

Facility: Three Mile Island - 1

Form ES-401-3

Exam Date: 05/12/2003

Exam Level: SRO

Tier	Group	K/A Category Points											Point Total
		K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	
1. Emergency & Abnormal Plant Evolutions	1	4	4	4				4	4			4	24
	2	3	3	2				3	3			2	16
	3	1	0	0				0	1			1	3
	Tier Totals	8	7	6				7	8			7	43
2. Plant Systems	1	2	1	2	2	1	3	1	2	2	1	2	19
	2	1	1	2	2	1	1	1	2	2	1	3	17
	3	0	0	0	1	0	1	1	0	0	0	1	4
	Tier Totals	3	2	4	5	2	5	3	4	4	2	6	40
3. Generic Knowledge And Abilities					Cat 1		Cat 2		Cat 3		Cat 4		
					4		5		4		4		17

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

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Emergency and Abnormal Plant Evolutions - Tier 1 / Group 1

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E/APE #	E/APE Name / Safety Function	K1	K2	K3	A1	A2	G	KA Topic	Imp.	Points
001	Continuous Rod Withdrawal / 1					X		AA2.04 - Reactor power and its trend	4.3	1
003	Dropped Control Rod / 1		X					AK2.05 - Control rod drive power supplies and logic circuits	2.8	1
003	Dropped Control Rod / 1				X			AA1.06 - RCS pressure and temperature	4.1	1
005	Inoperable/Stuck Control Rod / 1	X						AK1.01 - Axial power imbalance	3.8	1
011	Large Break LOCA / 3						X	2.1.33 - Ability to recognize indications for system operating parameters which are entry-level conditions for technical specifications.	4.0	1
011	Large Break LOCA / 3	X						EK1.01 - Natural circulation and cooling, including reflux boiling	4.4	1
015	Reactor Coolant Pump (RCP) Malfunctions / 4						X	2.4.6 - Knowledge symptom based EOP mitigation strategies.	4.0	1
017	Reactor Coolant Pump (RCP) Malfunctions (Loss of RC Flow) / 4					X		AA2.10 - When to secure RCPs on loss of cooling or seal injection	3.7	1
026	Loss of Component Cooling Water (CCW) / 8			X				AK3.03 - Guidance actions contained in EOP for Loss of CCW	4.2	1
026	Loss of Component Cooling Water (CCW) / 8				X			AA1.07 - Flow rates to the components and systems that are serviced by the CCWS; interactions among the components	3.0	1

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E/APE #	E/APE Name / Safety Function	K1	K2	K3	A1	A2	G	KA Topic	Imp.	Points
029	Anticipated Transient Without Scram (ATWS) / 1		X					EK2.06 - Breakers, relays, and disconnects	3.1*	1
029	Anticipated Transient Without Scram (ATWS) / 1				X			EA1.05 - BIT outlet valve switches	3.6*	1
051	Loss of Condenser Vacuum / 4			X				AK3.01 - Loss of steam dump capability upon loss of condenser vacuum	3.1*	1
055	Loss of Offsite and Onsite Power (Station Blackout) / 6			X				EK3.01 - Length of time for which battery capacity is designed	3.4	1
067	Plant Fire on Site / 9						X	2.1.32 - Ability to explain and apply all system limits and precautions.	3.8	1
069	Loss of Containment Integrity / 5					X		AA2.01 - Loss of containment integrity	4.3	1
069	Loss of Containment Integrity / 5	X						AK1.01 - Effect of pressure on leak rate	3.1	1
074	Inadequate Core Cooling / 4					X		EA2.06 - Changes in PZR level due to PZR steam bubble transfer to the RCS during inadequate core cooling	4.6	1

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E/APE #	E/APE Name / Safety Function	K1	K2	K3	A1	A2	G	KA Topic	Imp.	Points
A03	Loss of NNI-Y / 7		X					AK2.2 - 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	1
A03	Loss of NNI-Y / 7				X			AA1.1 - Components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features	4.0	1
A06	Shutdown Outside Control Room / 8	X						AK1.3 - Annunciators and conditions indicating signals, and remedial actions associated with the (Shutdown Outside Control Room)	3.4	1
E05	Excessive Heat Transfer / 4		X					EK2.1 - Components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features	4.0	1
E09	Natural Circulation Operations / 4						X	2.4.30 - Knowledge of which events related to system operations/status should be reported to outside agencies.	3.6	1
E09	Natural Circulation Operations / 4			X				EK3.2 - Normal, abnormal and emergency operating procedures associated with (Natural Circulation Operations)	3.8	1

