

Dominion Nuclear Connecticut, Inc.  
Millstone Power Station  
Rope Ferry Road  
Waterford, CT 06385



**Dominion**<sup>SM</sup>

JUL 29 2009

**EXAMINATION SECURITY AND INTEGRITY CONSIDERATIONS – WITHHOLD  
UNDER GUIDANCE OF NUREG-1021, ES-201**

Mr. Samuel L. Hansell, Chief  
Operations Branch – Division of Reactor Safety  
U.S. Nuclear Regulatory Commission  
475 Allendale Road  
King of Prussia, PA 19406-1415

Serial No. 09-320A  
MPS Lic/BAK R0  
Docket No. 50-423  
License No. NPF-49

**DOMINION NUCLEAR CONNECTICUT, INC.**  
**MILLSTONE POWER STATION UNIT 3**  
**SENIOR REACTOR AND REACTOR OPERATOR INITIAL EXAMINATIONS:**  
**WRITTEN EXAMINATIONS, OPERATING TESTS AND REFERENCE MATERIALS**

In a letter dated May 6, 2009,<sup>1</sup> the U.S. Nuclear Regulatory Commission (NRC) requested Dominion Nuclear Connecticut, Inc. (DNC) submit written examinations, operating tests and reference materials for Senior Reactor Operator and Reactor Operator Examinations – Millstone Power Station Unit 3, by July 30, 2009 for administration of examinations during the weeks of September 14 and 21, 2009.

Enclosure 1, Written Examinations, Operating Tests and Reference Materials, is being furnished in accordance with 10 CFR 55.40(b)(3) by an authorized representative of the facility. All materials are “complete and ready-to-use.”

Consistent with guidance contained in NUREG-1021 Examination Standard 201, Attachment 1, “Examination Security and Integrity Considerations,” the outlines contained in Enclosure 1 should be withheld from public disclosure until after the examination has been completed. No redacted versions are being supplied.

If you have any questions or require additional information, please contact Mr. Jeff T. Spence at (860) 437-2540.

Sincerely,

A. J. Jordan  
Site Vice President - Millstone

2009 AUG -3 PM 1:13  
RECEIVED  
REGION 1

<sup>1</sup> Samuel L. Hansell, Jr. letter from the U.S. NRC, to David A. Christian, “Senior Reactor and Reactor Operator Initial Examinations – Millstone Power Station, Unit 3,” dated May 6, 2009

Enclosure: 1

Commitments made in this letter: None.

cc: (w/o attachment)  
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Millstone Power Station

U.S. Nuclear Regulatory Commission  
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**EXAMINATION SECURITY AND INTEGRITY CONSIDERATIONS – WITHHOLD  
UNDER GUIDANCE OF NUREG-1021, ES-201**

**ENCLOSURE**

**SENIOR REACTOR OPERATOR AND REACTOR OPERATOR  
INITIAL EXAMINATIONS:  
WRITTEN EXAMINATIONS, OPERATING TESTS AND REFERENCE MATERIALS**

**MILLSTONE POWER STATION UNIT 3  
DOMINION NUCLEAR CONNECTICUT, INC. (DNC)**

**NOTE: THE ENCLOSURE TO THIS LETTER CONTAINS REACTOR OPERATOR  
EXAMINATION INFORMATION – WITHHOLD UNTIL AFTER THE EXAMINATION HAS  
BEEN COMPLETED PER GUIDANCE IN NUREG-1021, ES-201**

Facility: Millstone 3		Date of Exam: Weeks of Sept 14 and 21, 2009																
Tier	Group	RO K/A Category Points											SRO-Only Points					
		K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G *	Total	A 2	G*	Total		
1. Emergency & Abnormal Plant Evolutions	1	5	2	1	N/A			4	4	N/A			2	18	4	2	6	
	2	2	0	1	N/A			2	2	N/A			2	9	0	4	4	
	Tier Totals	7	2	2	N/A			6	6	N/A			4	27	4	6	10	
2. Plant Systems	1	3	4	3	1	2	2	4	2	3	2	2	28	2	3	5		
	2	1	0	0	1	1	1	0	1	1	0	4	10	2	1	3		
	Tier Totals	4	4	3	2	3	3	4	3	4	2	6	38	4	4	8		
3. Generic Knowledge and Abilities Categories					1	2	3	4					10	1	2	3	4	7
					3	3	2	2					10	2	2	1	2	

Note: 1. Ensure that at least two topics from every applicable K/A category are sampled within each tier of the RO and SRO-only outlines (i. e., except for one category in Tier 3 of the SRO-only outline, the "Tier Totals" in each K/A category shall not be less than two).

