Administrative Topics Outline

Form ES-301-1

Facility: <u>Three Mile Island</u> Examination Level: RO 🛛 SF	RO 🗌	Date of Examination: <u>06/26/17</u> Operating Test Number: <u>TMI-2017-1</u>					
Administrative Topic (See Note)	Type Code*	Describe activity to be performed					
Conduct of Operations	R, N	Shutdown Margin for Low Temperature Conditions 2.1.43					
Conduct of Operations	R, D	Perform a Transient Leak Rate Calculation 2.1.23					
Equipment Control S, D		Perform the "Shiftly Checks" IAW 1301-1, DATA SHEET 1 2.2.12					
Radiation Control							
Emergency Plan	S, P, D	ERO Notification 2.4.39 From 12-01 NRC Exam					
NOTE: All items (5 total) are retaking only the adm	required for S inistrative top	ROs. RO applicants require only 4 items unless they are bics (which would require all five items).					
 * 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) 							

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RA1-1 – The examinee will have to calculate shutdown margin(SDM) for a low temperature situation and will determine that SDM is NOT more negative than -1 $\%\Delta k/k$.

RA1-2 – The examinee will use OS-24 to calculate a transient leakrate.

RA2 – The examinee will be in the simulator to perform a portion of the shift and daily log set. The examinee will have to identify all out of specification readings.

RA4 – The examinee will have to make all ERO notifications as shift communicator.

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Administrative Topic (See Note)	Type Code*	Describe activity to be performed				
Conduct of Operations	R, P, D	Maintain Minimum Shift Manning with Overtime 2.1.5 From 14-01 NRC Exam				
Conduct of Operations	R, D	Perform an estimated critical rod position calculation 2.1.43				
Equipment Control	R, D	Use Station Drawing to Predict Impact of Component Failure and Evaluate Technical Specification Implications 2.2.41				
Radiation Control	R, D	Revew RB Entry Survey Log 2.3.12				
Emergency Plan S,		EAL and PAR 2.4.44				
NOTE: All items (5 total) are retaking only the adm	required for S inistrative top	ROs. RO applicants require only 4 items unless they are ics (which would require all five items).				
 * Type Codes & Criteria: (C)ontrol room, (S)imulator, or Class(R)oom (D)irect from bank (≤ 3 for ROs; ≤ 4 for SROs & RO retal (N)ew or (M)odified from bank (≥ 1) (P)revious 2 exams (≤ 1; randomly selected) 						

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SA1-1 – The examinee will have to identify the required actions to restore minimum staffing and then select personnel to control overtime.

SA1-2 – The examinee will have to independently perform, and approve an estimated critical position.

SA2 – The examinee will have to use station drawings to determine that the Emergency Diesel Generator is inoperable and declare the correct technical specification time clock.

SA3 – The examinee will have to identify all the faults in the RP Entry Survey Log.

SA4 – The examinee will have to determine the EAL and make a PAR in accordance with the facility Emergency Plan.

Control Room/In-Plant Systems Outline

Facility: Three Mile Island	nination: <u>06/26/17</u>							
Exam Level: RO 🗌 SRO-I 🛛 SRO-U 🗌	est No.: <u>TMI-2017-1</u>							
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Control Room Systems: *8 for RO; 7 for SRO-I; 2 or 3 for SRO-U								
System / JPM Title	Type Code*	Safety Function						
a. Makeup System / Emergency Borate Using Alternate Path - 004 A2.14	A, D, S	1						
 B. Reactor Coolant System / Restoration of let temperature closure of MU-V-3 - 002 A1.02 	 B. Reactor Coolant System / Restoration of letdown flow following high temperature closure of MU-V-3 - 002 A1.02 							
 c. Emergency Core Cooling System / Respond – Alternate Path - 006 A2.13 	 c. Emergency Core Cooling System / Respond to inadvertant ES actuation – Alternate Path - 006 A2.13 							
 d. Residual Heat Removal System / Transfer of Recirculation - Alternate Path – 005 A2.04 	A, D, L, S	4S						
e. Containment Cooling System / Perform Eme Reactor Building Emergency Cooling water	A, M, S	5						
 A.C Electrical Distribution / Transfer BOP B Transformer – 062 A4.01 	usses from 1B to 1A Aux	M, S	6					
g. N/A for SRO's	g. N/A for SRO's							
 h. Radiation Monitoring System / Respond IAV Response with failure – Alternate Path – 07 	V OP-TM-MAP-C0101 Alarm 2 A3.01	A, D, P, S	7					
In-Plant Systems * (3 for RO); (3 for SRO-I); (3	or 2 for SRO-U)							
 Main Steam System / Locally / Manually Op Valves (MS-V-3A-F) 041 A4.08 	erate the Turbine Bypass	D	4S					
j. Nuclear Service Closed Cooling Water / Em Service Closed Cooling Surge Tank (NS-T-	ergency Makeup to Nuclear 1) - 008A4.07	D, E	8					
k. Waste Gas System / Take Corrective Actior Gas Release – 071G2.1.30	n for an Unauthorized Waste	N, R	9					
 * All RO and SRO-I control room (and in-pla functions; all five SRO-U systems must se may overlap those tested in the control ro 	ant) systems must be different and erve different safety functions; in-p om.	serve different s lant systems and	afety functions					
* Type Codes	Criteria for RO / S	SRO-I / SRO-U						

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

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JPM A: <u>Emergency Borate Using the RBAT as the Source – Alternate Path</u> - In this JPM the examinee will be directed to perform OP-TM-EOP-010, Rule 5 for emergency boration. Due to malfunctions, the examinee will have to initiate emergency boration using Guide 1.

JPM B: <u>Restoration of Letdown Flow Following Temperature Closure of MU-V-3</u> – In this JPM the examinee will show the ability to restore letdown while maintaining normal pressurizer level and makeup tank bands.

JPM C: <u>Respond to an Inadvertent ESAS Actuation-Alternate Path</u> – In this JPM the examinee will show the ability to perform the IMA's of OP-TM-AOP-046, INADVERTENT ESAS ACTUATION. The 'B' 500 psig ES signal will not be able to be cleared so the examinee will end up having to throttle open MU-V-16B to ensure proper makeup pump flow.

JPM D: <u>Transfer of Reactor Building Sump Recirculation - Alternate Path</u> – In this JPM the examinee will demonstrate the ability to throttle LPI to within limits after a sump recirculation suction valve fails to open after a LOCA.

JPM E: <u>Perform Emergency Operations of Reactor Building Emergency Cooling Water –</u> <u>Alternate Path</u> – In this JPM the examinee will be directed to initiate Reactor Building Emergency Cooling. This JPM is modified so that RR-V-1B does not open and RR-P-1B must be secured.

JPM F: <u>Transfer BOP Busses from 1B to 1A Aux Transformer</u> – In this JPM the examinee will demonstrate the ability to transfer the 1C 4160V Bus from the 1B Aux Transformer to the 1A Aux Transformer.

JPM H: <u>Respond IAW OP-TM-MAP-C0101 Alarm Response with Failure – Alternate Path</u> – In this JPM, the examinee will have to put the control tower on emergency recirculation. AH-E-18B will trip so the examinee will have to start the opposite train.

JPM I: <u>Manually/Locally operate the turbine bypass valves (MS-V-3A-F)</u> – In this JPM the examinee will take local manual control of MS-V-3C.

JPM J: <u>Emergency Makeup to Nuclear Service Closed Cooling Surge Tank (NS-T-1)</u> – In this JPM the examinee will have to do an emergency fill of the nuclear closed cooling water surge tank.

JPM K: <u>Take Corrective Action for an Unauthorized Waste Gas release – Inplant</u> – In this JPM the examinee will have to identify what a waste gas tank is releasing and take action to stop the release.