K/A Category Totals: 4 4 4 4 4 4

Group Point Total: 24

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Emergency and Abnormal Plant Evolutions - Tier 1 / Group 2

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E/APE #	E/APE Name / Safety Function	K1	K2	K3	A1	A2	G	KA Topic	Imp.	Points
007	Reactor Trip / 1		X					EK2.03 - Reactor trip status panel	3.6	1
007	Reactor Trip / 1				X			EA1.03 - RCS pressure and temperature	4.1	1
008	Pressurizer (PZR) Vapor Space Accident (Relief Valve Stuck Open) / 3		X					AK2.01 - Valves	2.7	1
008	Pressurizer (PZR) Vapor Space Accident (Relief Valve Stuck Open) / 3			X				AK3.03 - Actions contained in EOP for PZR vapor space accident/LOCA	4.6	1
009	Small Break LOCA / 3						X	2.2.25 - Knowledge of bases in technical specifications for limiting conditions for operations and safety limits.	3.7	1
009	Small Break LOCA / 3	X						EK1.01 - Natural circulation and cooling, including reflux boiling	4.7	1
022	Loss of Reactor Coolant Makeup / 2	X						AK1.02 - Relationship of charging flow to pressure differential between charging and RCS	3.1	1
027	Pressurizer Pressure Control (PZR PCS) Malfunction / 3		X					AK2.03 - Controllers and positioners	2.8	1
033	Loss of Intermediate Range Nuclear Instrumentation / 7			X				AK3.01 - Termination of startup following loss of intermediate-range instrumentation	3.6	1

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Emergency and Abnormal Plant Evolutions - Tier 1 / Group 2

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E/APE #	E/APE Name / Safety Function	K1	K2	K3	A1	A2	G	KA Topic	Imp.	Points
038	Steam Generator Tube Rupture (SGTR) / 3				X			EA1.08 - Core cooling monitor	3.8*	1
038	Steam Generator Tube Rupture (SGTR) / 3					X		EA2.09 - Existence of natural circulation, using plant parameters	4.2	1
061	Area Radiation Monitoring (ARM) System Alarms / 7					X		AA2.01 - ARM panel displays	3.7	1
061	Area Radiation Monitoring (ARM) System Alarms / 7						X	2.1.32 - Ability to explain and apply all system limits and precautions.	3.8	1
A01	Plant Runback / 1				X			AA1.1 - Components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features	3.7	1
E08	LOCA Cooldown / 4					X		EA2.2 - Adherence to appropriate procedures and operation within the limitations in the facility's license and amendments	4.0	1
E08	LOCA Cooldown / 4	X						EK1.3 - Annunciators and conditions indicating signals, and remedial actions associated with the (LOCA Cooldown)	3.5	1

K/A Category Totals: 3 3 2 3 3 2

Group Point Total: 16

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Emergency and Abnormal Plant Evolutions - Tier 1 / Group 3

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E/APE #	E/APE Name / Safety Function	K1	K2	K3	A1	A2	G	KA Topic	Imp.	Points
A08	Refuel Canal Level Decrease / 8					X		AA2.1 - Facility conditions and selection of appropriate procedures during abnormal and emergency operations	4.0	1
E13	EOP Rules						X	2.2.22 - Knowledge of limiting conditions for operations and safety limits.	4.1	1
E13	EOP Rules	X						EK1.2 - Normal, abnormal and emergency operating procedures associated with (EOP Rules)	3.6	1

K/A Category Totals: 1 0 0 0 1 1

Group Point Total: 3

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Plant Systems - Tier 2 / Group 1