2. The point total for each group and tier in the proposed outline must match that specified in the table. The final point total for each group and tier may deviate by ± 1 from that specified in the table based on NRC revisions. The final RO exam must total 75 points and the SRO-only exam must total 25 points.

3. Systems/evolutions within each group are identified on the associated outline; systems or evolutions that do not apply at the facility should be deleted and justified; operationally important, site-specific systems/evolutions that are not included on the outline should be added. Refer to Section D of ES-401 for guidance regarding the elimination of inappropriate K/A statements.

4. Select topics from as many systems and evolutions as possible; sample every system or evolution in the group before selecting as second topic for any system or evolution.

5. Absent a plant-specific priority, only those K/As having an importance rating (IR) of 2.5 or higher shall be selected. Use the RO and SRO ratings for the RO and SRO-only portions, respectively.

6. Select SRO topics for Tiers 1 and 2 from the shaded systems and K/A categories.

7. \* The generic (G) K/As in Tiers 1 and 2 shall be selected from Section 2 of the K/A Catalog, but the topics must be relevant to the applicable evolution or system. Refer to Section D.1.b of ES-401 for the applicable K/As.

8. On the following pages, enter the K/A numbers, a brief description of each topic, the topics' importance ratings (IRs) for the applicable license level, and the point totals (#) for each system and category. Enter the group and tier totals for each category in the table above; if fuel handling equipment is sampled in other than Category A2 or G\* on the SRO-only exam, enter it on the left side of Column A2 for Tier 2, Group 2 (Note #1 does not apply). Use duplicate pages for RO and SRO-only exams.

9. For Tier 3, select topics from Section 2 of the K/A catalog, and enter the K/A numbers, descriptions, IRs, and point totals (#) on Form ES-401-3. Limit SRO selections to K/As that are linked to 10CFR55.43.

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

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

ES-401		PWR Examination Outline						Form ES-401-2	
Emergency and Abnormal Plant Evolutions - Tier 1/Group 2 (RO)									
E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	G	K/A Topic(s)	IR	#
00003 Dropped Control Rod / 1				1			Operate/monitor the demand counter and the P/A converter	2.9/2.9	1
000032 Loss of Source Range NI / 7	1						Operational implications of the effect of voltage changes on performance	2.5/3.1	1
000033 Loss of Intermediate Range NI / 7				1			Operate/monitor power-available indicators in cabinets or equipment drawers	2.9/3.1	1
000036 Fuel Handling Accident / 8			2				Reasons for interlocks associated with fuel handling equipment	2.9/3.6	1
000037 Steam Generator Tube Leak					9		Determine/interpret status, using independent, redundant condensate air ejector exhaust monitor	2.8/3.4	1
W/E07 Inad. Core Cooling / 4	3						Operational implications of annunciators, conditions, indications and remedial actions associated with saturated core cooling	3.2/3.6	1
W/E01 Rediagnosis					2		Determine/interpret adherence to appropriate procedures and operation within license	3.3/3.9	1
W/E13 Steam Generator Over-pressure / 4						2.4.31	Knowledge of alarms, indications, or annunciator response procedures	4.2/4.1	1
Site Specific Turbine Trip						2.4.31	Knowledge of alarms, indications, or annunciator response procedures	4.2/4.1	1
K/A Category Point Totals:	2	0	1	2	2	2	Group Point Total:		9

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

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

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

ES-401	PWR Examination Outline Plant Systems - Tier 2/Group 1 (SRO)											Form ES-401-2			
System # / Name	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G	K/A Topic(s)	IR	#	
012 Reactor Protection												2.1.7	Ability to evaluate plant performance and make operational judgments	4.7	1
026 Containment Spray												2.4.9	Knowledge of low power / shutdown implications in accident (LOCA) mitigation strategy	4.2	1
039 Main and Reheat Steam								4					Predict the impact of and use procedures to mitigate the consequences of a malfunctioning steam dump	3.7	1
059 Main Feedwater								7					Predict the impact of and use procedures to mitigate the consequences of tripping of MFW turbine	3.3	1
062 AC Electrical Distribution												2.1.20	Ability to interpret and execute procedure steps	4.6	1
K/A Category Point Totals:	0	0	0	0	0	0	0	2	0	0	3	Group Point Total:		5	

