	Normal	1		3		
	Instrument	2	1	1		
	Component	2	5	6		
	Major	1	4	5		
RO 2 Candidates 2, 4, 6, 8	Reactivity	1		3		
	Normal	1	2			
	Instrument	2	3	1		
	Component	2	6	4		
	Major	1	4	5		
SRO-I as RO Candidates A, B, C, D	Reactivity	1				
	Normal	0				
	Instrument	1				
	Component	1				
	Major	1				
SRO-I as SRO Candidates A, B, C, D	Reactivity	0				
	Normal	1				
	Instrument	1				
	Component	1				
	Major	1				

Instructions: (1) Enter the operating test number and Form ES-D-1 event numbers for each evolution type.

(2) Reactivity manipulations may be conducted under normal or controlled abnormal conditions (refer to Section D.4.d) but must be significant per Section C.2.a of Appendix D.

Author: Fred Nyzard

Chief Examiner: _____

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: 'B' AFW Pump; SJAE Radiation Monitor.

Event No.	Malf. No.	Event Type*	Event Description
1	RP10C @ 0%	I(RO)	Pressurizer pressure transmitter failure (safety channel) results in diagnosis and implementation of ARP to bypass RPS, ESFAS and ATWS trip units and use of Technical Specifications
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 65%	I(BOP)	Near completion of a sufficient downpower, cause an oscillation of the main feed regulating valve which can be controlled by shifting the valve control to manual.
4	RC04 @ 75% MS07A @100% BT-1	M(All)	300 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	FW30 @100%	C(BOP)	'A' AFW pump degraded performance will cause the secondary RO 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	RD0127	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.
4	RD0304 @50% RP04A-D	C(RO)	Second rod slips 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.
5	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.
6	RX13B @1%	C(BOP)	Failure of #2 ADV to be fully closed requires recognition and contingency action to manually isolate the ADV.

* (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; Main Steam Flow main transmitter.

Event No.	Malf. No.	Event Type*	Event Description
1	RX07B@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 ED08C FW36A @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 6.9 kV busses fails to auto transfer which causes the LOOP /EOP to be entered after the SPTA are completed. After the LOOP EOP has been entered and just before the 6.9kV busses are energized, a loss of all AFW flow occurs. This should lead to a transition to the LOAF EOP. The best success path would be restoration of power to the condensate pumps. 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	RX01A @15%	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.
2	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.
3		R(RO) N(BOP)	Normal plant shutdown due to RCP seal failure
4	RC09B @30%	M(All)	Failure of 'B' third seal causes decision to be made to trip the plant.
5	RC20B @6%	C(BOP)	At time of trip, the 'B'RCP thermal barrier fails causing a 33 GPM leak into the RBCCW system. The EOP diagnosis should cause the EOP for LOCA to be entered.
	RX14A @0%	I(BOP)	Failure of the 'A' steam Dump to condenser valve to keep Tc between 530 and 535 °F will cause operator to take contingency action to maintain correct band.

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

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. Manually Placing EBFS in Operation on the Enclosure Building Filtration Region	D,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. Respond to Loss of RBCCW	A,N,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		

ORIGINAL SUBMITTAL

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. Secure From Emergency Boration	N,S,L	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. Pumping the Containment Sump	D,S	5
f. Unload and Shutdown the "A" Diesel Generator	D,S	6
g. Dropped CEA Recovery	A,M,S	1
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 Exam Level (circle one): RO / SRO(I) ~~/ SRO(U)~~	Date of Examination: 08/07/2000 Operating Test No.: 3 (Contingency Set)

B.1 Control Room Systems

System / JPM Title	Type Code*	Safety Function
a. Securing Emergency Boration	N,S,L	1
b. Dropped CEA Recovery	D,A,S	1
c. Temperature Control of the Quench Tank	N,S	3
d.. Restart RCPs as Part of an Excess Steam Demand	D,S, L	4
e. Unload and Shutdown the "A" Diesel Generator	D,S	6
f. LPSI Pump Operability Test	D,A,S	2
g. Respond to Loss of RBCCW	A,N,S,	8
B.2 Facility Walk-Through		
a. Local Manual Operation of the "A" Atmospheric Dump Valve	A,M,R,L	4
b. Establish Manual Control of Hydrogen Purge Valve	D,R,L	5
c. Shutdown From Outside the Control Room	N,L	8
*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		