Facility:	James A. Fitzpatrick	Date of Examination:	May 2018
Examination Level:	RO	Operating Test Number:	17-1

Administrative Topic (see Note)	Type Code*	Describe activity to be performed
Conduct of Operations	M, R	Core Thermal Heat Balance Verification Using Turbine Steam Pressure K/A 2.1.19 (3.9), OP-65, RAP-7.3.03
Conduct of Operations	D, S	Perform Daily Checks Per ST-40D K/A 2.1.18 (3.6), ST-40D
Equipment Control	P, D, R 14-2 NRC	Perform ST-23C, Jet Pump Operability – Two Loop K/A 2.2.12 (3.7), ST-23C
Radiation Control	D, R	Determine Release Rates K/A 2.3.11 (3.8), ARP, SP-03.07
Emergency Plan		

NOTE: All items (five total) are required for SROs. RO applicants require only four items unless they are retaking only the administrative topics (which would require all five items).

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

Facility:	James A. Fitzpatrick	Date of Examination:	May 2018
Examination Level:	SRO	Operating Test Number:	17-1

Administrative Topic (see Note)	Type Code*	Describe activity to be performed
Conduct of Operations	M, R	Core Thermal Heat Balance Verification Using Turbine Steam Pressure K/A 2.1.19 (3.8), OP-65, RAP-7.3.03
Conduct of Operations	D, R	Determine Reportability Requirements – Scram with Containment Isolation K/A 2.1.18 (3.8), NUREG 1022, LS-AA-1400
Equipment Control	P, D, R 14-2 NRC	Review ST-23C, Jet Pump Operability – Two Loop K/A 2.2.12 (4.1), ST-23C
Radiation Control	D, R	Determine Actions for Inoperable Stack Radiation Monitor K/A 2.3.11 (4.3), ODCM
Emergency Plan	N, R	Determine Protective Action Recommendations and Complete Part 1 Notification Fact Sheet K/A 2.4.44 (4.4), EP-CE-111, EP-CE-114

NOTE: All items (five total) are required for SROs. RO applicants require only four items unless they are retaking only the administrative topics (which would require all five items).

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

water

Facility: James A. Fitzpatrick	Date of Examination: May 2018
Exam Level: RO / SRO-I / **SRO-U**	Operating Test Number: 17-1

Control Room Systems:* 8 for RO, 7 for SRO-I, and **2 or 3 for SRO-U**		
System/JPM Title	Type Code*	Safety Function
a. Perform Actions for Fire in Plant – RWR System K/A 202001 A4.01 (3.7/3.7), AOP-28	P, D, A, S 16-1 NRC	4
b. Transfer Feedwater Level Control to Master-Auto **K/A 259001 A4.01 (3.6/3.5), OP-2A**	**N, L, S**	**2**
c. Roll Main Turbine, Low Bearing Oil Pressure **K/A 241000 A4.11 (3.1/3.1), OP-9, ARP 09-5-2-07**	**M, A, L, S**	**3**
d. Perform Control Rod Operability Test, CRD Pump Trips K/A 201001 A2.01 (3.2/3.3), ST-20C, AOP-69	M, A, S	1
e. Perform EDG Load Test, EDG Ground Overload **K/A 264000 A4.04 (3.7/3.7), ST-9BB**	**D, A, EN, S**	**6**
f. Perform Area Radiation Monitor Functional Test K/A 272000 A4.02 (3.0/3.0)	D, S	7
g. Isolate Control Room and Relay Room Ventilation K/A 290003 A4.01 (3.2/3.2), OP-55B	N, EN, S	9
h. Lower Torus Water Level (RO only) K/A 223001 A2.11 (3.6/3.8), OP-13B	D, EN, S	5
In-Plant Systems:* 3 for RO, 3 for SRO-I, and **3 or 2 for SRO-U**		
i. Restore H2/O2 Monitors Following Isolation **K/A 223002 A2.09 (3.6/3.7), EP-2, OP-37**	**D, A, E**	**5**
j. Supply Fire Protection Water to EDGs B & D K/A 286000 K1.09 (3.2/3.3), OP-22	D, E	8
k. Swap CRD Pump Suction Filter **K/A 201001 A2.06 (2.9/2.9), OP-25**	**D, R**	**1**

*	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, and in-plant systems and functions may overlap those tested in the control room.