PWR Examination Outline Plant Systems - Tier 2/Group 2 (RO)												Form ES-401-2		
System # / Name	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G	K/A Topic(s)	IR	#
002 Reactor Coolant								2				Predict the impact of and use procedures to mitigate the consequences of a loss of coolant pressure	4.2/4.4	1
011 Pressurizer Level Control											2.1.28	Purpose of major system components and controls	4.1/4.1	1
014 Rod Position Indication											2.2.38	Conditions and limits in the facility license	3.6/4.5	1
015 Nuclear Instrumentation						1						Effect of a loss or malfunction of sensors on NIS	2.9/3.2	1
016 Non-nuclear Instrumentation				1								Design features / interlocks which provide for reading NNI outside control room	2.8/2.9	1
017 In-core Temperature Monitor					2							Operational implications of saturation and subcooling	3.7/4.0	1
029 Containment Purge									1			Monitor automatic operation of Ctmt purge isolation	3.8/4.0	1
033 Spent Fuel Pool Cooling											2.2.12	Knowledge of surveillance procedures	3.7/4.1	1
035 Steam Generator	1											Physical connections / cause-effect relationship between S/Gs and MFW/AFW	4.2/4.5	1
041 Steam Dump/ Turbine Bypass Control											2.4.31	Knowledge of annunciators, indications, or response procedures	4.2/4.1	1
K/A Category Point Totals:	1	0	0	1	1	1	0	1	1	0	4	Group Point Total:		10

ES-401	PWR Examination Outline Plant Systems - Tier 2/Group 2 (SRO)											Form ES-401-2			
System # / Name	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G	K/A Topic(s)	IR	#	
011 Pressurizer Level Control												2.4.4	Ability to recognize abnormal parameters that are entry conditions for emergency and abnormal operating procedures	4.7	1
086 Fire Protection								1					Predict the impact of and use procedures to mitigate the consequences of FPS manual shutdown	3.1	1
Site Specific AMSAC								X					Predict the impact of and use procedures to mitigate the consequences of AMSAC malfunction	N/A	1
K/A Category Point Totals:	0	0	0	0	0	0	0	2	0	0	1	Group Point Total:			3

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



Written Exam Development Process (provided per ES-401, Section D.1.b.)

The Millstone 3 2009 License Exam Outline was developed using the random-systematic sampling methodology described in ES-401, Attachment 1, using a coffee can and poker chips.

Facility: <u>Millstone 3</u>		Date of Examination: <u>9/14 – 9/25/09</u>
Examination Level: RO <input checked="" type="checkbox"/>	SRO <input type="checkbox"/>	Operating Test Number: <u>2K9</u>
Administrative Topic (see Note)	Type Code*	Describe activity to be performed
Conduct of Operations RO A.1.1	D, R	Determine Shutdown Margin with Inoperable Control Rods. K/A 2.1.25
Conduct of Operations RO A.1.2	N, R	Complete a Shutdown Safety Assessment Checklist. K/A 2.1.20
Equipment Control RO A.2	P, D, R	Given a Maintenance Repair Recommendation and Reference Material, Recommend a Clearance Boundary. K/A 2.2.13
Radiation Control RO A.3	N, R	Review a Radiological Work Procedure and Survey Map. K/A 2.3.7
Emergency Procedures / Plan		
NOTE: All items (5 total) are required for SROs. RO applicants require only 4 items unless they are retaking only the administrative topics, when all 5 are required.		
* Type Codes & Criteria: (C)ontrol room, (S)imulator, or Class(R)oom (D)irect from bank ( ≤ 3 for ROs; ≤ 4 for SROs & RO retakes) (N)ew or (M)odified from bank ( ≥ 1) (P)revious 2 exams ( ≤ 1; randomly selected)		

Facility: Millstone 3Date of Examination: 9/14 – 9/25/09Examination Level: RO SRO Operating Test Number: 2K9

Administrative Topic (see Note)	Type Code*	Describe activity to be performed
Conduct of Operations SRO A.1.1	N, R	Loss of Containment Closure. K/A 2.1.36
Conduct of Operations SRO A.1.2	M, R	Respond to Degrading Intake Conditions. K/A 2.1.23
Equipment Control SRO A.2	D, R	Notifications and Reportability Associated with a Safety Limit Violation. K/A 2.2.22
Radiation Control SRO A.3	P, D, R	Review and Approve a Radioactive Liquid Waste Discharge Permit. K/A 2.3.6
Emergency Procedures / Plan SRO A.4	N, R	Emergency Plan Classification and Protective Action Recommendation for a General Emergency. K/A 2.4.41 / 2.4.44

NOTE: All items (5 total) are required for SROs. RO applicants require only 4 items unless they are retaking only the administrative topics, when all 5 are required.

