

Facility: TMI		Date of Exam: 4/2012																
Tier	Group	RO K/A Category Points											SRO-Only Points					
		K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G *	Total	A2		G*	Total	
1. Emergency & Plant Evaluations	1	3	3	3				3	3				3	18	3		3	6
	2	1	1	2				2	2				1	9	2		2	4
	Tier Totals	4	4	5				5	5				4	27	5		5	10
2. Plant Systems	1	2	2	3	3	2	2	3	3	3	2	3	28	3		2	5	
	2	1	1	1	1	0	1	1	1	1	1	10	0	1	2	3		
	Tier Totals	3	3	4	4	2	3	4	4	4	3	4	38	4		4	8	
3. Generic Knowledge & Abilities				1		2		3		4		10	1		2	3	4	7
				3		3		2		2			2		1	2	2	
<p>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).</p> <p>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.</p> <p>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 that are not included on the outline should be added. Refer to section D.1.b of ES-401, for guidance regarding elimination of inappropriate K/A statements.</p> <p>4. Select topics from as many systems and evolutions as possible; sample every system or evolution in the group before selecting a second topic for any system or evolution.</p> <p>5. Absent a plant specific priority, only those KAs 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.</p> <p>6. Select SRO topics for Tiers 1 and 2 from the shaded systems and K/A categories.</p> <p>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/A's</p> <p>8. On the following pages, enter the K/A numbers, a brief description of each topic, the topics' importance ratings (IR) 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.</p> <p>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</p>																		

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PWR Examination Outline
Emergency and Abnormal Plant Evolutions - Tier 1 Group 1

EAPE#/Name Safety Function	K1	K2	K3	A1	A2	G	K/A Topic(s)	Imp.	Q#
062 / Loss of Nuclear Service Water / 4					X		AA2.02 - Ability to determine and interpret the following as they apply to the Loss of Nuclear Service Water: The cause of possible SWS loss	3.6	76
058 / Loss of DC Power / 6					X		AA2.02 - Ability to determine and interpret the following as they apply to the Loss of DC Power: 125V dc bus voltage, low/critical low, alarm	3.6	77
065 / Loss of Instrument Air / 8					X		AA2.08 - Ability to determine and interpret the following as they apply to the Loss of Instrument Air: Failure Modes of air-operated equipment.	3.3	78
077 / Generator Voltage and Electrical Grid Disturbances / 6						X	2.4.4 – Ability to recognize abnormal indications for system operating parameters that are entry-level conditions for emergency and abnormal operating procedures.	4.7	79
054 / Loss of Main Feedwater / 4						X	2.2.37 - Loss of Main Feedwater: Ability to determine operability and/or availability of safety related equipment.	4.6	80
038 / Steam Generator Tube Rupture / 3						X	2.4.30 - Emergency Procedures / Plan: Knowledge of events related to system operation / status that must be reported to internal organizations or external agencies, such as the state, the NRC, or the transmission system operator.	4.1	81
E05 / Steam Line Rupture - Excessive Heat Transfer / 4	X						EK1.3 - Knowledge of the operational implications of the following concepts as they apply to the (Excessive Heat Transfer) Annunciators and conditions indicating signals, and remedial actions associated with the (Excessive Heat Transfer).	3.8	39
007 / Reactor Trip / 1	X						EK1.02 - Knowledge of the operational implications of the following concepts as they apply to the reactor trip: Shutdown margin	3.4	40
008 / Pressurizer Vapor Space Accident / 3	X						AK1.02 - Knowledge of the operational implications of the following concepts as they apply to a Pressurizer Vapor Space Accident: Change in leak rate with change in pressure	3.1	41
029 / Anticipated Transient Without Scram (ATWS) / 1		X					EK2.06 - Knowledge of the interrelations between the following and ATWS: Breakers, relays, and disconnects	2.9	42

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PWR Examination Outline

Emergency and Abnormal Plant Evolutions - Tier 1 Group 1

EAPE#/Name Safety Function	K1	K2	K3	A1	A2	G	K/A Topic(s)	Imp.	Q#
015 / 17 / Reactor Coolant Pump Malfunctions / 4		X					AK2.10 - Knowledge of the interrelations between the Reactor Coolant Pump Malfunctions (Loss of RC Flow) and the following: RCP indicators and controls	2.8	43
011 / Large Break LOCA / 3		X					EK2.02 - Knowledge of the interrelations between the following Large Break LOCA: Pumps	2.6	44
055 / Station Blackout / 6			X				EK3.01 - Knowledge of the reasons for the following responses as they apply to the Station Blackout: Length of time for which battery capacity is designed	2.7	45
E04 / Inadequate Heat Transfer - Loss of Secondary Heat Sink / 4			X				EK3.4 - Knowledge of the reasons for the following responses as they apply to the (Inadequate Heat Transfer) RO or SRO function within the control room team as appropriate to the assigned position, in such a way that procedures are adhered to and the limitations in the facilities license and amendments are not violated.	3.5	46
009 / Small Break LOCA / 3			X				EK3.12 - Knowledge of the reasons for the following responses as they apply to the small break LOCA: Letdown isolation	3.4	47
054 / Loss of Main Feedwater / 4				X			AA1.02 - Ability to operate and / or monitor the following as they apply to the Loss of Main Feedwater (MFW): Manual startup of electric and steam-driven AFW pumps	4.4	48
056 / Loss of Off-site Power / 6				X			AA1.04 - Ability to operate and / or monitor the following as they apply to the Loss of Offsite Power: Adjustment of speed of ED/G to maintain frequency and voltage levels	3.2	49
027 / Pressurizer Pressure Control System Malfunction / 3				X			AA1.01 - Ability to operate and / or monitor the following as they apply to the Pressurizer Pressure Control Malfunctions: PZR heaters, sprays, and PORVs	4.0	50
026 / Loss of Component Cooling Water / 8					X		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	2.9	51
022 / Loss of Rx Coolant Makeup / 2					X		AA2.04 - Ability to determine and interpret the following as they apply to the Loss of Reactor Coolant Makeup: How long PZR level can be maintained within limits	2.9	52