* Type Codes	Criteria for R /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/≥ 1/≥ 1 (control room system)
(L)ow-Power/Shutdown	≥ 1/≥ 1/≥ 1
(N)ew or (M)odified from bank including 1(A)	≥ 2/≥ 2/≥ 1
(P)revious 2 exams	≤ 3/≤ 3/≤ 2 (randomly selected)
(R)CA	≥ 1/≥ 1/≥ 1
(S)imulator	

Facility: JAF 17-1 NRC		Date of Exam: May 2018																
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 Evolutions	1	3	3	3				4	4			3	20	3		4		7
	2	1	2	1				1	1			1	7	1		2		3
	Tier Totals	4	5	4				5	5			4	27	4		6		10
2. Plant Systems	1	2	2	2	3	2	3	3	2	2	3	2	26	2		3		5
	2	1	0	2	1	1	2	1	1	1	1	1	12	0	2	1		3
	Tier Totals	3	2	4	4	3	5	4	3	3	4	3	38	4		4		8
3. Generic Knowledge & Abilities Categories		1			2			3			4		10	1	2	3	4	7
		2			3			2			3			1	2	2	2	

Note: 1. Ensure that at least two topics from every applicable K/A category are sampled within each tier of the RO and SRO-only outline sections (i.e., except for one category in Tier 3 of the SRO-only section, the "Tier Totals" in each K/A category shall not be less than two). (One Tier 3 radiation control K/A is allowed if it is replaced by a K/A from another Tier 3 category.)

2. The point total for each group and tier in the proposed outline must match that specified in the table. The final point total for each group and tier may deviate by ±1 from that specified in the table based on NRC revisions. The final RO exam must total 75 points, and the SRO-only exam must total 25 points.
3. Systems/evolutions within each group are identified on the outline. Systems or evolutions that do not apply at the facility should be deleted with justification. Operationally important, site-specific systems/evolutions that are not included on the outline should be added. Refer to Section D.1.b of ES-401 for guidance regarding the elimination of inappropriate K/A statements.
4. Select topics from as many systems and evolutions as possible. Sample every system or evolution in the group before selecting a second topic for any system or evolution.
5. Absent a plant-specific priority, only those K/As having an importance rating (IR) of 2.5 or higher. Use the RO and SRO ratings for the RO and SRO-only portions, respectively.
6. Select SRO topics for Tiers 1 and 2 from the shaded systems and K/A categories.
7. The generic (G) K/As in Tiers 1 and 2 shall be selected from Section 2 of the K/A catalog, but the topics must be relevant to the applicable evolution or system. Refer to Section D.1.b of ES-401 for the applicable K/As.
8. On the following pages, enter the K/A numbers, a brief description of each topic, the topics' IRs for the applicable license level, and the point totals (#) for each system and category. Enter the group and tier totals for each category in the table above. If fuel-handling equipment is sampled in a category other than Category A2 or G* on the SRO-only exam, enter it on the left side of Column A2 for Tier 2, Group 2. (Note 1 does not apply.) Use duplicate pages for RO and SRO-only exams.
9. For Tier 3, select topics from Section 2 of the K/A catalog, and enter the K/A numbers, descriptions, IRs, and point totals (#) on Form ES-401-3. Limit SRO selections to K/As that are linked to 10 CFR 55.43.

G* Generic K/As

* These systems/evolutions must be included as part of the sample (as applicable to the facility) when Revision 3 of the K/A catalog is used to develop the sample plan. They are not required to be included when using earlier revisions of the K/A catalog.

** These systems/evolutions may be eliminated from the sample (as applicable to the facility) when Revision 3 of the K/A catalog is used to develop the sample plan.