\* Type Codes & Criteria:  
 (C)ontrol room, (S)imulator, or Class(R)oom  
 (D)irect from bank ( ≤ 3 for ROs; ≤ 4 for SROs & RO retakes)  
 (N)ew or (M)odified from bank ( ≥ 1)  
 (P)revious 2 exams ( ≤ 1; randomly selected)

Facility: Millstone Unit 3

Date of Examination: 9/14 – 9/25/09

Exam Level: RO  SRO-I  SRO-U

Operating Test No.: 2K9

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

System / JPM Title	Type Code*	Safety Function
a. S.1 / Lineup RHR System in the Injection Mode (RCS Leak)	D, S, A, E, L	4.1 - 005
b. S.2 / Cold Leg Recirculation.	D, S, A, E, EN	3 - 006
c. S.3 / Align Safety Grade Boration Path.	N, S, A, E	1 - 004
d. S.4 / Respond to an Inadvertent Containment Isolation Phase 'A'.	N, S, E, EN	2 - 013
e. S.5 / Establish MFW While Responding to a Loss of Heat Sink.	D, S, E	4.2 - 059
f. S.6 / Energize an AC Emergency Bus Through the RSSA during ECA-0.0.	P, S, D, E	6 - 062
g. S.7 / Performance of the Immediate Actions of E-0.	P, S, A, E, EN	7 - 012
h. S.8 / Manually Initiate Containment Spray.	D, S, A, E	5 - 026

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

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

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

\* Type Codes

Criteria for RO / SRO-I / SRO-U

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

Facility: Millstone Unit 3

Date of Examination: 9/14 – 9/25/09

Exam Level: RO  SRO-I  SRO-U

Operating Test No.: 2K9

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

System / JPM Title	Type Code*	Safety Function
a. S.1 / Lineup RHR System in the Injection Mode (RCS Leak)	D, S, A, E, L	4.1 - 005
b. S.2 / Cold Leg Recirculation.	D, S, A, E, EN	3 - 006
c. S.3 / Align Safety Grade Boration Path.	N, S, A, E	1 - 004
d. S.4 / Respond to an Inadvertent Containment Isolation Phase 'A'.	N, S, E, EN	2 - 013
e. S.5 / Establish MFW While Responding to a Loss of Heat Sink.	D, S, E	4.2 - 059
f. S.6 / Energize an AC Emergency Bus Through the RSSA during ECA-0.0.	P, S, D, E	6 - 062
g. S.7 / Performance of the Immediate Actions of E-0.	P, S, A, E, EN	7 - 012
h.		

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

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

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

\* Type Codes

Criteria for RO / SRO-I / SRO-U

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

Facility: Millstone Unit 3

Date of Examination: 9/14 – 9/25/09

Exam Level: RO  SRO-I  SRO-U

Operating Test No.: 2K9

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

System / JPM Title	Type Code*	Safety Function
a. S.3 / Align Safety Grade Boration Path.	N, S, A, E	1 - 004
b. S.4 / Respond to an Inadvertent Containment Isolation Phase 'A'.	N, S, E, EN	2 - 013
c. S.7 / Performance of the Immediate Actions of E-0.	P, S, A, E, EN	7 - 012
d.		
e.		
f.		
g.		
h.		

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

i. P.1 / Establish Alternate Charging Pump Cooling.	P, D, E, R	4.2 - 076
j. P.3 / Local Isolation of a Faulted Steam Generator	M, E	4.1 - 039
k.		

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

\* Type Codes

Criteria for RO / SRO-I / SRO-U

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

Facility: Millstone 3 Scenario No.: 2K9 NRC-01 Op-Test No.: 2K9

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

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

Turnover:

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

Event No.	Malf. No	Event Type*	Event Description
1	CV05	I (RO)	Letdown Temperature transmitter fails high. (Annunciator response)
2	RX12M	I (BOP)	'A' steam generator level channel (controlling) failure. (AOP 3571)
3	SW01C	C (RO)	'C' Service Water Pump trip. (Annunciator response)
4		R (RO) R (SRO) N (BOP)	'B' Turbine Driven Main Feed Pump (TD MFP) seal failure. Rapid downpower (1%/min) to place the Motor Driven Main Feed Pump (MD MFP) in service.
5	FW07A/C RP09A/B RP10A/B I/O 32N	C (BOP)	'B' TD MFP trip, MD MFP fails to start. Results in a manual reactor trip attempt. Automatic and manual reactor trip failure.
6	FW20 I/O MV8104	M (ALL) C (BOP) C (RO)	ATWS / Load Center 32N fails to deenergize. AFW pumps fail to auto start. Emergency boration valve, 3CHS*MV8104 will fail to open.
7	MS01B RP11E RP08A/B	C(RO) C (BOP)	'B' main steam line break in CTMT. Several HPSI components fail to respond to a Safety Injection signal. Main Steamline Isolation fails to automatically actuate.