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PWR Examination Outline

Emergency and Abnormal Plant Evolutions - Tier 1 Group 1

EAPE#/Name Safety Function	K1	K2	K3	A1	A2	G	K/A Topic(s)	Imp.	Q#
065 / Loss of Instrument Air / 8					X		AA2.05 - Ability to determine and interpret the following as they apply to the Loss of Instrument Air: When to commence plant shutdown if instrument air pressure is decreasing	3.4	53
077 / Generator Voltage and Electric Grid Disturbances						X	2.2.37 - Equipment Control: Ability to determine operability and / or availability of safety related equipment.	3.6	54
025 / Loss of Residual Heat Removal System / 4						X	2.1.32 - Conduct of Operations: Ability to explain and apply all system limits and precautions.	3.8	55
062 / Loss of Nuclear Service Water / 4						X	2.4.8 - Emergency Procedures / Plan: Knowledge of how abnormal operating procedures are used in conjunction with EOP's.	3.8	56
K/A Category Totals	3	3	3	3	3/3	3/3	Group Point Total:	18/6	

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PWR Examination Outline

Emergency and Abnormal Plant Evolutions - Tier 1 Group 2

EAPE#/Name Safety Function	K1	K2	K3	A1	A2	G	K/A Topic(s)	Imp.	Q#
A06 / Control Room Evac. / 8					X		AA2.1 - Ability to determine and interpret the following as they apply to the (Shutdown Outside Control room) Facility conditions and selection of appropriate procedures during abnormal and emergency operations.	4.2	82
037 / Steam Generator Tube Leak / 3					X		AA2.09 - Ability to determine and interpret the following as they apply to the Steam Generator Tube Leak: System status, using independent readings from redundant Condensate air ejector exhaust monitor	3.4	83
A03 / Loss of NNI-Y / 7						X	2.1.23 - Loss of NNI-Y - Ability to perform specific system and integrated plant procedures during all modes of plant operation.	4.4	84
005 / Inoperable/Stuck Control Rod / 1						X	2.2.38 - Inoperable/Stuck Control Rod - Knowledge of conditions and limitations in the facility license.	4.5	85
028 / Pressurizer Level Control Malfunction / 2	X						AK1.01 - Knowledge of the operational implications of the following concepts as they apply to Pressurizer Level Control Malfunctions: PZR reference leak abnormalities	2.8	57
A07 / Flooding / 8		X					AK2.2 - Knowledge of the interrelations between the (Flooding) and the following: Facility's heat removal systems, including primary coolant, emergency coolant, the decay heat removal systems, and relations between the proper operation of these systems to the operation of the facility.	3.3	58
A06 / Control Room Evac. / 8			X				AK3.3 - Knowledge of the reasons for the following responses as they apply to the (Shutdown Outside Control Room) : Manipulation of controls required to obtain desired operating results during abnormal, and emergency situations.	4.2	59
001 / Continuous Rod Withdrawal / 1				X			AA1.07 - Ability to operate and / or monitor the following as they apply to the Continuous Rod Withdrawal: RPI	3.3	60
051 / Loss of Condenser Vacuum / 4					X		AA2.02 - Ability to determine and interpret the following as they apply to the Loss of Condenser Vacuum: Conditions requiring reactor and/or turbine trip	3.9	61

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PWR Examination Outline

Emergency and Abnormal Plant Evolutions - Tier 1 Group 2

EAPE#/Name Safety Function	K1	K2	K3	A1	A2	G	K/A Topic(s)	Imp.	Q#
061 / Area Radiation Monitoring (ARM) System Alarms / 7						X	2.4.8 - Emergency Procedures / Plan: Knowledge of how abnormal operating procedures are used in conjunction with EOP's.	3.8	62
060 / Accidental Gaseous RadWaste Release / 9					X		EA2.05 - Ability to determine and interpret the following as they apply to the Accidental Gaseous Radwaste: That the automatic safety actions have occurred as a result of a high ARM system signal	3.7	63
E09 / Natural Circ. / 4			X				EK3.4 - Knowledge of the reasons for the following responses as they apply to the (Natural Circulation Cooldown) RO or SRO function within the control room team as appropriate to the assigned position, in such a way that procedures are adhered to and the limitations in the facilities license and amendments are not violated.	3.8	64
A04 / Turbine Trip / 4				X			AA1.3 - Ability to operate and / or monitor the following as they apply to the (Turbine Trip) Desired operating results during abnormal and emergency situations.	3.5	65
K/A Category Totals	1	1	2	2	2/2	1/2	Group Point Total:	9/4	

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PWR Examination Outline
Plant Systems - Tier 2 Group 1

System #/Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	K/A Topic(s)	Imp.	Q#
006 Emergency Core Cooling								X				A2.10 - Ability to (a) predict the impacts of the following malfunctions or operations on the ECCS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Low boron concentration in SIS	3.9	86
010 Pressurizer Pressure Control								X				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	3.6	87
012 Reactor Protection											X	2.2.12 - Equipment Control: Knowledge of surveillance procedures.	4.1	88
026 Containment Spray											X	2.4.21 - Emergency Procedures / Plan: 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.	4.6	89
013 Engineered Safety Features Actuation								X				A2.04 - Ability to (a) predict the impacts of the following malfunctions or operations on the ESFAS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Loss of instrument bus.	4.2	90
012 Reactor Protection	X											K1.01 - Knowledge of the physical connections and/or cause effect relationships between the RPS and the following systems: 120V vital/instrument power system	3.4	1
061 Auxillary/Emergency Feedwater	X											K1.02 - Knowledge of the physical connections and/or cause-effect relationships between the AFW and the following systems: MFW System	3.4	2

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PWR Examination Outline
Plant Systems - Tier 2 Group 1