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Control Room/In-Plant Systems Outline

Exam Level: RO SRO-I SRO-U SRO-U Operating Test No.: TMI-2017-1 Control Room Systems: *8 for RO; 7 for SRO-I; 2 or 3 for SRO-U Type Code* Safety Function a. Makeup System / Emergency Borate Using the RBAT as the Source – Al D, S 1 b. Reactor Coolant System / Restoration of letdown flow following high temperature closure of MU-V-3 - 002 A1.02 D, S 2 c. Emergency Core Cooling System / Respond to inadvertant ES actuation - Alternate Path - 006 A2.13 A, EN, M, S 3 d. Residual Heat Removal System / Transfer of Reactor Building Sump Recirculation - Alternate Path - 005 A2.04 A, D, L, S 4P e. Containment Cooling System / Perform Emergency Operations of Reactor Building Emergency Cooling Water - Alternate Path - 022 A4.04 A, M, S 5 f. A.C Electrical Distribution / Transfer BOP Busses from 1B to 1A Aux M, S 6 6 g. Component Cooling Water System / Cross Connect the Secondary River M, S 8 8 Water System to the Nuclear River Water System - 026 A4.02 M, S 7 h. Radiation Monitoring System / Respond IAW OP-TM-MAP-C0101 Alarm A, D, P, S 7 n-Plant Systems * (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U) 4 8 j. Nuclear Service Closed Cooling Water / Emergency Makeup to Nuclear Service Closed Cooling Surge Tank (NS-T-1) - 008A4.07 D, E 8	Facility: Three Mile Island	nination: <u>06/26/17</u>								
Control Room Systems: *8 for RO; 7 for SRO-I; 2 or 3 for SRO-U System / JPM Title Type Code* Safety Function a. Makeup System / Emergency Borate Using the RBAT as the Source – Alternate Path - 004 A2.14 A, D, S 1 b. Reactor Coolant System / Restoration of letdown flow following high temperature closure of MU-V-3 - 002 A1.02 D, S 2 c. Emergency Core Cooling System / Respond to inadvertant ES actuation - Alternate Path - 006 A2.13 A, EN, M, S 3 d. Residual Heat Removal System / Transfer of Reactor Building Sump Recirculation - Alternate Path - 005 A2.04 A, M, S 5 e. Containment Cooling System / Perform Emergency Operations of Reactor Building Emergency Cooling water - Alternate Path - 022 A4.04 M, S 6 f. A.C Electrical Distribution / Transfer BOP Busses from 1B to 1A Aux Transformer - 062 A4.01 M, S 8 g. Component Cooling Water System / Cross Connect the Secondary River Water System to the Nuclear River Water System - 026 AA2.02 M, S 8 h. Radiation Monitoring System / Benon IAW OP-TM-MAP-C0101 Alarm Response with failure – Alternate Path - 072 A3.01 M, S 7 In-Plant Systems * (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U) i. Main Steam System / Locally / Manually OP-TM Emergency Makeup to Nuclear Service Closed Cooling Water / Emergency Makeup to Nuclear Service Closed Cooling Surge Tank (NS-T-1) - 008A4.07 D,	Exam Level: RO 🛛 SRO-I 🗌 SRO-U 🗌	est No.: <u>TMI-20</u>	17-1							
Control Room Systems: *8 for RO; 7 for SRO-I; 2 or 3 for SRO-U System / JPM Title Type Code* Safety Function a. Makeup System / Emergency Borate Using the RBAT as the Source – Alternate Path - 004 A2.14 A, D, S 1 b. Reactor Coolant System / Restoration of letdown flow following high temperature closure of MU-V-3 - 002 A1.02 D, S 2 c. Emergency Core Cooling System / Respond to inadvertant ES actuation – Alternate Path - 006 A2.13 A, EN, M, S 3 d. Residual Heat Removal System / Transfer of Reactor Building Sump Recirculation - Alternate Path - 005 A2.04 A, D, L, S 4P e. Containment Cooling System / Perform Emergency Operations of Reactor Building Emergency Cooling water - Alternate Path - 022 A4.04 M, S 6 f. A.C Electrical Distribution / Transfer BOP Busses from 1B to 1A Aux Transformer - 062 A4.01 M, S 8 g. Component Cooling Water System / Cross Connect the Secondary River Water System to the Nuclear River Water System - 026 AA2.02 M, S 8 h. Radiation Monitoring System / Respond IAW OP-TM-MAP-C0101 Alarm Response with failure - Alternate Path - 072 A3.01 A, D, P, S 7 In-Plant System / Locally / Manually Operate the Turbine Bypass Valves (MS-V-3A-F) 041 A4.08 D 4S j. Nuclear Service Closed Cooling Water / Emergency Makeup to Nuclear Service Closed Cooling Surge Tank (NS-T-1)										
System / JPM TitleType Code*Safety Functiona. Makeup System / Emergency Borate Using the RBAT as the Source – Alternate Path - 004 A2.14A, D, S1b. Reactor Coolant System / Restoration of letdown flow following high temperature closure of MU-V-3 - 002 A1.02D, S2c. Emergency Core Cooling System / Respond to inadvertant ES actuation - Alternate Path - 006 A2.13A, EN, M, S3d. Residual Heat Removal System / Transfer of Reactor Building Sump Recirculation - Alternate Path - 005 A2.04A, D, L, S4Pe. Containment Cooling System / Perform Emergency Operations of Reactor Building Emergency Cooling water - Alternate Path - 022 A4.04M, S6f. A, C Electrical Distribution / Transfer BOP Busses from 1B to 1A Aux Transformer - 062 A4.01M, S8g. Component Cooling Water System / Cross Connect the Secondary River Water System to the Nuclear River Water System - 026 AA2.02M, S8h. Radiation Monitoring System / Respond IAW OP-TM-MAP-C0101 Alarm Response with failure – Alternate Path - 072 A3.01A, D, P, S7In-Plant Systems * (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)I.Main Steam System / Locally / Manually Operate the Turbine Bypass Service Closed Cooling Surge Tank (NS-T-1) - 008A4.07D, E8j. Nuclear Service Closed Cooling Surge Tank (NS-T-1) - 008A4.07N, R99* Mal RO and SRO-I control room (and in-plant) systems must be different and serve different safety functions; in Plant systems and functions may overlap those tested in the control room.Criteria for RO / SRO-I / SRO-U8	Control Room Systems: *8 for RO; 7 for SRO-I	; 2 or 3 for SRO-U								
a. Makeup System / Emergency Borate Using the RBAT as the Source – A, D, S 1 Alternate Path - 004 A2.14 D. Reactor Coolant System / Restoration of letdown flow following high temperature closure of MU-V-3 - 002 A1.02 D. S 2 c. Emergency Core Cooling System / Respond to inadvertant ES actuation - Alternate Path - 006 A2.13 A, EN, M, S 3 d. Residual Heat Removal System / Transfer of Reactor Building Sump Recirculation - Alternate Path - 005 A2.04 A, D, L, S 4P e. Containment Cooling System / Perform Emergency Operations of Reactor Building Emergency Cooling water - Alternate Path - 022 A4.04 A, M, S 5 f. A.C Electrical Distribution / Transfer BOP Busses from 1B to 1A Aux Transformer - 062 A4.01 M, S 8 g. Component Cooling Water System / Cross Connect the Secondary River Water System - 026 AA2.02 M, S 8 h. Radiation Monitoring System / Respond IAW OP-TM-MAP-C0101 Alarm Response with failure - Alternate Path - 072 A3.01 A, D, P, S 7 In-Plant Systems * (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U) I 4S i. Main Steam System / Take Corrective Action for an Unauthorized Waste System / D, E 8 8 j. Nuclear Service Closed Cooling Water / Emergency Makeup to Nuclear Service Closed Cooling Surge Tank (NS-T-1) - 008A4.07 D, E 8 j. Nuclear Service Closed Cooling Water / Emergency Makeup to	System / JPM Title Type Code* Safet Function									
b. Reactor Coolant System / Restoration of letdown flow following high temperature closure of MU-V-3 - 002 A1.02 D, S 2 c. Emergency Core Cooling System / Respond to inadvertant ES actuation - Alternate Path - 006 A2.13 A, EN, M, S 3 d. Residual Heat Removal System / Transfer of Reactor Building Sump Recirculation - Alternate Path - 005 A2.04 A, D, L, S 4P e. Containment Cooling System / Perform Emergency Operations of Reactor Building Emergency Cooling water - Alternate Path - 022 A4.04 A, M, S 5 f. A.C Electrical Distribution / Transfer BOP Busses from 1B to 1A Aux Transformer - 062 A4.01 M, S 6 g. Component Cooling Water System / Respond IAW OP-TM-MAP-C0101 Alarm Response with failure - Alternate Path - 072 A3.01 A, D, P, S 7 In-Plant Systems * (3 for RO); (3 for SRO-1); (3 or 2 for SRO-U) Main Steam System / Locally / Manually Operate the Turbine Bypass D 4S j. Nuclear Service Closed Cooling Water / Emergency Makeup to Nuclear Service Closed Cooling Surge Tank (NS-T-1) - 008A4.07 D, E 8 k. Waste Gas System / Take Corrective Action for an Unauthorized Waste Gas release - 071G2.1.30 * N, R 9 * All RO and SRO-I control room (and in-plant) systems must be different and serve different safety functions; and functions may overlap those tested in the control room. Kriteria for RO / SRO-I / SRO-U *	a. Makeup System / Emergency Borate Using Alternate Path - 004 A2.14	A, D, S	1							
c. Emergency Core Cooling System / Respond to inadvertant ES actuation – Alternate Path - 006 A2.13A, EN, M, S3d. Residual Heat Removal System / Transfer of Reactor Building Sump Recirculation - Alternate Path - 005 A2.04A, D, L, S4Pe. Containment Cooling System / Perform Emergency Operations of Reactor Building Emergency Cooling water - Alternate Path - 022 A4.04A, M, S5f. A.C Electrical Distribution / Transfer BOP Busses from 1B to 1A Aux Transformer - 062 A4.01M, S6g. Component Cooling Water System / Cross Connect the Secondary River Water System to the Nuclear River Water System - 026 A2.02M, S8h. Radiation Monitoring System / Respond IAW OP-TM-MAP-C0101 Alarm Response with failure - Alternate Path - 072 A3.01A, D, P, S7In-Plant Systems * (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)i.Main Steam System / Locally / Manually Operate the Turbine Bypass Valves (MS-V-3A-F) 041 A4.08D4Sj. Nuclear Service Closed Cooling Water / Emergency Makeup to Nuclear Service Closed Cooling Surge Tank (NS-T-1) - 008A4.07D, E8k. Waste Gas System / Take Corrective Action for an Unauthorized Waste Gas release - 071G2.1.30N, R9* All RO and SRO-I control room (and in-plant) systems must be different and serve different safety functions; all five SRO-U systems must serve different safety functions; in-plant systems and functions may overlap those tested in the control room.N, R9	 B. Reactor Coolant System / Restoration of letter temperature closure of MU-V-3 - 002 A1.02 	 Reactor Coolant System / Restoration of letdown flow following high temperature closure of MU-V-3 - 002 A1.02 								