JAF 17-1 NRC
Written 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#
295028 High Drywell Temperature / 5					X		EA2.05 - Ability to determine and/or interpret the following as they apply to HIGH DRYWELL TEMPERATURE: Torus/suppression chamber pressure: Plant-Specific	3.8	76
295019 Partial or Complete Loss of Instrument Air / 8					X		AA2.01 - Ability to determine and/or interpret the following as they apply to PARTIAL OR COMPLETE LOSS OF INSTRUMENT AIR: Instrument air system pressure	3.6	77
295005 Main Turbine Generator Trip / 3					X		AA2.05 - Ability to determine and/or interpret the following as they apply to MAIN TURBINE GENERATOR TRIP: Reactor power	3.9	78
295038 High Off-site Release Rate / 9						X	2.4.41 - Emergency Procedures / Plan: Knowledge of the emergency action level thresholds and classifications.	4.6	79
295003 Partial or Complete Loss of AC Power / 6						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	80
295004 Partial or Complete Loss of DC Power / 6						X	2.2.36 – Equipment Control: Ability to analyze the effect of maintenance activities, such as degraded power sources, on the status of limiting conditions for operations.	4.2	81
295031 Reactor Low Water Level / 2						X	2.4.6 - Emergency Procedures / Plan: Knowledge of EOP mitigation strategies.	4.7	82
700000 Generator Voltage and Electric Grid Disturbances	X						AK1.03 - Knowledge of the operational implications of the following concepts as they apply to GENERATOR VOLTAGE AND ELECTRIC GRID DISTURBANCES: Under-excitation	3.3	39
295037 SCRAM Condition Present and Reactor Power Above APRM Downscale or Unknown / 1	X						EK1.06 - Knowledge of the operational implications of the following concepts as they apply to SCRAM CONDITION PRESENT AND REACTOR POWER ABOVE APRM DOWNSCALE OR UNKNOWN: Cooldown effects on reactor power	4.0	40
295028 High Drywell Temperature / 5	X						EK1.02 - Knowledge of the operational implications of the following concepts as they apply to HIGH DRYWELL TEMPERATURE: Equipment environmental qualification	2.9	41
295006 SCRAM / 1		X					AK2.03 - Knowledge of the interrelations between SCRAM and the following: CRD hydraulic system	3.7	42
295024 High Drywell Pressure / 5		X					EK2.15 - Knowledge of the interrelations between HIGH DRYWELL PRESSURE and the following: Containment spray logic: Plant-Specific	3.8	43
295038 High Off-site Release Rate / 9		X					EK2.06 - Knowledge of the interrelations between HIGH OFF-SITE RELEASE RATE and the following: Process liquid radiation monitoring system	3.4	44

JAF 17-1 NRC
Written 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#
295026 Suppression Pool High Water Temperature / 5			X				EK3.01 - Knowledge of the reasons for the following responses as they apply to SUPPRESSION POOL HIGH WATER TEMPERATURE: Emergency/normal depressurization	3.8	45
295001 Partial or Complete Loss of Forced Core Flow Circulation / 1 & 4			X				AK3.05 - Knowledge of the reasons for the following responses as they apply to PARTIAL OR COMPLETE LOSS OF FORCED CORE FLOW CIRCULATION: Reduced loop operating requirements: Plant-Specific	3.2	46
295030 Low Suppression Pool Water Level / 5			X				EK3.02 - Knowledge of the reasons for the following responses as they apply to LOW SUPPRESSION POOL WATER LEVEL: HPCI operation: Plant-Specific	3.5	47
295019 Partial or Complete Loss of Instrument Air / 8				X			AA1.03 - Ability to operate and/or monitor the following as they apply to PARTIAL OR COMPLETE LOSS OF INSTRUMENT AIR: Instrument air compressor power supplies	3.0	48
295018 Partial or Complete Loss of CCW / 8				X			AA1.03 - Ability to operate and/or monitor the following as they apply to PARTIAL OR COMPLETE LOSS OF COMPONENT COOLING WATER: Affected systems so as to isolate damaged portions	3.3	49
600000 Plant Fire On-site / 8				X			AA1.05 - Ability to operate and / or monitor the following as they apply to PLANT FIRE ON SITE: Plant and control room ventilation systems	3.0	50
295005 Main Turbine Generator Trip / 3					X		AA2.01 - Ability to determine and/or interpret the following as they apply to MAIN TURBINE GENERATOR TRIP: Turbine speed	2.6	51
295004 Partial or Complete Loss of DC Power / 6					X		AA2.04 - Ability to determine and/or interpret the following as they apply to PARTIAL OR COMPLETE LOSS OF D.C. POWER: System lineups	3.2	52
295003 Partial or Complete Loss of AC Power / 6					X		AA2.02 - Ability to determine and/or interpret the following as they apply to PARTIAL OR COMPLETE LOSS OF A.C. POWER: Reactor power, pressure, and level	4.2	53
295016 Control Room Abandonment / 7						X	2.1.23 – Conduct of Operations: Ability to perform specific system and integrated plant procedures during all modes of plant operation.	4.3	54
295021 Loss of Shutdown Cooling / 4						X	2.2.37 - Equipment Control: Ability to determine operability and / or availability of safety related equipment.	3.6	55
295023 Refueling Accidents / 8						X	2.2.22 - Equipment Control: Knowledge of limiting conditions for operations and safety limits.	4.0	56
295025 High Reactor Pressure / 3				X			EA1.02 - Ability to operate and/or monitor the following as they apply to HIGH REACTOR PRESSURE: Reactor/turbine pressure regulating system	3.8	57
295031 Reactor Low Water Level / 2					X		EA2.02 - Ability to determine and/or interpret the following as they apply to REACTOR LOW WATER LEVEL:	4.0	58