System #/Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	K/A Topic(s)	Imp.	Q#
006 Emergency Core Cooling		X										K2.02 - Knowledge of bus power supplies to the following: Valve operators for accumulators	2.5	3
076 Service Water		X										K2.04 - Knowledge of bus power supplies to the following: Reactor building closed cooling water	2.5	4
064 Emergency Diesel Generator			X									K3.01 - Knowledge of the effect that a loss or malfunction of the ED/G system will have on the following: Systems controlled by automatic loader	3.8	5
013 Engineered Safety Features Actuation			X									K3.03 - Knowledge of the effect that a loss or malfunction of the ESFAS will have on the following: Containment	4.3	6
063 DC Electrical Distribution				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	7
008 Component Cooling Water				X								K4.01 - Knowledge of CCWS design feature(s) and/or interlock(s) which provide for the following: Automatic start of standby pump	3.1	8
007 Pressurizer Relief/Quench Tank					X							K5.02 - Knowledge of the operational implications of the following concepts as they apply to PRTS: Method of forming a steam bubble in the PZR	3.1	9
010 Pressurizer Pressure Control					X							K5.01 - Knowledge of the operational implications of the following concepts as they apply to the PZR PCS: Determination of condition of fluid in PZR, using steam tables	3.5	10
004 Chemical and Volume Control						X						K6.17 - Knowledge of the operational implications of the following concepts as they apply to the CVCS: Flow paths for emergency boration	4.4	11
005 Residual Heat Removal						X						K6.03 - Knowledge of the effect of a loss or malfunction on the following will have on the RHRS: RHR heat exchanger	2.5	12

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PWR Examination Outline
Plant Systems - Tier 2 Group 1

System #/Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	K/A Topic(s)	Imp.	Q#
003 Reactor Coolant Pump							X					A1.02 - Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the RCPS controls including: RCP pump and motor bearing temperatures	2.9	13
022 Containment Cooling							X					A1.01 - Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the CCS controls including: Containment temperature	3.6	14
103 Containment								X				A2.05 - Ability to (a) predict the impacts of the following malfunctions or operations on the containment system-and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations Emergency containment entry	2.9	15
026 Containment Spray								X				A2.04 - Ability to (a) predict the impacts of the following malfunctions or operations on the CSS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Failure of spray pump	3.9	16
078 Instrument Air									X			A3.01 - Ability to monitor automatic operation of the IAS, including: Air pressure	3.1	17
062 AC Electrical Distribution									X			A3.01 - Ability to monitor automatic operation of the ac distribution system, including: Vital ac bus amperage	3.0	18
039 Main and Reheat Steam										X		A4.07 - Ability to manually operate and/or monitor in the control room: Steam dump valves.	2.8	19
073 Process Radiation Monitoring										X		A4.01 - Ability to manually operate and/or monitor in the control room Effluent release	3.9	20
059 Main Feedwater											X	2.4.2 - Main Feedwater: Emergency Procedures / Plan: Knowledge of system set points, interlocks and automatic actions associated with EOP entry conditions.	4.5	21

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PWR Examination Outline
Plant Systems - Tier 2 Group 1

System #/Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	K/A Topic(s)	Imp.	Q#
078 Instrument Air											X	2.4.21 - Emergency Procedures / Plan: 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.	4.0	22
062 AC Electrical Distribution							X					A1.03 - Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the ac distribution system controls including: Effect on instrumentation and controls of switching power supplies	2.5	23
008 Component Cooling Water								X				A2.03 - Ability to (a) predict the impacts of the following malfunctions or operations on the CCWS, and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: High/low CCW temperature	3	24
039 Main and Reheat Steam									X			A3.02 - Ability to monitor automatic operation of the MRSS, including: Isolation of the MRSS	3.1	25
006 Emergency Core Cooling			X									K3.01 - Knowledge of the effect that a loss or malfunction of the ECCS will have on the following RCS	4.1	26
064 Emergency Diesel Generator				X								K4.02 - Knowledge of ED/G system design feature(s) and/or inter-lock(s) which provide for the following: Trips for ED/G while operating (normal or emergency)	3.9	27
005 Residual Heat Removal											X	2.1.7 - Conduct of Operations: Ability to evaluate plant performance and make operational judgments based on operating characteristics, reactor behavior, and instrument interpretation.	4.4	28
K/A Category Totals	2	2	3	3	2	2	3	3/5	3	2	3/2	Group Point Total:	28/5	

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PWR Examination Outline
Plant Systems - Tier 2 Group 2

System #/Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	K/A Topic(s)	Imp.	Q#
016 Non-Nuclear Instrumentation System								X				A2.01 - Ability to (a) predict the impacts of the following malfunctions or operations on the NNIS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Detector failure	3.1	91
068 Liquid Radwaste											X	2.2.40 - Equipment Control: Ability to apply technical specifications for a system.	4.7	92
029 Containment Purge System											X	2.1.20 - Containment Purge System: Ability to interpret and execute procedure steps.	4.6	93
002 Reactor Coolant							X					A1.03 - Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the RCS controls including: Temperature	3.7	29
014 Rod Position Indication	X											K1.02 - Knowledge of the physical connections and/or cause-effect relationships between the RPIS and the following systems: NIS	3.0	30
041 Steam Dump/Turbine Bypass Control											X	2.1.20 - Conduct of Operations: Ability to interpret and execute procedure steps.	4.6	31
075 Circulating Water		X										K2.03 - Knowledge of bus power supplies to the following: Emergency/essential SWS pumps	2.6	32
071 Waste Gas Disposal								X				A2.09 - Ability to (a) predict the impacts of the following malfunctions or operations on the Waste Gas Disposal System ; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Stuck-open relief valve	3.0	33
029 Containment Purge				X								K4.03 - Knowledge of design feature(s) and/or interlock(s) which provide for the following: Automatic purge isolation	3.2	34

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PWR Examination Outline
Plant Systems - Tier 2 Group 2

System #/Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	K/A Topic(s)	Imp.	Q#
072 Area Radiation Monitoring			X									K3.02 - Knowledge of the effect that a loss or malfunction of the ARM system will have on the following: Fuel handling operations	3.1	35
086 Fire Protection						X						K6.04 - Knowledge of the effect of a loss or malfunction on the Fire Protection System following will have on the : Fire, smoke, and heat detectors	2.6	36
015 Nuclear Instrumentation									X			A3.04 - Ability to monitor automatic operation of the NIS, including: Maximum disagreement allowed between channels	3.3	37
034 Fuel Handling Equipment										X		A4.01 - Ability to manually operate and/or monitor in the control room: Radiation levels	3.3	38
K/A Category Totals	1	1	1	1	0	1	1	1/1	1	1	1/2	Group Point Total:	10/3	