d. Residual Heat Removal System / Transfer of Reactor Building Sump Recirculation - Alternate Path - 005 A2.04 A, D, L, S 4P e. Containment Cooling System / Perform Emergency Operations of Reactor Building Emergency Cooling water - Alternate Path - 022 A4.04 A, M, S 5 f. A.C Electrical Distribution / Transfer BOP Busses from 1B to 1A Aux Transformer - 062 A4.01 M, S 6 g. Component Cooling Water System / Cross Connect the Secondary River Water System to the Nuclear River Water System - 026 AA2.02 M, S 8 h. Radiation Monitoring System / Respond IAW OP-TM-MAP-C0101 Alarm Response with failure - Alternate Path - 072 A3.01 A, D, P, S 7 In-Plant Systems * (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U) i. Main Steam System / Locally / Manually Operate the Turbine Bypass Valves (MS-V-3A-F) 041 A4.08 D 4S j. Nuclear Service Closed Cooling Water / Emergency Makeup to Nuclear Service Closed Cooling Surge Tank (NS-T-1) - 008A4.07 D, E 8 k. Waste Gas System / Take Corrective Action for an Unauthorized Waste Gas release - 071G2.1.30 N, R 9 * All RO and SRO-I control room (and in-plant) systems must be different and serve different safety functions; all five SRO-U systems must serve different safety functions; in-plant systems and functions may overlap those tested in the control room. Criteria for RO / SRO-I / SRO-I / SRO-I / SRO-I	 c. Emergency Core Cooling System / Respond – Alternate Path - 006 A2.13 	 Emergency Core Cooling System / Respond to inadvertant ES actuation Alternate Path - 006 A2.13 								
e. Containment Cooling System / Perform Emergency Operations of Reactor Building Emergency Cooling water - Alternate Path - 022 A4.04 A, M, S 5 f. A.C Electrical Distribution / Transfer BOP Busses from 1B to 1A Aux Transformer - 062 A4.01 M, S 6 g. Component Cooling Water System / Cross Connect the Secondary River Water System to the Nuclear River Water System - 026 AA2.02 M, S 8 h. Radiation Monitoring System / Respond IAW OP-TM-MAP-C0101 Alarm Response with failure - Alternate Path - 072 A3.01 A, D, P, S 7 In-Plant Systems * (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U) i. Main Steam System / Locally / Manually Operate the Turbine Bypass Valves (MS-V-3A-F) 041 A4.08 D 4S j. Nuclear Service Closed Cooling Water / Emergency Makeup to Nuclear Service Closed Cooling Surge Tank (NS-T-1) - 008A4.07 D, E 8 k. Waste Gas System / Take Corrective Action for an Unauthorized Waste Gas release - 071G2.1.30 N, R 9 * All RO and SRO-I control room (and in-plant) systems must be different and serve different safety functions; all five SRO-U systems must serve different safety functions; in-plant systems and functions may overlap those tested in the control room. Criteria for RO / SRO-I / SRO-U	 d. Residual Heat Removal System / Transfer of Recirculation - Alternate Path – 005 A2.04 	d. Residual Heat Removal System / Transfer of Reactor Building Sump Recirculation - Alternate Path – 005 A2.04								
f.A.C Electrical Distribution / Transfer BOP Busses from 1B to 1A AuxM, S6g.Component Cooling Water System / Cross Connect the Secondary River Water System to the Nuclear River Water System - 026 AA2.02M, S8h.Radiation Monitoring System / Respond IAW OP-TM-MAP-C0101 Alarm Response with failure – Alternate Path – 072 A3.01A, D, P, S7In-Plant Systems * (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)In-Plant Systems * (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)D4Sj.Muclear Service Closed Cooling Water / Emergency Makeup to Nuclear Service Closed Cooling Surge Tank (NS-T-1) - 008A4.07D, E8k.Waste Gas System / Take Corrective Action for an Unauthorized Waste Gas release - 071G2.1.30N, R9*All RO and SRO-I control room (and in-plant) systems must be different and serve different safety functions; in-plant systems and functions may overlap those tested in the control room.Criteria for RO / SRO-I / SRO-U	e. Containment Cooling System / Perform Eme Reactor Building Emergency Cooling water	A, M, S	5							
g. Component Cooling Water System / Cross Connect the Secondary River Water System to the Nuclear River Water System - 026 AA2.02M, S8h. Radiation Monitoring System / Respond IAW OP-TM-MAP-C0101 Alarm Response with failure – Alternate Path – 072 A3.01A, D, P, S7In-Plant Systems * (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)In-Plant Systems / Locally / Manually Operate the Turbine Bypass Valves (MS-V-3A-F) 041 A4.08D4Sj. Nuclear Service Closed Cooling Water / Emergency Makeup to Nuclear Service Closed Cooling Surge Tank (NS-T-1) - 008A4.07D, E8k. Waste Gas System / Take Corrective Action for an Unauthorized Waste Gas release - 071G2.1.30N, R9* All RO and SRO-I control room (and in-plant) systems must be different and serve different safety functions; all five SRO-U systems must serve different safety functions; in-plant systems and functions may overlap those tested in the control room.Criteria for RO / SRO-I / SRO-U	 A.C Electrical Distribution / Transfer BOP Bo Transformer – 062 A4.01 	usses from 1B to 1A Aux	M, S	6						
h. Radiation Monitoring System / Respond IAW OP-TM-MAP-C0101 Alarm Response with failure – Alternate Path – 072 A3.01A, D, P, S7In-Plant Systems * (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)i. Main Steam System / Locally / Manually Operate the Turbine Bypass Valves (MS-V-3A-F) 041 A4.08D4Sj. Nuclear Service Closed Cooling Water / Emergency Makeup to Nuclear Service Closed Cooling Surge Tank (NS-T-1) - 008A4.07D, E8k. Waste Gas System / Take Corrective Action for an Unauthorized Waste Gas release - 071G2.1.30N, R9*All RO and SRO-I control room (and in-plant) systems must be different and serve different safety functions; all five SRO-U systems must serve different safety functions; in-plant systems and functions may overlap those tested in the control room.Criteria for RO / SRO-I / SRO-U	g. Component Cooling Water System / Cross (Water System to the Nuclear River Water S	Connect the Secondary River ystem - 026 AA2.02	M, S	8						
In-Plant Systems * (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U) i. Main Steam System / Locally / Manually Operate the Turbine Bypass Valves (MS-V-3A-F) 041 A4.08 D 4S j. Nuclear Service Closed Cooling Water / Emergency Makeup to Nuclear Service Closed Cooling Surge Tank (NS-T-1) - 008A4.07 D, E 8 k. Waste Gas System / Take Corrective Action for an Unauthorized Waste Gas release - 071G2.1.30 N, R 9 * All RO and SRO-I control room (and in-plant) systems must be different and serve different safety functions; all five SRO-U systems must serve different safety functions; in-plant systems and functions may overlap those tested in the control room. Criteria for RO / SRO-I / SRO-U	 h. Radiation Monitoring System / Respond IAV Response with failure – Alternate Path – 072 	V OP-TM-MAP-C0101 Alarm 2 A3.01	A, D, P, S	7						
i. Main Steam System / Locally / Manually Operate the Turbine Bypass D 4S Valves (MS-V-3A-F) 041 A4.08 D 4S j. Nuclear Service Closed Cooling Water / Emergency Makeup to Nuclear Service Closed Cooling Surge Tank (NS-T-1) - 008A4.07 D, E 8 k. Waste Gas System / Take Corrective Action for an Unauthorized Waste Gas release - 071G2.1.30 N, R 9 * All RO and SRO-I control room (and in-plant) systems must be different and serve different safety functions; all five SRO-U systems must serve different safety functions; in-plant systems and functions may overlap those tested in the control room. * Type Codes Criteria for RO / SRO-I / SRO-U	In-Plant Systems * (3 for RO); (3 for SRO-I); (3	or 2 for SRO-U)								
j. Nuclear Service Closed Cooling Water / Emergency Makeup to Nuclear Service Closed Cooling Surge Tank (NS-T-1) - 008A4.07 D, E 8 k. Waste Gas System / Take Corrective Action for an Unauthorized Waste Gas release - 071G2.1.30 N, R 9 * All RO and SRO-I control room (and in-plant) systems must be different and serve different safety functions; all five SRO-U systems must serve different safety functions; in-plant systems and functions may overlap those tested in the control room. Criteria for RO / SRO-I / SRO-U	 Main Steam System / Locally / Manually Op Valves (MS-V-3A-F) 041 A4.08 	erate the Turbine Bypass	D	4S						
k. Waste Gas System / Take Corrective Action for an Unauthorized Waste N, R 9 Sas release - 071G2.1.30 * All RO and SRO-I control room (and in-plant) systems must be different and serve different safety functions; all five SRO-U systems must serve different safety functions; in-plant systems and functions may overlap those tested in the control room. * Type Codes Criteria for RO / SRO-I / SRO-U	j. Nuclear Service Closed Cooling Water / Em Service Closed Cooling Surge Tank (NS-T-	ergency Makeup to Nuclear 1) - 008A4.07	D, E	8						
* All RO and SRO-I control room (and in-plant) systems must be different and serve different safety functions; all five SRO-U systems must serve different safety functions; in-plant systems and functions may overlap those tested in the control room. * Type Codes Criteria for RO / SRO-I / SRO-U	k. Waste Gas System / Take Corrective Action Gas release - 071G2.1.30	n for an Unauthorized Waste	N, R	9						
* Type Codes Criteria for RO / SRO-I / SRO-U	 * All RO and SRO-I control room (and in-pla functions; all five SRO-U systems must se may overlap those tested in the control room 	ant) systems must be different and erve different safety functions; in-p om.	serve different s lant systems and	afety functions						
	* Type Codes	Criteria for RO / S	SRO-I / SRO-U							