Form ES-401-3

Sys/Ev #	System / Evolution Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	KA Topic	Imp.	Points
001	Control Rod Drive System / 1						X						K6.03 - Reactor trip breakers, including controls	4.2	1
003	Reactor Coolant Pump System (RCPS) / 4			X									K3.03 - Feedwater and emergency feedwater	3.1	1
003	Reactor Coolant Pump System (RCPS) / 4								X				A2.02 - Conditions which exist for an abnormal shutdown of an RCP in comparison to a normal shutdown of an RCP	3.9	1
004	Chemical and Volume Control System (CVCS) / 1											X	2.4.4 - Ability to recognize abnormal indications for system operating parameters which are entry-level conditions for emergency and abnormal operating procedures.	4.3	1
004	Chemical and Volume Control System (CVCS) / 1										X		A4.18 - Emergency borate valve	4.1	1
015	Nuclear Instrumentation System / 7				X								K4.04 - Slow response time of SPNDs	3.6?	1
015	Nuclear Instrumentation System / 7						X						K6.04 - Bistables and logic circuits	3.2	1
022	Containment Cooling System (CCS) / 5		X										K2.01 - Containment cooling fans	3.1	1
026	Containment Spray System (CSS) / 5	X											K1.01 - ECCS	4.2	1
026	Containment Spray System (CSS) / 5									X			A3.01 - Pump starts and correct MOV positioning	4.5	1
061	Auxiliary / Emergency Feedwater (AFW) System / 4					X							K5.02 - Decay heat sources and magnitude	3.6	1

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Plant Systems - Tier 2 / Group 1

Form ES-401-3

Sys/Ev #	System / Evolution Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	KA Topic	Imp.	Points
061	Auxiliary / Emergency Feedwater (AFW) System / 4						X						K6.01 - Controllers and positioners	2.8*	1
063	D.C. Electrical Distribution System / 6											X	2.1.14 - Knowledge of system status criteria which require the notification of plant personnel.	3.3	1
063	D.C. Electrical Distribution System / 6				X								K4.04 - Trips	2.9?	1
068	Liquid Radwaste System (LRS) / 9	X											K1.07 - Sources of liquid wastes for LRS	2.9	1
068	Liquid Radwaste System (LRS) / 9									X			A3.02 - Automatic isolation	3.6	1
071	Waste Gas Disposal System (WGDS) / 9								X				A2.02 - Use of waste gas release monitors, radiation, gas flow rate, and totalizer	3.6	1
072	Area Radiation Monitoring (ARM) System / 7			X									K3.02 - Fuel handling operations	3.5	1
072	Area Radiation Monitoring (ARM) System / 7							X					A1.01 - Radiation levels	3.6	1

K/A Category Totals: 2 1 2 2 1 3 1 2 2 1 2

Group Point Total: 19

ES - 401 Plant Systems - Tier 2 / Group 2 Form ES-401-3

Sys/Ev #	System / Evolution Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	KA Topic	Imp.	Points
002	Reactor Coolant System (RCS) / 2			X									K3.02 - Fuel	4.5	1
002	Reactor Coolant System (RCS) / 2					X							K5.18 - Brittle fracture	3.6	1
011	Pressurizer Level Control System (PZR LCS) / 2								X				A2.08 - Loss of level compensation	2.8	1
012	Reactor Protection System / 7				X								K4.05 - Spurious trip protection	2.9	1
012	Reactor Protection System / 7						X						K6.11 - Trip setpoint calculators	2.9	1
029	Containment Purge System (CPS) / 8	X											K1.01 - Gaseous radiation release monitors	3.7	1
033	Spent Fuel Pool Cooling System (SFPCS) / 8									X			A3.01 - Temperature control valves	2.7*	1
034	Fuel Handling Equipment System (FHES) / 8								X				A2.02 - Dropped cask	3.9	1
035	Steam Generator System (S/GS) / 4											X	2.4.49 - Ability to perform without reference to procedures those actions that require immediate operation of system components and controls.	4.0	1
039	Main and Reheat Steam System (MRSS) / 4											X	2.4.6 - Knowledge symptom based EOP mitigation strategies.	4.0	1
039	Main and Reheat Steam System (MRSS) / 4										X		A4.07 - Steam dump valves	2.9	1

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PWR SRO (nination Outline

Printed: 02(03

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Plant Systems - Tier 2 / Group 2

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Sys/Ev #	System / Evolution Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	KA Topic	Imp.	Points
055	Condenser Air Removal System (CARS) / 4									X			A3.03 - Automatic diversion of CARS exhaust	2.7*	1
064	Emergency Diesel Generator (ED/G) System / 6		X										K2.03 - Control power	3.6	1
073	Process Radiation Monitoring (PRM) System / 7				X								K4.01 - Release termination when radiation exceeds setpoint	4.3	1
073	Process Radiation Monitoring (PRM) System / 7							X					A1.01 - Radiation levels	3.5	1
075	Circulating Water System / 8			X									K3.07 - ESFAS	3.5*	1
103	Containment System / 5											X	2.4.30 - Knowledge of which events related to system operations/status should be reported to outside agencies.	3.6	1