Facility: TMI		Date:				
Category	KA #	Topic	RO		SRO-Only	
1. Conduct of Operations			IR	Q#	IR	Q#
	2.1.45	Ability to identify and interpret diverse indications to validate the response of another indicator.	4.3	66		
	2.1.25	Ability to interpret reference materials, such as graphs, curves, tables, etc.	3.9	67		
	2.1.36	Knowledge of procedures and limitations involved in core alterations.	3.0	74		
	2.1.42	Knowledge of new and spent fuel movement procedures.			3.4	94
	2.1.7	Ability to evaluate plant performance and make operational judgments based on operating characteristics, reactor behavior, and instrument interpretations.			4.7	98
Subtotal				3		2
2. Equipment Control	2.2.1	Equipment Control: Ability to perform pre-startup procedures for the facility, including operating those controls associated with plant equipment that could affect reactivity.	4.5	68		
	2.2.18	Knowledge of the process for managing maintenance activities during shutdown operations, such as risk assessments, work prioritization, etc.	2.6	69		
	2.2.39	Knowledge of less than or equal to one hour technical specification action statements for systems.	3.9	75		
	2.2.21	Knowledge of pre- and post-maintenance operability requirements.			4.1	95
Subtotal				3		1

3. Radiation Control	2.3.13	Knowledge of Radiological Safety Procedures pertaining to licensed operator duties, such as response to radiation monitor alarms, containment entry requirements, fuel handling responsibilities, access to locked high radiation areas, aligning filters, etc.	3.4	70			
	2.3.14	Knowledge of radiation or contamination hazards that may arise during normal, abnormal, or emergency conditions or activities.	3.4	71			
	2.3.11	Ability to control radiation releases.			4.3	96	
	2.3.13	Knowledge of Radiological Safety Procedures pertaining to licensed operator duties, such as response to radiation monitor alarms, containment entry requirements, fuel handling responsibilities, access to locked high radiation areas, aligning filters, etc.			3.8	99	
	Subtotal				2		2
4. Emergency Procedures / Plan	2.4.47	Ability to diagnose and recognize trends in an accurate and timely manner utilizing the appropriate control room reference material.	4.2	72			
	2.4.1	Knowledge of EOP entry conditions and immediate action steps.	4.6	73			
	2.4.27	Knowledge of "fire in the plant" procedures.			3.9	97	
	2.4.41	Knowledge of emergency action thresholds and classifications.			4.6	100	
Subtotal				2		2	
Tier 3 Point Total:				10		7	

Tier / Group	Randomly Selected KA	Reason for Rejection
1 / 1	077 / 2.4.3 replaced by 077 / 2.2.37	The subject K/A isn't relevant at the subject facility.
2 / 2	071 / A2.07 replaced by 071 / A2.09	The subject K/A isn't relevant at the subject facility.
2 / 1	059 / 2.4.3 replaced by 059 / 2.4.45	The subject K/A isn't relevant at the subject facility.
1 / 1	056 / AA1.12 replaced by 056 / AA1.04	056/AA1.12 overlaps with a JPM on the Operating Exam.
2 / 1	008 / A2.02 replaced by 008 / A2.03	There is an overlap issue between the KA selected and a JPM on the Operating Test
2 / 1	064 / K2.02 replaced by 064 / K4.02	It isn't possible to prepare a psychometrically sound question related to the subject K/A.
2 / 1	059 / 2.4.45 again replaced by 059 / 2.4.2	Could not write an acceptable discriminating question, randomly chose new generic against same system.
1 / 1	007 / EK1.05 replaced by 007 EK1.02	Could not write an operationally valid question, beyond GFES level, randomly chose a new K in same system.
1 / 1	038 / EA2.11 replaced by 022 / AA2.04	Could not write a question below level 5 that met NRC standard, randomly chose in same tier / group / A2.
3	2.2.13 replaced by 2.2.1	Overlap with JPM randomly replaced with same G tier.
1/1 SRO	015/017 / AA2.02 replaced by 015/017 AA2.08	Could not write SRO level question to 2.02, also AA2.02 over-sampled, randomly chosen from same system.
1/1 SRO	025 / 2.1.27 replaced by 025 / 2.4.1	Could not write SRO level question to 2.1.27 for evolution 025, randomly chose from generics against same evolution.
1/1 SRO	E05 / 2.1.32 replaced by 054 / 2.2.37	No system limits and precautions associated with this evolution, randomly chose new K/A from NKEG exam outline generator.
1/2 SRO	059 / 2.4.8 replaced by A03 / 2.1.23	No EOP for accidental liquid release, randomly chose new K/A from NKEG exam outline generator.
1/2 SRO	A04 / 2.4.9 replaced by 005 / 2.2.38	Could not write test question to low power turbine trip affect on mitigation strategy, randomly chose new K/A from NKEG exam outline generator.
2/1 SRO	004 / A2.04 replaced by 006 / A2.10	No accidental gas release associated with CCVC, randomly chose new K/A from NKEG exam outline generator.
2/1 SRO	059 / 2.4.47 replaced by 013 / A2.04	Could not write E-plan related question to MFW trending, randomly chose new K/A from NKEG exam outline generator.
2/2 SRO	056 / A2.04 replaced by 016 A2.01	Could not write SRO level question, randomly chose new K/A from NKEG exam outline generator.
2/2 SRO	045 / 2.2.37 replaced by 017 / A2.02	Could not write operability of safety system question against turbine, randomly chose new K/A from NKEG exam outline generator.
2/2 SRO	017 / A2.02 again replaced 071 / 2.1.20	Could not write a discriminating question, randomly chose new K/A again.
1/1 SRO	015/017 AA2.08 replaced by 065 / AA2.08	Could not write a discriminating SRO level question. Randomly picked a new K/A.
1/1 SRO	025 / 2.4.4 again replaced by 077 / 2.4.4	Could not write a discriminating SRO level question. Randomly chose a new evolution in the tier.

3 SRO	2.1.14 replaced by 2.1.7	Could not write a discriminating question at the SRO level. Randomly chose new K/A from tier 1.
3 SRO	2.4.35 replaced by 2.4.41	Could not write a discriminating question at the SRO level. Randomly chose a new K/A from tier 4
2 / 2 SRO	071 / 2.1.20 replaced by 029 / 2.1.20	Could not write an SRO level discriminating question on this K/A, stayed with same Generic, replaced system in same tier.