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

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JPM A: <u>Emergency Borate Using the RBAT as the Source – Alternate Path</u> - In this JPM the examinee will be directed to perform OP-TM-EOP-010, Rule 5 for emergency boration. Due to malfunctions, the examinee will have to initiate emergency boration using Guide 1.

JPM B: <u>Restoration of Letdown Flow Following Temperature Closure of MU-V-3</u> – In this JPM the examinee will show the ability to restore letdown while maintaining normal pressurizer level and makeup tank bands.

JPM C: <u>Respond to an Inadvertent ESAS Actuation-Alternate Path</u> – In this JPM the examinee will show the ability to perform the IMA's of OP-TM-AOP-046, INADVERTENT ESAS ACTUATION. The 'B' 500 psig ES signal will not be able to be cleared so the examinee will end up having to throttle open MU-V-16B to ensure proper makeup pump flow.</u>

JPM D: <u>Transfer of Reactor Building Sump Recirculation - Alternate Path</u> – In this JPM the examinee will demonstrate the ability to throttle LPI to within limits after a sump recirculation suction valve fails to open after a LOCA.

JPM E: <u>Perform Emergency Operations of Reactor Building Emergency Cooling Water –</u> <u>Alternate Path</u> – In this JPM the examinee will be directed to initiate Reactor Building Emergency Cooling. This JPM is modified so that RR-V-1B does not open and RR-P-1B must be secured.

JPM F: <u>Transfer BOP Busses from 1B to 1A Aux Transformer</u> – In this JPM the examinee will demonstrate the ability to transfer the 1C 4160V Bus from the 1B Aux Transformer to the 1A Aux Transformer.

JPM G: <u>Cross Connect the Secondary River Water System to the Nuclear River Water System</u> – In this JPM the examinee will have to cross connect Secondary River with Nuclear River water.

JPM H: <u>Respond IAW OP-TM-MAP-C0101 Alarm Response with Failure – Alternate Path</u> – In this JPM, the examinee will have to put the control tower on emergency recirculation. AH-E-18B will trip so the examinee will have to start the opposite train.

JPM I: <u>Manually/Locally operate the turbine bypass valves (MS-V-3A-F)</u> – In this JPM the examinee will take local manual control of MS-V-3C.

JPM J: <u>Emergency Makeup to Nuclear Service Closed Cooling Surge Tank (NS-T-1)</u> – In this JPM the examinee will have to do an emergency fill of the nuclear closed cooling water surge tank.

JPM K: <u>Take Corrective Action for an Unauthorized Waste Gas release – Inplant</u> – In this JPM the examinee will have to identify what a waste gas tank is releasing and take action to stop the release.

Appendix E)
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Scenario Outline

Facility: Examiners:	Three	Mile Island	Scenario No.: 1 Op Test No.: TMI-201 Operators:	<u>7-1</u>							
Initial Cond	itions:	• 100% pov	wer, MOL								
		• EG-Y-1A	"A" Diesel Generator Out of Service								
Turnover:		EG-Y-1A change o	7 day LCO has expired. Plant is beginning a shutdown. Directed freactor power is 1%/minute	rate of							
Critical Tasl	ks:	Electrical F Natural Cir	Power Alignment (CT-8) rculation RCS Flow (CT-12)								
Event No.	Malf. No.	alf. No. Event Type* Event Description									
1		R CRS R URO	Shutdown reactor in 1102-4 (Allow power to lower >10%) (ICS in Auto, ULD in Hand)	wn reactor in 1102-4 (Allow power to lower >10%) Auto, ULD in Hand)							
2		TS CRS	EF-P-1 oil bubbler empty, EF-P-1 inoperable	l oil bubbler empty, EF-P-1 inoperable							
3	RW02A	TS CRS C ARO	NR-P-1A Trips, NR-P-1B Fails to Auto-Start, entry into OP- MAP-B0105, and OP-TM-MAP-B0205 (ARO: Starts NR-P-1B from CR)	-TM-							
4	IC09 IC53	I CRS I URO I ARO	ICS Malfunction, entry into OP-TM-AOP-070 (Main Generator Megawatts fails to 50%, SASS fails to act	uate)							
5	ED22C	I CRS I URO I ARO	Loss of ICS AUTO Subfeed Power (MU), entry into OP-TM H0108 (URO: Operate MU-V-32 in HAND, ARO: Restore letdown)	-MAP-							
6	ED01	M CRS M URO M ARO	Loss of Offsite power with one Emergency Diesel available into OP-TM-AOP-020	, Entry							
7	FW62C	C CRS C ARO	EF-P-2B trips, Entry into OP-TM-EOP-004, Lack of Heat T	ranfer							
0		C CRS	Places the SBO diesel on the 1D 4KV bus, starts EF-P-2A	the SBO diesel on the 1D 4KV bus, starts EF-P-2A							

Appendix D

Scenario Outline

Facility: Examiners:	Three I	Mile Island	Scenario No.: 2 Op Test No.: <u>TMI-2017-1</u> Operators:									
Initial Condit	tions:	• 85% powe	er, MOL, load following									
		EG-Y-1A	is 2 days into a 6 day system outage									
-		,										
Turnover: Maintain 85% power												
	Critical Lasks: • Limit Uncontrolled Radiation Release (CT-21)											
Event No.	Malf. No.	Event Type*	Event Description									
1	ES08A	TS CRS I URO I ARO	nadvertent 4# ES actuation, "A" train, entry into OP-TM-AOP-046									
2	TH17A	TS CRS R URO	'A' OTSG Tube Leak, TS call, Reactivity manipulation (URO: Lowers power)									
3	TH13C	C CRS C ARO	RC-P-1C High Vibrations ARO: Secures RCP)									
4	IC63	I CRS I URO I ARO	Feedwater fails to re-ratio on loss of RCP									
5	TH16A	M CRS M URO M ARO	'A' OTSG tube rupture, requiring HPI initiation, entry into OP-TM- EOP-001									
6	MU23A	C CRS C URO	MU-P-1A fails to start on ES (URO: Starts MU-P-1A)									
7		C CRS C URO C ARO	Loss of SCM, entry into OP-TM-EOP-002, then return to OP-TM- EOP-005 (URO: Rule 1, ARO: Steams 'A' OTSG)									
* (N)	ormal, (R)e	activity, (I)nstru	ument, (C)omponent, (M)ajor									