K/A Category Totals: 1 1 2 2 1 1 1 2 2 1 3

Group Point Total: 17

ES - 401 Plant Systems - Tier 2 / Group 3 Form ES-401-3

Sys/Ev #	System / Evolution Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	KA Topic	Imp.	Points
005	Residual Heat Removal System (RHRS) / 4						X						K6.03 - RHR heat exchanger	2.6	1
005	Residual Heat Removal System (RHRS) / 4							X					A1.01 - Heatup/cooldown rates	3.6	1
007	Pressurizer Relief Tank/Quench Tank System (PRTS) / 5				X								K4.01 - Quench tank cooling	2.9	1
008	Component Cooling Water System (CCWS) / 8											X	2.2.22 - Knowledge of limiting conditions for operations and safety limits.	4.1	1

K/A Category Totals: 0 0 0 1 0 1 1 0 0 0 1

Group Point Total: 4

Generic Knowledge and Abilities Outline (Tier 3)

Printed: 02/24/2006

PWR SRO Examination Outline

Form ES-401-5

Facility: Three Mile Island - 1

Generic Category	KA	KA Topic	Imp.	Points
Conduct of Operations	2.1.5	Ability to locate and use procedures and directives related to shift staffing and activities.	3.4	1
	2.1.7	Ability to evaluate plant performance and make operational judgments based on operating characteristics, reactor behavior, and instrument interpretation.	4.4	1
	2.1.10	Knowledge of conditions and limitations in the facility license.	3.9	1
	2.1.34	Ability to maintain primary and secondary plant chemistry within allowable limits.	2.9	1
Category Total:				4
Equipment Control	2.2.1	Ability to perform pre-startup procedures for the facility, including operating those controls associated with plant equipment that could affect reactivity.	3.6	1
	2.2.11	Knowledge of the process for controlling temporary changes.	3.4*	1
	2.2.19	Knowledge of maintenance work order requirements.	3.1	1
	2.2.26	Knowledge of refueling administrative requirements.	3.7	1
	2.2.27	Knowledge of the refueling process.	3.5	1
Category Total:				5
Radiation Control	2.3.1	Knowledge of 10 CFR: 20 and related facility radiation control requirements.	3.0	1
	2.3.3	Knowledge of SRO responsibilities for auxiliary systems that are outside the control room (e.g., waste disposal and handling systems).	2.9	1
	2.3.8	Knowledge of the process for performing a planned gaseous radioactive release.	3.2	1
	2.3.10	Ability to perform procedures to reduce excessive levels of radiation and guard against personnel exposure.	3.3	1
Category Total:				4

Generic Knowledge and Abilities Outline (Tier 3)

Printed: 02/24/200

PWR SRO Examination Outline

Form ES-401-5

Facility: Three Mile Island - 1

Generic Category	KA	KA Topic	Imp.	Points
Emergency Procedures/Plan	2.4.10	Knowledge of annunciator response procedures.	3.1	1
	2.4.11	Knowledge of abnormal condition procedures.	3.6	1
	2.4.33	Knowledge of the process used track inoperable alarms.	2.8	1
	2.4.44	Knowledge of emergency plan protective action recommendations.	4.0	1

Category Total: 4

Generic Total: 17

Tier / Group	Randomly Selected K/A	Reason for Rejection
2/1	061 A1.03	This K/A needs to be suppressed, since it applies to a multi-unit facility.
		Tier 2/Group 1 K/A 061 K6.01 was randomly selected as a replacement.
2/2	035 2.4.49	This K/A needs to be suppressed, since there are no "emergency essential"
		SWS Pumps associated with the Circulating Water System at TMI.