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

Facility: Millstone 3 Scenario No.: 2K9 NRC-02 Op-Test No.: 2K9

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

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

Turnover:

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

Event No.	Malf. No	Event Type*	Event Description
1	RX09A	I (RO)	Controlling channel of PZR pressure fails high. (AOP 3571)
2		R (RO) R (SRO) N (BOP)	CONVEX directed Emergency Load Reduction. (AOP 3575 at 5%/min)
3	RX16A	I (RO, BOP)	Turbine Impulse pressure instrument (3MSS-PT505) fails as is, concurrent with downpower. (AOP 3571)
4	CV11B	C (RO)	'B' Charging pump trip. (EOP 3506)
5	RX19	I (BOP)	Main feed pressure channel fails low (3FWS-PT508) (AOP 3571)
6	CV13C	C (RO)	'C' RCP #1 seal degradation results in high seal leakoff. Procedurally required reactor trip. (Annunciator Response)
7	RC02C RP07A/B RP11L	M (ALL) C (RO) C (BOP)	Small break LOCA inside CTMT (catastrophic loss of 'C' RCP seal package). Safety Injection fails to automatically actuate. Feedwater Isolation fails to automatically actuate.
8	ED01	C (RO)	Loss of offsite power. RO must restart ECCS pumps.
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor			

Facility: Millstone 3 Scenario No.: 2K9 NRC-03 Op-Test No.: 2K9

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

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

Turnover:

The plant is at 100% power and at beginning of life. The "B" HVK Chiller unit is out of service for planned maintenance. The 'B' MDAFW is out of service for planned maintenance. Rod Control is in 'Manual' to allow I & C calibrate the Tav<sub>g</sub> –T<sub>ref</sub> rod control circuitry.

Event No.	Malf. No	Event Type*	Event Description
1	MS11C	I (BOP)	'C' SG pressure channel failure. (3MSS-PT20C) (Annunciator response, AOP 3571)
2	RX10A	I (RO)	Controlling channel of PZR level fails high. (AOP 3571)
3	I/O Ann	R (RO) R (SRO) N (BOP)	'B' Main transformer high temperature and subsequent procedurally required downpower. (Annunciator response, AOP 3575)
4		I (RO)	Manual Rod Control concurrent with downpower.
5	ED04C	C (RO, BOP)	Loss of emergency bus 34C. (AOP 3577)
6	ED01 RC07B FW20C	M (ALL) C (BOP) C (RO) C (BOP)	Loss of offsite power resulting in a reactor trip. 'A' EDG starts but does not close in to 34C (bus differential lockout). 'B' EDG fails to start automatically or manually from the control room. 'B' PZR PORV (3RCS*PCV456) is stuck partially open. TD AFW fails to automatically start.
7	SW01B/D	C (RO)	"B" EDG is started locally. "B" service water pumps fail to auto-start after "B" EDG is successfully started locally.
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor			

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

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

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

Turnover:

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

Event No.	Malf. No	Event Type*	Event Description
1		R (RO) R (SRO) N (BOP)	Power ascension from 3% to 8% power using OP 3203, <i>Plant Startup</i> .
2	CV10B	I (RO)	VCT level transmitter fails high. (Annunciator response)
3	NI09C	I (BOP)	Power Range Nuclear Instrument (NI) Channel 43 Lower Detector fails high requiring FRV Bypass valve controllers to be placed in manual.
4	RC25B	C (RO) C (BOP)	'B' RCP high shaft vibration requiring an immediate shutdown of the affected RCP. RCP is tripped using AOP 3554.
5	RP10A/B RP09A/B MS01D RP11K	M (ALL) C (BOP) C (RO)	'D' Main Steamline break in CTMT. Main Board manual reactor trip switches fail. Successful manual reactor trip from load centers 32B and 32N. Containment Isolation Phase 'A' fails to automatically actuate.
6	SG01D	M (ALL)	Hot, dry 'D' SG results in a SGTR. Faulted, ruptured SG.

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