Appendix D

Scenario Outline

Facility: Examiners:	Three I	Mile Island	Scenario No.: 5 Op Test No.: <u>TMI-2017-1</u> Operators:								
Initial Condi		 2% Turt I&C FW- 	power, MOL, ICS is in manual with reactivity control at the diamond bine offline for bearing maintenance maintenance is occurring on HSPS, Train B EFW actuation logic circuit -P-1A is operating with control on the MSC								
Turnover: Raise reactor power to 100%											
Critical Task	(S:	Establish arControl HPI	nd Maintain Reactor Shutdown Requirements (CT-23) (CT-5)								
Event No.	Malf. No.	Event Type*	Event Description								
1	RM0323	TS CRS	Reactor Building Hi Range Radiation Monitor, RM-G-23, Failure								
2		N CRS R URO	Raise reactor power from 3% to 10% (URO: Power ascension with ICS in Manual)								
3	RC04A	I CRS I URO	Pressurizer Level Transmitter fails, entry into OP-TM-MAP-G0105, OP-TM-MAP-G0205 (URO: Controls MU-V-17 in HAND)								
4	IA07 IA01C	C CRS C ARO	Loss of Instrument Air, entry into OP-TM-AOP-028 (ARO: Starts IA-P-1A or B)								
5		C CRS C ARO	Cavitating Circ Water Pump (ARO: Secure cavitiating circ water pump)								
6	MU07	I CRS I URO	Seal Flow Instrument Fails, RCP Seal flow High (URO: MU-V-32, Normalizes Seal Injection)								
7	IC38B	TS CRS C ARO	Invalid "B" OTSG Low Level, "B" EFW inadvertent actuation (ARO: Defeats invalid signal, secures EF-P-2B)								
8	PLA-4-9 PLB-8-3	M CRS M URO M ARO	Circ Water Rupture, Loss of Vacuum, Reactor Trip, Entry into EOP- 001, Stuck Rods								
9	TH06	C CRS C URO C ARO	RCS leak, PZR Level Cannot be maintained without HPI, Entry into EOP-006 (URO: Initiate HPI, ARO: Initiate EFW)								
* (N)	ormal, (R)e	activity, (I)nstr	ument, (C)omponent, (M)ajor								

PWR Examination Outline

Facility: Three f	Facility: Three Mile Island Date of Exam: 06/28/17																
Tier Group RO K/A Category Point							RO K/A Category Points SRO-Only Points								nts		
Tier	Group	К 1	K 2	К 3	К 4	K 5	К 6	A 1	A 2	A 3	A 4	G*	Total		A2	G*	Total
1.	1	2	1	5				2	6			2	18				6
Emergency & Abnormal	2	1	1	2		N/A		1	3	N	/A	1	9				4
Plant Evolutions	Tier Totals	3	2	7				3	9			3	27				10
1 3 2 2 3 2 3 2 3						3	3	2	3	28				5			
2. Plant	2	1	0	1	0	0	0	1	2	2	1	2	10				3
Systems	Tier Totals	4	2	3	3	2	3	3	5	5	3	5	38				8
3. Generic Knowledge and Abilities 1 2 3 4 10 1 2 3 4 7 Categories 2 3 2 3 2 3 10 1 2 3 4 7										7							
 Generic Knowledge and Abilities 2 3 4 1 2 3 4 10 1 2 3 4 7 Note: Ensure that at least two topics from every applicable K/A category are sampled within each tier of the RO and SRO-only outline, the "Tier Totals" in each K/A category shall not be less than two). (One Tier 3 Radiation Control K/A is allowed if the K/A is replaced by a K/A from another Tier 3 Category). 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 in the proposed outline must match that specified in the table. The final Point total for each group and tier in the proposed outline sociated outline; systems or evolutions that a ter total scolar must total 25 points. Systems/evolutions within each group and tier daupi																	

000058 Loss of DC Power / 6			x				AK3.01Knowledge of the reasons for the following responses as they apply to the Loss of DC Power: Use of dc control power by D/Gs	3.4/3.7	10
000062 Loss of Nuclear Svc Water / 4			x				AK3.02 Knowledge of the reasons for the following responses as they apply to the Loss of Nuclear Service Water: The automatic actions (alignments) within the nuclear service water resulting from the actuation of the ESFAS	3.6/3.9	11
000065 Loss of Instrument Air / 8					x		AA2.07 Ability to determine and interpret the following as they apply to the Loss of Instrument Air: When to trip reactor if instrument air pressure is de-creasing.	3.6/4.2	66
W/E04 LOCA Outside Containment / 3									
W/E11 Loss of Emergency Coolant Recirc. / 4									
BW/E04; W/E05 Inadequate Heat Transfer - Loss of Secondary Heat Sink / 4	x						EK1.2 Knowledge of the operational implications of the following concepts as they apply to the (Inadequate Heat Transfer): Normal, abnormal and emergency operating procedures associated with (Inadequate Heat Transfer).	4.0/4.2	47
000077 Generator Voltage and Electric Grid Disturbances / 6						x	2.4.11 Knowledge of abnormal condition procedures.	4.0/4.2	49
K/A Category Totals:	2	1	5	2	6	2	Group Point Total:	18	18

3

ES-401 PWR Examination Outline Emergency and Abnormal Plant Evolutions - Tier 1/Group 2 (RO / SRO) Form ES-401-2 E/APE # / Name / Safety Function K K A A G* K/A Topic(s) IR #												
E/APE # / Name / Safety Function	К 1	К 2	К 3	A 1	A 2	G*	K/A Topic(s)	IR	#			
000001 Continuous Rod Withdrawal / 1					x		AA2.05 Ability to determine and interpret the following as they apply to Continuous Rod Withdrawal :Uncontrolled rod withdrawal, from available indications	4.4/4.6	12			
000003 Dropped Control Rod / 1												
000005 Inoperable/Stuck Control Rod / 1												
000024 Emergency Boration / 1						x	2.2.12 Knowledge of surveillance procedures.	3.7/4/1	60			
000028 Pressurizer Level Malfunction / 2	x						AK1.01 Knowledge of the operational implications of the following concepts as they apply to Pressurizer Level Control Malfunctions: PZR reference leg leak abnormalities	2.8/3.1	13			
000032 Loss of Source Range NI / 7			х				AK3.01 Knowledge of the reasons for the following responses as they apply to the Loss of Source Range Nuclear Instrumentation: Startup termination on source-range loss	3.2/3.6	14			
000033 Loss of Intermediate Range NI / 7									ļ			
000036 (BW/A08) Fuel Handling Accident / 8												
000037 Steam Generator Tube Leak / 3												
000051 Loss of Condenser Vacuum / 4												
000059 Accidental Liquid Radwaste Rel. / 9												
000060 Accidental Gaseous Radwaste Rel. / 9												
000061 ARM System Alarms / 7					х		AA2.03 Ability to determine and interpret the following as they apply to Area Radiation Monitoring (ARM) System Alarms: Setpoints for alert and high alarms	3.0/3.3	15			
000067 Plant Fire On-site / 8												
000068 (BW/A06) Control Room Evac. / 8												
000069 (W/E14) Loss of CTMT Integrity / 5												
000074 (W/E06&E07) Inad. Core Cooling / 4												
000076 High Reactor Coolant Activity / 9				x			AA1.04 Ability to operate and / or monitor the following as they apply to the High Reactor Coolant Activity: Failed fuel-monitoring equipment	3.2/3.4	16			
W/EO1 & E02 Rediagnosis & SI Termination / 3							1					
W/E13 Steam Generator Over-pressure / 4												
W/E15 Containment Flooding / 5												
W/E16 High Containment Radiation / 9												
BW/A01 Plant Runback / 1			_									
BW/A02&A03 Loss of NNI-X/Y / 7		x					AK2.1 Knowledge of the interrelations between the (Loss of NNI-X/Y) and the following: Components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.	3.8/4.0	17			
BW/A04 Turbine Trip / 4												
BW/A05 Emergency Diesel Actuation / 6					x		AA2.1 Ability to determine and interpret the following as they apply to (Emergency Diesel Actuation) Facility conditions and selection of appropriate procedures during abnormal and emergency operations.	3.5/4.2	48			