Facility: Three Mile Island Unit 1		Date of Examination: May 12, 2003
Examination Level (circle one): RO / SRO		Operating Test Number: _____
Administrative Topic/Subject Description		Describe method of evaluation: 1. ONE Administrative JPM, OR 2. TWO Administrative Questions.
A.1	Plant Parameter Verification	Perform Estimated Critical Boron Concentration Calculation. (JPM)
	Shift Staffing Requirements	Minimum Shift Staffing, Control of Overtime. (JPM)
A.2	Use Of Station Drawings	Predict Operational Impact Of Instrument Failure. (JPM)
A.3	Radiation Release	Liquid Radiation Release Approval. (JPM) (Organ Dose prevents approval)
A.4	Emergency Classification	Classify Event And Complete Initial Notification Forms. (JPM)

Facility: <u>Three Mile Island Unit 1</u>	Date of Examination: May 12, 2003	
Exam Level (circle one): RO / SRO(I) / SRO(U)	Operating Test No.: _____	
B.1 Control Room Systems		
System/JPM Title	Type Code*	Safety Function
a. Chemical and Volume Control (004)/Perform an Emergency Boration (Alt. Path – Backup Emergency Boration Required).	N, A, S, L	1
b. Engineered Safety Feature Actuation Systems (013)/Respond to inadvertent ES Actuation.	D, S	2
c. Emergency Core Cooling System (006)/Respond to a High Pressure Injection (HPI) initiation (Alt. Path - MU-V-14A fails).	N, A, S	3
d. Residual Heat Removal System (005)/Respond to a failure of Low Pressure Injection (Alt. Path – DHV-6 Fails to Open).	N, A, S, L	4 Primary
e. Main Steam System (039)/Respond to inadvertent closure of a Main Steam Isolation Valve.	D, S	4 Secondary
f. Containment Cooling System (022)/Return Reactor Building (RB) Emergency Cooling to Engineered Safeguards Standby.	N, S	5
g. Emergency Diesel Generator (EDG) System (064)/EDG Operation (Alt. Path – EDG Fails to Auto Load).	D, A, S	6
B.2 Facility Walk-Through		
a. Chemical and Volume Control System (004)/Manually Open RCP Seal Injection Isolation Valve (MU-V-26).	N, R	2 Emergency
b. Pressurizer Pressure Control System (010)/Transfer Pressurizer Heater Group 8 or 9 to an Engineered Safeguards Bus.	D	3 Emergency
c. Emergency Feedwater System (061)/Local Reset of Emergency Feedwater Pump (EF-P-1).	D	4 Secondary Emergency
* Type Codes: (D)irect from bank, (M)odified from bank, (N)ew, (A)lternate path, (C)ontrol room, (S)imulator, (L)ow-Power, (R)CA.		

Scenario Outline

Simulation Facility:	Three Mile Island Unit 1	Scenario No.:	#1	Op Test No.:	
Examiners	_____	Operators	_____	CRS	
	_____		_____	URO	
	_____		_____	PRO	
Description	Evaluate the ability of the crew to perform normal operations (secure FWP) and forced power reduction (due to dropped control rod) with ICS in manual. Following the power reduction, a controller failure requires the operator to implement manual Pressurizer level control. When the only operating Feedwater Pump trips, the Main Turbine trips, but the reactor does not (ATWS). The operator is required initiate a manual reactor trip. Following reactor trip, an RCS piping break results in loss of Reactor Coolant, and saturated liquid conditions. The overall scenario provides the opportunity to demonstrate ability to utilize normal, emergency, and accident mitigation procedures, and compliance with Technical Specifications requirements.				
Initial Conditions	ICS in manual due to SG-Rx Master controller failure (Malfunction IC23 OTSG Reactor Master output fails to zero volts). Plant is at 68% power, ready to secure FW-P-1A to enable coupling repair.				
Turnover	See Attached "Shift Turnover" Sheet				

Event No.	Malf. No.	Event Type*	Event Description
1		N URO ARO US	Secure feedwater pump (FW-P-1A) .
2	RD0117	C URO ARO US	Dropped Control Rod in controlling group.
3		R URO ARO US	Manual power reduction due to dropped rod.
4	I/O OVERRIDE	I URO ARO US	Pressurizer level controller fails to 0% demand, closing makeup control valve (MU-V-17).
5	FW15B	M URO M ARO M US	Loss of feedwater due to feedwater pump (FW-P-1B) failure. NOTES: Rapid control oil leak, auto start of oil pump, MAP – don't want manual Rx Trip.
6	RD28	I URO ARO US	"ATWS – RPS Auto Trip Failure.
7	MU16A	M URO M ARO M US	Small Break LOCA, Loss of Subcooling Margin
8	MU23C	C URO ARO US	High pressure injection pump (MU-P-1C) fails to automatically start.