Facility: Three Mile IslandDate of Examination: April 2012Examination Level: RO ☒ SRO ☐Operating Test Number: 289-2012-301

Administrative Topic (See Note)	Type Code*	Describe activity to be performed
Conduct of Operations	N/R	Perform a Manual Power Range Calculation 2.1.37 (4.3)
Conduct of Operations	M/R	Perform a Transient Leak Rate Calculation 2.1.23 (4.3)
Equipment Control	N/R	Isolate a Component for Maintenance 2.2.41 (3.5)
Radiation Control	n/a	Category not selected for RO applicants
Emergency Procedures/Plan	N/S	ERO Notification – Alt Path

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

THREE MILE ISLAND 2011 NRC RO EXAMINATION**CONDUCT OF OPERATIONS (A1-1):** Perform a Manual Power Range Calculation.

Given a data sheet and reference 1302-1.1, Power Range Calibration, the candidate will be directed to manually check Power Range Calibration using hand calculations.

This JPM is a new JPM.

License is evaluated against properly calculating Power Range Calibration and identifying an Error Linear Power greater than 2.0%.

Safety significance, failure to identify an Error Linear Power >2.0% would result in continued operation with Offset Error outside of the acceptance criteria IAW T.S. 4.1.

CONDUCT OF OPERATIONS (A1-2): Perform a Transient Leak Rate Calculation.

Given plant conditions and reference OS-24, Conduct of Operations During Abnormal and Emergency Events, the candidate will be directed to perform a transient RCS leak rate calculation that will most accurately determine the current RCS leak rate.

JPM is modified from a Bank JPM.

License is evaluated against properly calculating an RCS leak rate when given multiple data points.

Several opportunities for error exist in: multiple data points of leak rate (leak worsens at one point), multiple times given (5 minute minimum for most accurate), and calculation errors.

Safety significance, failure to calculate an accurate RCS leak rate could cause a lower than realistic rate and redirect a Control Room crew away from appropriate Procedures IAW T.S.'s.

EQUIPMENT CONTROL (A2): Isolate a Component for Maintenance.

Given a plant component needing to be isolated identify mechanical and electrical isolation points. This is a new JPM developed for this class.

Safety significance is failure to properly identify the correct points could lead to a loss of nuclear services river water and/or personnel injury.

RADIATION CONTROL (A3): Category not selected for RO Candidates.**EMERGENCY PROCEDURES/PLAN (A4):** ERO Notification -- Alt Path

An emergency has been declared at Limerick but due to communication equipment issues TMI must make notifications. Multiple problems are experienced with the normal and first backup systems of communication at TMI resulting in an alternate path to the 2nd backup system.

Facility: Three Mile IslandDate of Examination: April 2012Examination Level: RO ☐ SRO ☒Operating Test Number: 289-2012-301

Administrative Topic (See Note)	Type Code*	Describe activity to be performed
Conduct of Operations	N/R	Perform and Approve a Manual Power Range Calculation 2.1.37 (4.6)
Conduct of Operations	M/R	Perform a Transient Leak Rate Calculation with a T.S. Call 2.1.23 (4.4)
Equipment Control	M/R	Evaluate a Completed Surveillance Procedure and Perform Appropriate Actions 2.2.12 (4.1)
Radiation Control	N/R	Review and Approve a Gaseous Release Permit for a Waste Gas Tank 2.3.6 (3.8)
Emergency Procedures/Plan	M/R	Identify and Declare an Emergency Classification with a PAR 2.4.41 (4.6)

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

THREE MILE ISLAND 2012 NRC SRO EXAMINATION

CONDUCT OF OPERATIONS (A1-1): Perform and Approve a Manual Power Range Calculation. Given a data sheet and reference 1302-1.1, Power Range Calibration, the candidate will be directed to manually check and approve Power Range Calibration using hand calculations.

This JPM is a new JPM.

License is evaluated against properly calculating Power Range Calibration, identifying several errors in the given data sheet, and not approving the hand calculation.

Safety significance, failure to identify the errors would result in continued operation with Power Range instrumentation outside of the acceptance criteria IAW T.S. 4.1.

CONDUCT OF OPERATIONS (A1-2): Perform a Transient Leak Rate Calculation with a T.S. Call. Given plant conditions and reference OS-24, Conduct of Operations During Abnormal and Emergency Events, the candidate will be directed to perform a transient RCS leak rate calculation that will most accurately determine the current RCS leak rate and identify any T.S.

JPM is modified from a Bank JPM.

License is evaluated against properly calculating an RCS leak rate when given multiple data points.

Several opportunities for error exist in: multiple data points of leak rate (leak worsens at one point), multiple times given (5 minutes for most accurate), and calculation errors, and identifying the proper T.S.

Safety significance, failure to calculate an accurate RCS leak rate could cause a lower than realistic rate and redirect a Control Room crew away from appropriate Procedures and EAL's IAW T.S.'s.

EQUIPMENT CONTROL (A2): Evaluate a Completed Surveillance Procedure and Perform

Appropriate Actions.

Given plant conditions, a data sheet, and reference ER-TM-321-1041, TMI-1 IST Program Requirements, the candidate will be directed to evaluate a completed surveillance procedure and perform appropriate actions.

JPM is modified from a Bank JPM.

License is evaluated against properly reviewing the data sheet against ER-TM-321-1041, and identifying out-of-spec data points.

Safety significance, failure to identify out-of-spec data points would lead to unknown violation of Tech Specs and could lead to possible equipment damage and/or personnel injury.

RADIATION CONTROL (A3): Review and Approve a Gaseous Release Permit for a Waste Gas Tank. Given plant conditions, data sheets, and reference 6610-ADM-4250.11, Releasing Radioactive Gaseous Effluents – Waste Gas Tanks A/B/C, the candidate is directed to review and approve a filled-out gaseous release permit.

This JPM is a new JPM.

License is evaluated against properly reviewing the given data against 6610-ADM-4250.11, and identifying incorrect data points.

Safety significance, failure to identify incorrect data points would lead to a gaseous release with radiation above Tech Spec allowed levels and possible adverse effects to the environment.