BW/A07 Flooding / 8									
BW/E03 Inadequate Subcooling Margin / 4			x				EK3.1 Knowledge of the reasons for the following responses as they apply to (Inadequate Subcooling Margin) Facility operating characteristics during transient conditions, including coolant chemistry and the effects of temperature, pressure, and reactivity changes and operating limitations and reasons for these operating characteristics.	3.2/3.8	51
BW/E08; W/E03 LOCA Cooldown - Depress. / 4									
BW/E09; CE/A13; W/E09&E10 Natural Circ. / 4									
BW/E13&E14 EOP Rules and Enclosures									
CE/A11; W/E08 RCS Overcooling - PTS / 4									
CE/A16 Excess RCS Leakage / 2									
CE/E09 Functional Recovery									
K/A Category Point Totals:	1	1	2	1	3	1	Group Point Total:		9

4

ES-401 PWR Examination Outline Form ES-401-2 Plant Systems - Tier 2/Group 1 (RO / SRO)														
System # / Name	К 1	к 2	К 3	К 4	K 5	К 6	A 1	A 2	A 3	A 4	G*	K/A Topic(s)	IR	#
003 Reactor Coolant Pump					x							K5.03 Knowledge of the operational implications of the following concepts as they apply to RCPS: Effects of RCP shutdown on T-ave., including the reason for unreliability of T-ave. in the shutdown loop.	3.1/3.5	58
004 Chemical and Volume Control							x					A1.06 Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the CVCS controls including: VCT level	3.0/3.2	18
005 Residual Heat Removal					x					х		K5.01 Knowledge of the operational implications of the following concepts as they apply the RHRS: Nil ductility transition temperature (brittle fracture)	2.6/2.9	19
												A4.02: Ability to manually operate and/or monitor in the control room: Heat exchanger bypass flow control.	3.4/3.1	59
006 Emergency Core Cooling		x										K2.02 Knowledge of bus power supplies to the following: ESFAS-operated values.	3.6/3.8	68
007 Pressurizer Relief/Quench Tank											x	2.1.23 Ability to perform specific system and integrated plant procedures during all modes of plant operation.	4.3/4.4	20
008 Component Cooling Water										x		A4.09 Ability to manually operate and/or monitor in the control room: CCW temperature control valve	30/4.9	21
010 Pressurizer Pressure Control						x		x				K6.01 Knowledge of the effect of a loss or malfunction of the following will have on the PZR PCS: Pressure detection systems	2.7/3.1	50 22
												A2.01 Ability to (a) predict the impacts of the following malfunctions or operations on the PZR PCS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Heater failures		
012 Reactor Protection						x						K6.02 Knowledge of the effect of a loss or malfunction of the following will have on RPS: Redundant channels	2.9/3.1	52
013 Engineered Safety Features Actuation	x											K1.01Knowledge of the physical connections and/or cause effect relationships between the ESFAS and the following systems: Initiation signals for ESF circuit logic	4.2/4.4	23

	1	<u> </u>	<u> </u>		r	_	<u> </u>		<u> </u>	1			r	
022 Containment Cooling				x				x				K4.04 Knowledge of CCS design feature(s) and/or interlock(s) which provide for the following: Cooling of containment penetrations.	2.5/3.0	53
												A2.03 Ability to (a) predict the impacts of the following malfunctions or operations on the CCS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Fan motor thermal overload/high-speed operation	2.6/3.0	24
025 Ice Condenser														
026 Containment Spray			x									K3.01 Knowledge of the effect that a loss or malfunction of the CSS will have on the following: CCS	3.9/4.1	65
039 Main and Reheat Steam	x					x						K1.08: Knowledge of the physical connections and/or cause-effect relationships between the MRSS and the following systems: MFW	2.7/2.9	61
												K5.08 Knowledge of the operational implications of the following concepts as the apply to the MRSS: Effect of steam removal on reactivity	3.6/3.6	27
059 Main Feedwater	x											K1.02 Knowledge of the physical connections and/or cause effect relationships between the MFW and the following systems: AFW system	3.4/3.4	26
061 Auxiliary/Emergency Feedwater			x						x			K3.01 Knowledge of the effect that a loss or malfunction of the AFW will have on the following: RCS	4.4/4.6	28
												A3.03 Ability to monitor automatic operation of the AFW, including: AFW S/G level control on automatic start	3.9/3.9	62
062 AC Electrical Distribution				x								K4.07 Knowledge of ac distribution system design feature(s) and/or interlock(s) which provide for the following: One-line diagram of 4kV to 480V distribution, including sources of normal and alternative power	2.7/3.1	54
063 DC Electrical Distribution				x		and and a set of the s			x			K4.02 Knowledge of DC electrical system design feature(s) and/or interlock(s) which provide for the following: Breaker interlocks, permissives, bypasses and cross-ties.	2.9/3.2	30
												A3.01 Ability to monitor automatic operation of the DC electrical system, including: Meters, annunciators, dials, recorders, and indicating lights	2.7/3.1	29
064 Emergency Diesel Generator		x							x			K2.02 Knowledge of the physical connections and/or cause effect relationships between the ED/G system and the following systems: Fuel oil pumps	2.8/3.1	31
												A3.03 Ability to monitor automatic operation of the ED/G system, including: Indicating lights, meters, and recorders	3.4/3.3	32
073 Process Radiation Monitoring											x	2.1.28 Knowledge of the purpose and function of major system components and controls.	4.1/4.1	55

076 Service Water								х				A2.01 Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the SWS controls including: Loss of SWS	7 33
078 Instrument Air							X					K1.04 Knowledge of the physical connections and/or cause-effect relationships between the IAS and the following systems: Cooling water to compressor	34
103 Containment											x	2.4.6: Knowledge of EOP mitigation 3.7/4. strategies.	7 57
K/A Category Point Totals:	3	2	2	3	2	3	2	3	3	2	3	Group Point Total: 28	28

ES-401				Pla	ant S	PW Syst	R E	xan - T	nina ier 2	tion 2/Gro	Outlin oup 2	ne F (RO / SRO)	orm ES-401	-2
System # / Name	К 1	к 2	к 3	к 4	к 5	K 6	A 1	A 2	A 3	A 4	G*	K/A Topic(s)	IR	#
001 Control Rod Drive			x									K3.02:Knowledge of the effect that a loss or malfunction of the CRDS will have on the following: rcs	3.4/3.5	35
002 Reactor Coolant									х			A3.01 Ability to monitor automatic operation of the RCS, including: Reactor coolant leak detection system	3.7/3.9	36
011 Pressurizer Level Control														
014 Rod Position Indication											x	2.4.4: Ability to recognize abnormal indications for system operating parameters that are entry-level conditions for emergency and abnormal operating procedures.	4.5/4.7	69
015 Nuclear Instrumentation								х				A2.01 Ability to (a) predict the impacts of the following malfunctions or operations on the NIS; and (b based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Power supply loss or erratic operation	3.5/3.9	25
016 Non-Nuclear Instrumentation														
017 In-Core Temperature Monitor														
027 Containment lodine Removal														
028 Hydrogen Recombiner and Purge Control										x		A4.01 Ability to monitor automatic operation of the HRPS, including: HRPS controls	4.0/4.0	75
029 Containment Purge														
033 Spent Fuel Pool Cooling														
034 Fuel Handling Equipment														
035 Steam Generator								x				A2.06 Ability to (a) predict the impacts of the following malfunctions or operations on the SGS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Small break LOCA	4.5/4.6	37
041 Steam Dump/Turbine Bypass Control							x					A1.02 Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the SDS controls including: Steam pressure	3.1/3.2	46
045 Main Turbine Generator														
055 Condenser Air Removal	x											K1.06Knowledge of the physical connections and/or cause effect relationships between the CARS and the following systems: PRM system	2.6/2.6	38
056 Condensate														
068 Liquid Radwaste									x			A3.02 Ability to monitor automatic operation of the Liquid Radwaste System including: Automatic isolation	3.6/3.6	39
071 Waste Gas Disposal														

072 Area Radiation Monitoring														
075 Circulating Water											X	2.4.21: Knowledge of the parameters and logic used to assess the status of safety functions, such as reactivity control, core cooling and heat removal, reactor coolant system integrity, containment conditions, radioactivity release control, etc.	3.8/4.5	63
079 Station Air														
086 Fire Protection														
K/A Category Point Totals:	1	0	1	0	0	0	1	2	2	1	2	Group Point Total:	10	10