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

Scenario Outline

Simulation Facility: Three Mile Island Unit 1
Scenario No.: #2
Op Test No.: _____

Examiners _____
Operators _____ CRS
_____ URO
_____ PRO

Description This scenario provides operational situations to evaluate the ability of crew members to implement plant procedures to perform normal operations (switch Condensate Pumps) and to respond abnormal and emergency conditions. While operating at full power, a control system instrumentation failure upsets the balance of plant control. After re-establishing plant stability, a hydrogen gas leak lowers Main Generator gas pressure, requiring a forced load reduction to protect the generator. Because of an Integrated Control System malfunction the load reduction must be performed manually. Following the load reduction, protective relay operation transfers loads off the 1A Auxiliary Transformer to 1B Auxiliary Transformer and Emergency Generator EG-Y-1B. A major steam line rupture inside the Containment Building causes the reactor to be tripped. Excessive OTSG heat transfer results in a core overcooling event, and ESAS actuation. Following isolation of feedwater sources to the affected OTSG, crew members are required take actions to prevent RCS reheat and re-pressurization. RCS pressure and temperature are required to be stabilized to protect OTSG and RCS components from excessive stresses that could lead to material failure and fission product release. Control and termination of HPI flow is complicated by a stuck open injection valve.

Initial Conditions Plant is at 100% power, with ICS if full automatic. Dispatcher ordered +200 MVAR ±20. Ready to switch Condensate Pumps.

Turnover See Attached "Shift Turnover" Sheet.

Event No.	Malf. No.	Event Type*	Event Description
1		N URO N ARO N US	Switch operating Condensate Pumps.
2	NI27B	I URO I ARO I US	RCS Loop A T-Hot transmitter failure (high), affecting ICS T-Ave indication.
3		C URO C ARO C US	Main Generator hydrogen gas leak.
4		R URO R ARO R US	Manual load reduction to 800 MW due to ICS controller failures.
5	ED02A	C URO C ARO C US	1A Auxiliary Transformer fault (Technical Specifications).
6	MS02B	M URO M ARO M US	Main Steam Line Rupture Inside the RB with ESAS actuation.
7	MU08C	C URO C ARO C US	Stuck open high pressure injection valve.

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

Scenario Outline

Simulation Facility: Three Mile Island Unit 1 **Scenario No.:** Alternate **Op Test No.:**

Examiners _____ **Operators** _____ CRS
 _____ URO
 _____ PRO

Description This scenario provides operational situations to evaluate the ability of crew members to implement plant procedures to perform normal operations, and to respond to abnormal and emergency conditions. While operating at full power, the operators are required to mitigate the effects of a controlling instrument failure by establishing manual control and then selecting alternate (valid) input signals. After re-establishing automatic RCS inventory control, the operators implement normal operating procedures to switch operating Makeup Pumps. An additional control system malfunction requires the operators to establish manual flow control for RCP seal injection. A small OTSG tube leak (greater than Technical Specification limits) forces the operators to implement an emergency operating procedure that includes plant shutdown. The power reduction is performed in manual due to an automatic control problem in the Control Rod Drive System. During the shutdown, a large OTSG Tube rupture develops, requiring the operators to initiate High pressure Injection and trip the reactor. One of the two ES Trains will not actuate automatically or manually at the Train level, requiring the operator to initiate individual components. Following reactor trip, actions are performed to ensure the reactor is shutdown properly, establish radiological controls and isolate potential secondary release paths, prevent inadvertent operation of the Main Steam Safety Valves, and reduce RCS leakage through the OTSG tubes in order to limit off-site doses.

Initial Conditions Plant is at 100% power, with ICS if full automatic. EF-P-2A is out of service for bearing replacement. MU-P-1A is operating, cooled by NSCC, to support MU-P-1B oil change.

Turnover See Attached "Shift Turnover" Sheet.

Event No.	Malf. No.	Event Type*	Event Description
1	RC04A	I URO ARO I US	Pressurizer level instrument failure.
2		N URO ARO N US	Switch operating Makeup Pumps.
3	MU07	C URO ARO C US	MU-V-32, RCP seal injection valve, failure.
4	TH17A	C URO ARO C US	Small OTSG 1A tube leak.
5		URO ARO US	Initiation of plant shutdown.
6	RD10C	I/R URO ARO I US	Control Rod Drive System automatic control failure.
7	TH16A	M URO ARO M US	OTSG tube rupture.
8	ES01B ES02B IO Override	I URO ARO I US	ES Train failure.

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