EMERGENCY PROCEDURES/PLAN (A4): Identify and Declare an Emergency Classification.

Given a set of conditions, and references EP-AA-112-100-F-01, Shift Emergency Director Checklist, EP-AA-1009 Exelon Nuclear Radiological Emergency Plan Annex For Three Mile Island (TMI) Station, EP-MA-114-100-F-01, State/Local Event Notification Form, EP-AA-111, Emergency Classification And Protective Action Recommendations, and EP-AA-111-F-09, TMI Plant Based PAR Flowchart, the candidate is directed to determine the Emergency Action Level (EAL) and make a Protective Action Recommendation (PAR) IAW the facility Emergency Plan.

JPM is modified from a Bank JPM.

License is evaluated against properly identifying the Emergency Classification and Protective Action Recommendations (PAR). Failure to correctly identify the Emergency Classification and Protective Action Recommendations could result in unnecessary harm to the general public.

Facility: <u>Three Mile Island</u>		Date of Examination: <u>April 2012</u>	
Exam Level: RO <input checked="" type="checkbox"/> SRO-I <input type="checkbox"/> SRO-U <input type="checkbox"/>		Operating Test Number: <u>289-2012-301</u>	
Control Room Systems [@] (8 for RO); (7 for SRO-I); (2 or 3 for SRO-U, including 1 ESF)			
System / JPM Title	Type Code*	Safety Function	
a. Recover From CRD Sequence Fault (Sys 001) A2.18	N/S	1	
b. Respond To High Pressure Injection Initiation (Alt Path – MU-V-14A Fails To Open). (Sys 006) A2.02	D/A/L/S	2	
c. Respond to an RCS leak into ICCW (EP 009) EA2.02	N/A/S	3	
d. RCP #1 Seal Failure (Sys 003) A2.01	P/A/S	4P	
e. Perform the Required Actions for EF-P-1 Trip (Sys 061) AA1.02	D/L/S	4S	
f. Establish Alternate RB Emergency Cooling (Sys 022) A4.01	N/A/L/S	5	
g. OP-TM-EOP-020 IMA's (APE 068) AA1.23	N/S	8	
h. Place an RPS cabinet in Manual Bypass (Sys 012) A4.03	N/A/S	7	
In-Plant Systems [@] (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)			
i. Supply VBC From the 1E Inverter (Sys 062) A4.01	N	6	
j. Place 8 th Stage Heating On-Line (Sys 039) G2.1.30	D	4S	
k. Prepare for Transfer to RB Sump Recirculation (Sys 006) K4.08	D/E/L/R	3	
@ 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			

THREE MILE ISLAND 2012 NRC RO EXAMINATION

JPM A – Recover From CRD Sequence Fault. New.

Safety significance failure to correct sequence fault allows operation outside analyzed reactivity addition rates.

JPM B – Respond To High Pressure Injection Initiation (Alt Path – MU-V-14A Fails To Open). Bank Alternate path.

Safety significance failure to complete this JPM will result in a loss all three HPI pumps.

JPM C – Respond to an RCS leak into ICCW. New Alternate path, alternate path leak gets worse, IAAT actions required.

Safety significance failure to properly respond will lead to a continued RCS leak outside containment.

JPM D – RCP #1 Seal Failure. Previous NRC 2011 Alternate path JPM. Alternate path failure worsens, pump must be shut down.

Safety significance failure to properly address excessive seal leakoff could result in Seal LOCA. Chosen randomly by drawing playing cards representing JPMs from last two exams.

JPM E – Perform the Required Actions for EF-P-1 trip. Bank JPM.

Safety significance failure to properly complete the task would lower the safety margin for EFW by having only motor driven pumps available.

JPM F – Establish Alternate RB Emergency Cooling. New Alternate path.

Safety significance failure to properly complete the task would result in containment temperatures greater than assumed in the structural analysis, see Technical Specification 3.17. Alternate path involves the complete failure of the emergency cooling systems and restoration of a portion of normal cooling under alternate power conditions.

JPM G – OP-TM-EOP-020 IMA's New.

Safety significantly failure to complete the IMA's of the EOP could result in failure to adequately control and transfer control of the reactor to the remote shutdown area.

JPM H – Place an RPS cabinet in Manual Bypass. New Alternate path. Alternate path failure in another cabinet requires placing cabinet in tripped state to place 1st cabinet in Manual Bypass.

Safety significance with a failed instrument in the other cabinet, incorrect operation in this cabinet would lead to reactor trip, an initiating event for transients.

JPM I – Supply VBC from the 1E inverter. New In Plant JPM.

Safety significance failure to complete the task properly could result in inadvertent safety system actuations, or other transients (accident initiators) due to reduction of Vital Power supplies.

JPM J – Place 8th Stage Heating On-Line. Bank JPM.

Safety significance failure to complete the task properly could result in water quality reduction to the OTSGs, long term result could be damage to tubes.

JPM K – Prepare for Transfer for RB Sump Recirculation. Bank JPM.

Safety significance failure to complete the task may result in inability to complete these actions at a later time due to inaccessibility due to radiation levels post accident on sup recirculation. This is a time critical action, approximately 25 minutes from start of event reference UFSAR 14.2.2.5.d and 6.1.3.2.

Facility: Three Mile IslandDate of Examination: April 2012Exam Level: RO ☐ SRO-I ☒ SRO-U ☐Operating Test Number: 289-2012-301Control Room Systems[@] (8 for RO); (7 for SRO-I); (2 or 3 for SRO-U, including 1 ESF)

System / JPM Title	Type Code*	Safety Function
a. Recover From CRD Sequence Fault (Sys 001) A2.18	N/S	1
b. Respond To High Pressure Injection Initiation (Alt Path – MU-V-14A Fails To Open). (Sys 006) A2.02	D/A/L/S	2
c. Respond to an RCS leak into ICCW (EP 009) EA2.02	N/A/S	3
d. RCP #1 Seal Failure (Sys 003) A2.01	P/A/S	4P
e. Perform the Required Actions for EF-P-1 Trip (Sys 061) AA1.02	D/L/S	4S
f. Establish Alternate RB Emergency Cooling (Sys 022) A4.01	N/A/L/S	5
g. OP-TM-EOP-020 IMA's (APE 068) AA1.23	N/S	8
h.		