Facility:		Date of Exam:				
Category	K/A #	Торіс	R	0	SRO	-Only
			IR	#	IR	#
	2.1.25	Ability to interpret reference materials, such as graphs, curves, tables, etc.	3.9/4.2	40		
	2.1.42	Knowledge of new and spent fuel movement procedures.	2.5/3.4	70		
1.	2.1.					
Operations	2.1.					
	2.1.					
	2.1.					
	Subtotal					
	2.2.12	Knowledge of surveillance procedures.	3.7/4.1	72		
	2.2.38	Knowledge of conditions and limitations in the facility license.	3.6/4.5	71		
2. Equipment	2.2.39	Knowledge of less than or equal to one hour Technical Specifications action statements for systems.	3.9/4.5	41		
Control	2.2.					
	2.2.					
	2.2.					
	Subtotal					
	2.3.4	Knowledge of radiation exposure limits under normal or emergency conditions.	3.2/3.7	42		
	2.3.11	Ability to control radiation releases.	3.8/4.3	43		
3.	2.3.					
Control	2.3.					
	2.3.					
	2.3.					
	Subtotal		-			
	2.4.9	Knowledge of low power/shutdown implications in accident (e.g., loss of coolant accident or loss of residual heat removal) mitigation strategies.	3.8/4.2	74		
4. Emergency	2.4.16	Knowledge of EOP implementation hierarchy and coordination with other support procedures or guidelines such as, operating procedures, abnormal operating procedures, and severe accident management guidelines.	3.5/4.4	44		
Plan	2.4.35	Knowledge of local auxiliary operator tasks during an emergency and the resultant operational effects.	3.8/4.0	45		
	2.4.					
	2.4.					
	2.4.					
	Subtotal					
Tier 3 Point Total				10		7

Record of Rejected K/As

Tier / Group	Randomly Selected K/A	Reason for Rejection
1/1	025 AA2.05	Subject not relevant at this facility. Replaced with 025 AA2.01.
1/1	038 EK202	Subject K/A oversampled. Overlaps with other questions on the written exam. Replaced 038 EA2.01.
1/1	040 AA2.03	Subject K/A more appropriately tested on operational exam. Replaced with 040 AA2.02.
1/1	065 AA2.07	Subject not relevant at this facility. Replaced with 065AA2.06.
2/1	006 K2.02	Subject not relevant at this facility. Replaced with 006 K2.04.
2/1	022 K4.04	Subject not relevant at this facility. Replaced with 022 K4.01.
2/1	039 K1.06	Subject K/A oversampled. Overlaps with other questions on written exam. Replaced with 039 K1.08.
2/1	061 A3.04	Subject not relevant at this facility. Replaced with 061 A3.03.
2/1	103 2.4.2	Subject not relevant at this facility. Replaced with 103 2.4.6.
2/2	014 2.4.21	K/A for this system is SRO knowledge. Replaced with 014 2.4.4
2/2	075 2.4.8	Subject generic K/A not relevant to selected system. Replaced with 075 2.4.21
3	2.1.42	Not relevant to the RO position. Replaced with 2.1.1.
3	2.2.23	Not RO LOK. Replaced with 2.2.39

PWR Examination Outline

Facility: Three	Facility: Three Mile Island Date of Exam: 06/26/17 RO K/A Category Points SRO-Only Points Tier Group																	
						RO	K/A	Cate	gory	Poir	nts				SR	<u>0-0r</u>	ly Poir	nts
Tier	Group	К 1	К 2	К 3	к 4	К 5	К 6	A 1	A 2	A 3	A 4	G*	Total		A2		G*	Total
1.	1												18		4		2	6
Emergency & Abnormal	2					N/A				N	/A		9		1		3	4
Plant Evolutions	Tier Totals												27		5		5	10
	1												28		2		3	5
2. Plant	2												10		2		1	3
Systems	Tier Totals												38		4		4	8
3. Generic H	Knowledge and Categories	l Abil	ities			1		2	:	3		4	10	1 2	2 2	3 1	4 2	7
Note: 1. 2. 3. 4. 5. 6. 7. 8. 9. G*	Ensure that and SRO-on each K/A cai replaced by The point tot final point to revisions. Th Systems/evo do not apply systems/evo for guidance Select topics group before Absent a pla selected. Us Select SRO The generic must be rele K/As. On the follow ratings (IRs) the group an category oth Tier 2, Group For Tier 3, se and point tot	at lease leasee lease l	ast tw utline ry sh r eaco na R whe faction n as the r eaco na R whe faction n as the r eaco na R whe r eaco r r r eaco r r r r r r r r r r r r r r r r r r r	vo to s (i.e all no ch gr ch g	pics solution of the solution	from keept keept and to and to build bo to inclain to constant to constant constant to constant to constant to constant to constant to con	n eve t for 6 s tha er 3 (tier ii titier r t tota bude ion c s an pic fr y tho tings 2 from 2 f	ery ap one con two Categon the May of the Are id leted d on of ina d even of are id leted d on of the the the the the the the the the the	oplica catego (gory) ((gory) prop devia point lentif with the c pproo blutic y sys /As h he R e sha o b se ers, a and the ue SF se d k// t SR	able i gory i One bose ts an ied c i just boutlin priat ons a stem navin QO ar delecte vster table RO-o uplic A cat O se	K/A of in Tier Tier d out y ±1 id the point the ificat he sh is poo or e and Sissed from n. R ef de point e alog, allection	catego er 3 of 3 Rad tline m from t e SRO e asso ion; op ould b A state ssible volutio RO-on ens a pom Se efer to scripti totals ove; if exam, pages , and e ons to	bry are sai the SRO- iation Cor hust match hat specif conly exai ociated ou perational e added. ements. ; sample e on. trance rati ily portion: nd K/A ca ction 2 of o Section I on of eacl (#) for ea fuel handl enter it on for RO an enter the k K/As that	mple only introl I introl I in	d within outline, specific the tab ust total system portant, er to Sec system R) of 2.3 spective ries. (/A Cata of ES	each the " lowe ed in ble ba 25 pi s or e site ction or e 5 or h ly. alog, 401 fc oppics nd ca nt is 0 10 (tier of Tier To d if the the tab ased or oints. evolutio specific D.1.b of volutio igher s but the or the a ' impor sample olumn ns. criptior CFR 55	f the RO otals" in K/A is ole. The n NRC ons that c of ES-401 n in the shall be topics applicable tance c. Enter ed in a A2 for ns, IRs, 5.43.

2

ES-401 Emer	genc	;y a	nd	Abn	PW	/R Ex ial Pl	kamina ant Ev	ation Outline Fo olutions - Tier 1/Group 1 (RO / SRO)	rm ES-401	-2
E/APE # / Name / Safety Function		K 1	К 2	к 3	A 1	A 2	G*	K/A Topic(s)	IR	#
000007 (BW/E02&E10 CE/E02) Reacto Trip - Stabilization - Recovery / 1	r									
000008 Pressurizer Vapor Space Accident / 3						x		AA2.20 Ability to determine and interpret the following as they apply to the Pressurizer Vapor Space Accident: PZR level indicators.	3.6	76
000009 Small Break LOCA / 3		_					x	2.4.31 Knowledge of annunciator alarms, indications, or response procedures.	4.1	77
000011 Large Break LOCA / 3										
000015/17 RCP Malfunctions / 4										
000022 Loss of Rx Coolant Makeup / 2										
000025 Loss of RHR System / 4										
000026 Loss of Component Cooling Water / 8						х		AA2.02: Ability to determine and interpret the following as they apply to the Loss of Component Cooling Water: The cause of possible CCW loss	3.6	78
000027 Pressurizer Pressure Control System Malfunction / 3										
000029 ATWS / 1										
000038 Steam Gen. Tube Rupture / 3										
000040 (BW/E05; CE/E05; W/E12) Steam Line Rupture - Excessive Heat Transfer / 4										
000054 (CE/E06) Loss of Main Feedwater / 4						x		AA2.01 Ability to determine and interpret the following as they apply to the Loss of Main Feedwater (MFW):Occurrence of reactor and/or turbine trip	4.4	79
000055 Station Blackout / 6										
000056 Loss of Off-site Power / 6										
000057 Loss of Vital AC Inst. Bus / 6										
000058 Loss of DC Power / 6						x		AA2.03 Ability to determine and interpret the following as they apply to the Loss of DC Power: DC loads lost; impact on ability to operate and monitor plant systems	3.9	80
000062 Loss of Nuclear Svc Water / 4										
000065 Loss of Instrument Air / 8										
W/E04 LOCA Outside Containment / 3										
W/E11 Loss of Emergency Coolant Recirc. / 4										
BW/E04; W/E05 Inadequate Heat Transfer - Loss of Secondary Heat Sink /	4						x	2.4.9: Ability to interpret control room indications to verify the status and operation of a system, and understand how operator actions and directives affect plant and system conditions.	4.1	81
000077 Generator Voltage and Electric Grid Disturbances / 6										
K/A Category Totals:						4	2	Group Point Total:		6