In-Plant Systems[@] (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)

i. Supply VBC From the 1E Inverter (Sys 062) A4.01	N	6
j. Place 8 th Stage Heating On-Line (Sys 039) G2.1.30	D	4S
k. Prepare for Transfer to RB Sump Recirculation (Sys 006) K4.08	D/E/L/R	3

[@] 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	

THREE MILE ISLAND 2012 NRC SRO EXAMINATION

JPM A – Recover From CRD Sequence Fault. New.

Safety significance failure to correct sequence fault allows operation outside analyzed reactivity addition rates.

JPM B – Respond To High Pressure Injection Initiation (Alt Path – MU-V-14A Fails To Open). Bank Alternate path.

Safety significance failure to complete this JPM will result in a loss all three HPI pumps.

JPM C – Respond to an RCS leak into ICCW. New Alternate path, alternate path leak gets worse, IAAT actions required.

Safety significance failure to properly respond will lead to a continued RCS leak outside containment.

JPM D – RCP #1 Seal Failure. Previous NRC 2011 Alternate path JPM. Alternate path failure worsens, pump must be shut down.

Safety significance failure to properly address excessive seal leakoff could result in Seal LOCA. Chosen randomly by drawing playing cards representing JPMs from last two exams.

JPM E – Perform the Required Actions for EF-P-1 trip. Bank JPM.

Safety significance failure to properly complete the task would lower the safety margin for EFW by having only motor driven pumps available.

JPM F – Establish Alternate RB Emergency Cooling. New Alternate path.

Safety significance failure to properly complete the task would result in containment temperatures greater than assumed in the structural analysis, see Technical Specification 3.17. Alternate path involves the complete failure of the emergency cooling systems and restoration of a portion of normal cooling under alternate power conditions.

JPM G – OP-TM-EOP-020 IMA's New.

Safety significantly failure to complete the IMA's of the EOP could result in failure to adequately control and transfer control of the reactor to the remote shutdown area.

JPM H – Not selected for SROs.

JPM I – Supply VBC from the 1E inverter. New In Plant JPM.

Safety significance failure to complete the task properly could result in inadvertent safety system actuations, or other transients (accident initiators) due to reduction of Vital Power supplies.

JPM J – Place 8th Stage Heating On-Line. Bank JPM.

Safety significance failure to complete the task properly could result in water quality reduction to the OTSGs, long term result could be damage to tubes.

JPM K – Prepare for Transfer for RB Sump Recirculation. Bank JPM.

Safety significance failure to complete the task may result in inability to complete these actions at a later time due to inaccessibility due to radiation levels post accident on sup recirculation. This is a time critical action, approximately 25 minutes from start of event reference UFSAR 14.2.2.5.d and 6.1.3.2.

Facility:	Three Mile Island	Scenario No.:	1	Op Test No.:	10-02 NRC
Examiners:			Operators:		
Initial Conditions:	<ul style="list-style-type: none"> (Temporary IC-231) 100% Power, MOL MO-P-1C and MO-P-1F are OFF for Chemistry purposes IAW OP-TM-431-403/406 Crane work is occurring on the West side of the Plant to stage new piping 				
Turnover:	Maintain 100% Reactor Power				
Critical Tasks:	<ul style="list-style-type: none"> FW Flow Control (CT-16) Isolate Overcooling SG(s) (CT-17) Control RCS Inventory (CT-30) 				
Event No.	Malf. No.	Event Type*	Event Description		
1	RW02C	C CRS(TS) C ARO	NR-P-1C Trips, NR-P-1B Fails to Auto-Start, entry into OP-TM-MAP-B0105, and OP-TM-MAP-B0205 (ARO: Starts NR-P-1B from CR)		
2	ED22G	I CRS I ARO	ICS Auto Power ICCW Subfeed Failure, entry into OP-TM-MAP-H-0108 (ARO: Restores Letdown following a Loss of ICS AUTO Power)		
3	EGR30	C CRS(TS) R URO	Loss of EG-Y-1A Starting Air, entry into OP-TM-MAP-A0102, and OP-TM-MAP-A0201 (URO: Reduce Reactor Power)		
4	IC09 IC53	I CRS I URO I ARO	MW Generated Input Fails to Zero Volts, entry into OP-TM-AOP-070 (URO/ARO: Control ICS in Manual IAW AOP-070)		
5	ED12 ED13	C CRS C URO C ARO	Loss of ICS Hand and Auto Power, entry into OP-TM-AOP-025, and OP-TM-EOP-001 (URO: Reactor Trip IMA's, ARO: Control OTSG Pressures)		
6	FW09A	M CRS M URO M ARO	FW Line Break Inside RB, Excessive Heat Transfer, entry into OP-TM-EOP-003.		
7	ZDISSM UV37(1)	C CRS C URO	MU-V-37 Fails Closed (URO: Throttle an MU-V-16 for minimum MU flow)		
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor					

NOTE: SCENARIO # 3 WAS DESIGNATED AS THE SPARE & WAS NOT USED SO IT WAS NOT INCLUDED IN THIS PACKAGE

Facility:	Three Mile Island	Scenario No.:	2	Op Test No.:	10-02 NRC
Examiners:			Operators:		
Initial Conditions:	<ul style="list-style-type: none"> (Temporary IC-232) 100% Power, MOL MO-P-1C and MO-P-1F are OFF for Chemistry purposes IAW OP-TM-431-403/406 Crane work is occurring on the West side of the Plant to stage new piping "C" RPS Cabinet is in Manual Bypass due to faulted Thot instrument. 				
Turnover:	Maintain 100% Power Operations				
Critical Tasks:	<ul style="list-style-type: none"> Control SG Pressure (adjust TBVs/ADVs) to: Maintain RC Temperature Constant or Maintain Appropriate Pri-Sec ΔT/Cooldown Rate (CT-11) Turbine Trip (CT-18) Restore Feed to a Dry OTSG (CT-26) 				
Event No.	Malf. No.	Event Type*	Event Description		
1	ZAIRC1LIC	C CRS C URO	MU-V-17 Fails Closed in Auto, entry into OP-TM-211-472 (URO: Controls Pressurizer Level with MU-V-17 in Manual)		
2	ED09D	C CRS(TS) C ARO	Loss of D Inverter, Loss of VBD, entry into OP-TM-AOP-018 (ARO: Place Rad Monitors Interlock switches to Defeat, Restore Control Building, Auxiliary Building, Fuel Handling Building Ventilation)		
3	NI15B	TS CRS	Nuclear Instrument, NI-6, Failure (fails low) (TS)		
4	IC23	I CRS I URO I ARO	SG/RX Demand Station fails to 0 Volts, Entry into OP-TM-AOP-070 (URO: ICS station to Manual, ARO: Controls temperature with SG A & B FW DEMAND stations in Manual)		
5	TU01D	C CRS R URO C ARO	High Vibrations on Main Turbine, entry into OP-TM-MAP-K0201 and 1102-4, Reactor shutdown (URO/ARO: Power reduction with ICS in Manual)		
6	FW15A FW15B TC02	C CRS C URO	Loss of both Main Feedwater Pumps, Turbine fails to trip, entry into OP-TM-EOP-001 (URO: IMA's of OP-TM-EOP-001)		
7	FW17 FW18A FW18B	M CRS M URO M ARO	Loss of Emergency Feedwater Pumps, entry into OP-TM-EOP-004, Lack of Heat Transfer.		
8	MS09A-F	C CRS C ARO	Turbine Bypass Valves fail Closed, OTSG Pressure control via Atmospheric Dump Valves (ARO: ADV control to Backup Loader)		
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor					

Facility:	Three Mile Island	Scenario No.:	4	Op Test No.:	10-02 NRC
Examiners:			Operators:		
Initial Conditions:					
	<ul style="list-style-type: none"> (Temporary IC-260) 85% Power, MOL MO-P-1C and MO-P-1F are OFF for Chemistry purposes IAW OP-TM-431-403/406 Crane work is occurring on the West side of the Plant to stage new piping MU-P-1C is OOS IAW OP-TM-211-432, Removing MU-P-1C From Service, for bearing replacement ICS is in Manual due to a faulted Reactor Demand circuit card, expected to be replaced within 24 hrs 				
Turnover: Maintain 85% Power					
Critical Tasks:					
	<ul style="list-style-type: none"> Trip all RCPs (CT-1) Shutdown Reactor - ATWS (CT-24) Maintain SG availability (CT-29) 				
Event No.	Malf. No.	Event Type*	Event Description		
1	TH15A	C CRS(TS) R URO C ARO	20 gpm tube leak on "A" OTSG, entry into OP-TM-EOP-005. (URO: commences a reactor shutdown with ICS in Manual, ARO: Place FW-P-1A/1B in HAND)		
2	ES08A	I CRS I URO I ARO	Inadvertent 500# ESAS Signal, entry into OP-TM-AOP-046. (URO: OP-TM-AOP-046 IMA's. ARO: Restores Letdown following an inadvertant ESAS signal)		
3	ED08B	C CRS(TS) C ARO	Loss of "B" DC, entry into OP-TM-AOP-024. (ARO: Energizes 1M DC from "A" DC)		
4	TC01	C CRS C URO	Main Turbine Trip, Reactor does not automatically trip, Entry into OP-TM-EOP-001. (URO: IMA's of OP-TM-EOP-001)		
5	TH18A	C CRS C URO	Sheared shaft on RC-P-1A, entry into OP-TM-MAP-F0301 and OP-TM-226-151. (URO: Trips 1A 6900V Bus)		
6	TH16A	M CRS M URO M ARO	OTSG Tube Rupture on "A" OTSG with a Loss of Subcooling Margin, entry into OP-TM-EOP-005, OP-TM-EOP-002.		
7	FW18A	C CRS C ARO	EF-P-2A Trips, entry into OP-TM-EOP-010, Rule 4. (ARO: Feeds OTSG's with Main Feedwater)		
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor					

Facility:	Three Mile Island	Scenario No.:	5	Op Test No.:	10-02 NRC
Examiners:			Operators:		
Initial Conditions:	<ul style="list-style-type: none"> (Temporary IC-235) 100% Power, MOL MO-P-1C and MO-P-1F are OFF for Chemistry purposes IAW OP-TM-431-403/406 Crane work is occurring on the West side of the Plant to stage new piping 				
Turnover:	Maintain 100% Reactor Power				
Critical Tasks:	<ul style="list-style-type: none"> FW Flow Control (CT-16) Maintain RB Radiation Boundary (includes SG tubes) (CT-19) 				
Event No.	Malf. No.	Event Type*	Event Description		
1	DHR32	TS CRS	BWST level lowers, entry into OP-TM-MAP-E0204		
2	RC37A	C CRS C URO	NSCCW Leak in RC-P-1A Motor Air Cooler, entry into OP-TM-MAP-F0201 (URO: Starts DW-P-1)		
3	MS12C	C CRS C ARO	Hi Level in Moist. Sep. Tank, entry into OP-TM-MAP-N0201 (ARO: Start MO-P-1C)		
4	FW04B	I CRS I URO I ARO	FW Temperature transmitter failure, entry into OP-TM-AOP-070 (URO/ARO: Controls reactivity and feedwater in manual. ARO: Controls Feedwater Flow in manual)		
5	RD0153 IC16	C CRS(TS) R URO C ARO	Dropped Safety Rod, runback fails to occur, entry into OP-TM-MAP-H0101, and OP-TM-AOP-062 (URO: Reactivity manipulation, ARO: Feedwater manipulation)		
6	RC37A	C CRS C URO C ARO	NSCCW Rupture in RC-P-1A Motor Air Cooler, Loss of NSCCW, Reactor trip, entry into OP-TM-AOP-031, and OP-TM-EOP-001 (URO: Reactor Trip IMA's)		
7	TH06	M CRS M URO M ARO	RCS LOCA, Loss of Subcooling Margin, entry into OP-TM-EOP-002.		
8	02A6S28 02A6S22	C CRS C URO	NSCCW Containment Isolation valves fail to close on ES signal with low level. (URO: Manually closes NSCCW Containment Valves)		
<p>* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor</p>					