ES-401 Emergency and Abr	P\ norn	NR nal F	Exar Plan	min t Ev	atio olut	n Outl ions -	ine Forn Tier 1/Group 2 (RO / SRO)	n ES-4	01-2
E/APE # / Name / Safety Function	К 1	К 2	к 3	A 1	A 2	G*	K/A Topic(s)	IR	#
000001 Continuous Rod Withdrawal / 1									
000003 Dropped Control Rod / 1									
000005 Inoperable/Stuck Control Rod / 1									
000024 Emergency Boration / 1									
000028 Pressurizer Level Malfunction / 2									
000032 Loss of Source Range NI / 7									
000033 Loss of Intermediate Range NI / 7									
000036 (BW/A08) Fuel Handling Accident / 8									
000037 Steam Generator Tube Leak / 3									
000051 Loss of Condenser Vacuum / 4									
000059 Accidental Liquid Radwaste Rel. / 9									
000060 Accidental Gaseous Radwaste Rel. / 9									
000061 ARM System Alarms / 7									
000067 Plant Fire On-site / 8									
000068 (BW/A06) Control Room Evac. / 8									
000069 (W/E14) Loss of CTMT Integrity / 5									
000074 (W/E06&E07) Inad. Core Cooling / 4									
000076 High Reactor Coolant Activity / 9						x	2.2.38 Knowledge of conditions and limitations in the facility license.	4.5	83
W/EO1 & E02 Rediagnosis & SI Termination / 3									
W/E13 Steam Generator Over-pressure / 4									
W/E15 Containment Flooding / 5									
W/E16 High Containment Radiation / 9									
BW/A01 Plant Runback / 1									
BW/A02&A03 Loss of NNI-X/Y / 7									
BW/A04 Turbine Trip / 4									
BW/A05 Emergency Diesel Actuation / 6									
BW/A07 Flooding / 8									
BW/E03 Inadequate Subcooling Margin / 4					x		EA2.1 Ability to determine and interpret the following as they apply to the (Inadequate Subcooling Margin)Facility conditions and selection of appropriate procedures during abnormal and emergency operations.	4.0	84
BW/E08; W/E03 LOCA Cooldown - Depress. / 4						x	2.4.18: Knowledge of the specific bases for EOPs.	4.0	82
BW/E09; CE/A13; W/E09&E10 Natural Circ. / 4									
BW/E13&E14 EOP Rules and Enclosures						x	2.2.44: Ability to recognize system parameters that are entry-level conditions for technical specifications.	4.5	84
CE/A11; W/E08 RCS Overcooling - PTS / 4									
CE/A16 Excess RCS Leakage / 2									
CE/E09 Functional Recovery									
K/A Category Point Totals:					1	3	Group Point Total:		4

4

ES-401 PWR Examination Outline Form ES-401-2 Plant Systems - Tier 2/Group 1 (RO / SRO)														
System # / Name	К 1	к 2	к 3	К 4	K 5	К 6	A 1	A 2	A 3	A 4	G*	K/A Topic(s)	IR	#
003 Reactor Coolant Pump														
004 Chemical and Volume Control														
005 Residual Heat Removal														
006 Emergency Core Cooling											x	2.4.9: Knowledge of low power/shutdown implications in accident (e.g., loss of coolant accident or loss of residual heat removal) mitigation strategies.	4.2	86
007 Pressurizer Relief/Quench Tank														
008 Component Cooling Water														
010 Pressurizer Pressure Control														
012 Reactor Protection														
013 Engineered Safety Features Actuation											x	2.4.35 Knowledge of local auxiliary operator tasks during an emergency and the resultant operational effects.	4.0	87
022 Containment Cooling														
025 Ice Condenser														
026 Containment Spray														
039 Main and Reheat Steam														
059 Main Feedwater														
061 Auxiliary/Emergency Feedwater											x	2.4.18 Knowledge of the specific bases for EOPs.	4.0	88
062 AC Electrical Distribution														
063 DC Electrical Distribution														
064 Emergency Diesel Generator														
073 Process Radiation Monitoring														
076 Service Water														
078 Instrument Air								x				A2.01 Ability to (a) predict the impacts of the following malfunctions or operations on the IAS and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations Ability to (a) predict the impacts of the following malfunctions or operations on the IAS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Air dryer and filter malfunctions	2.9	89
103 Containment								x				A2 04 Containment evacuation (including recognition of the alarm)	3.6	90
K/A Category Point Totals:								2			3	Group Point Total:		5

5

ES-401 PWR Examination Outline Form ES-401-2 Plant Systems - Tier 2/Group 2 (RO / SRO)														
System # / Name	к 1	к 2	к 3	К 4	К 5	к 6	A 1	A 2	A 3	A 4	G*	K/A Topic(s)	IR	#
001 Control Rod Drive														
002 Reactor Coolant														
011 Pressurizer Level Control														
014 Rod Position Indication														
015 Nuclear Instrumentation														
016 Non-Nuclear Instrumentation														
017 In-Core Temperature Monitor											x	2.4.3 Ability to identify post-accident instrumentation.	3.9	91
027 Containment Iodine Removal														
028 Hydrogen Recombiner and Purge Control														
029 Containment Purge														
033 Spent Fuel Pool Cooling														
034 Fuel Handling Equipment														
035 Steam Generator														
041 Steam Dump/Turbine Bypass Control														
045 Main Turbine Generator														
055 Condenser Air Removal														
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	92
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:	3.3	93
071 Waste Gas Disposal												197701		
072 Area Radiation Monitoring														
075 Circulating Water												· · · ·		
079 Station Air														
086 Fire Protection														
K/A Category Point Totals:								2			1	Group Point Total:		10/3

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

Facility:		Date of Exam:				
Category	K/A #	Торіс	R	0	SRO	-Only
			IR	#	IR	#
	2.1.32	Ability to explain and apply system limits and precautions.			4.0	94
	2.1.42	Knowledge of new and spent fuel movement procedures.			3.4	95
1.	2.1.4					
Conduct of Operations	2.1.					
	2.1.					
	2.1.					
	Subtotal					
	2.2.7	Knowledge of the process for conducting special or infrequent tests.			3.6	96
2. Equipment Control	2.2.21	Knowledge of pre- and post-maintenance operability requirements.			4.1	97
	2.2.					
	2.2.					
	2.2.					
	2.2.					
	Subtotal					
	2.3.6	Ability to approve release permits.			3.8	98
	2.3.					
3	2.3.					
Radiation Control	2.3.					
	2.3.					
	2.3.					
	Subtotal					
	2.4.34	Knowledge of RO tasks performed outside the main control room during an emergency and the resultant operational effects		-	4.1	99
4. Emergency Procedures / Plan	2.4.45	Ability to prioritize and interpret the significance of each annunciator or alarm.			4.3	100
	2.4.					
	2.4.					
	2.4.					
	2.4.					
	Subtotal					
Tier 3 Point Total				10	E.	7

Record of Rejected K/As

Tier / Group	Randomly Selected K/A	Reason for Rejection
1/1 SRO	008 AA2.20	This K/A overlaps with the operational exam. Replaced with 008 AA2.12.
1/1 SRO	BW/E04 2.2.12	This subject K/A is not relevant to the topic at the subject facility. Replaced with BW/E04 2.4.9
1/2 SRO	059 2.2.25	Unable to make a psychometrically sound question. Replaced with BW/E09 2.4.18.
1/2 SRO	BW/E13 2.2.39	This subject K/A is not relevant to the topic at the subject facility. Replaced with BW/E13 2.2.42.
2/1 SRO	006 2.4.4	Original K/A is RO LOK. Replaced with 006 2.4.9.
2/2 SRO	068 A2.02.	Unable to make an psychometrically sound SRO question. Replaced with 068 A2.04.

Administrative Topics Outline

Form ES-301-1

Facility: <u>Three Mile Island</u> Examination Level: RO 🛛 SF	RO []	Date of Examination: <u>06/26/17</u> Operating Test Number: <u>TMI-2017-1</u>					
Administrative Topic (See Note)	Type Code*	Describe activity to be performed					
Conduct of Operations	R, N	Shutdown Margin for Low Temperature Conditions 2.1.43					
Conduct of Operations	R, D	Perform a Transient Leak Rate Calculation 2.1.23					
Equipment Control	S, D	Perform the "Shiftly Checks" IAW 1301-1, DATA SHEET 1 2.2.12					
Radiation Control							
Emergency Plan	S, P, D	ERO Notification 2.4.39 From 12-01 NRC Exam					
NOTE: All items (5 total) are required for SROs. RO applicants require only 4 items unless they are retaking only the administrative topics (which would require all five items).							
 * 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) 							

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RA1-1 – The examinee will have to calculate shutdown margin(SDM)for a low temperature situation and will determine that SDM is NOT more negative than -1 $\%\Delta k/k$.

RA1-2 – The examinee will use OS-24 to calculate a transient leakrate.

RA2 – The examinee will be in the simulator to perform a portion of the shift and daily log set. The examinee will have to identify all out of specification readings.

RA4 – The examinee will have to make all ERO notifications as shift communicator.