JAF 17-1 NRC
Written 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#
							Reactor power		
K/A Category Totals:	3	3	3	4	4/3	3/4	Group Point Total:		20/7

JAF 17-1 NRC
Written 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#
295015 Incomplete SCRAM / 1					X		AA2.02 - Ability to determine and/or interpret the following as they apply to INCOMPLETE SCRAM: Control rod position	4.2	83
295034 Secondary Containment Ventilation High Radiation / 9						X	2.2.25 - Equipment Control: Knowledge of bases in technical specifications for limiting conditions for operations and safety limits.	4.2	84
295032 High Secondary Containment Area Temperature / 5						X	2.4.2 - Emergency Procedures / Plan: Knowledge of system set points, interlocks and automatic actions associated with EOP entry conditions.	4.6	85
295013 High Suppression Pool Temperature / 5	X						AK1.03 - Knowledge of the operational implications of the following concepts as they apply to HIGH SUPPRESSION POOL TEMPERATURE: Localized heating	3.0	59
295015 Incomplete SCRAM / 1		X					AK2.05 - Knowledge of the interrelations between INCOMPLETE SCRAM and the following: Rod worth minimizer: Plant-Specific	2.6	60
295007 High Reactor Pressure / 3			X				AK3.02 - Knowledge of the reasons for the following responses as they apply to HIGH REACTOR PRESSURE: HPCI operation: Plant-Specific	3.7	61
295022 Loss of CRD Pumps / 1				X			AA1.03 - Ability to operate and/or monitor the following as they apply to LOSS OF CRD PUMPS: Recirculation system: Plant-Specific	2.7	62
295020 Inadvertent Containment Isolation / 5 & 7					X		AA2.04 - Ability to determine and/or interpret the following as they apply to INADVERTENT CONTAINMENT ISOLATION: Reactor pressure	3.9	63
295012 High Drywell Temperature / 5						X	2.4.1 - Emergency Procedures / Plan: Knowledge of EOP entry conditions and immediate action steps.	4.6	64
295014 Inadvertent Reactivity Addition / 1		X					AK2.06 - Knowledge of the interrelations between INADVERTENT REACTIVITY ADDITION and the following: Moderator temperature	3.4	65
K/A Category Totals:	1	2	1	1	1/1	1/2	Group Point Total:		7/3

JAF 17-1 NRC
Written Examination Outline
Plant Systems – Tier 2 Group 1

System # / Name	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A2	A 3	A 4	G		Imp.	Q#
259002 Reactor Water Level Control								X				A2.03 - Ability to (a) predict the impacts of the following on the REACTOR WATER LEVEL CONTROL SYSTEM; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: Loss of reactor water level input	3.7	86
218000 ADS								X				A2.05 - Ability to (a) predict the impacts of the following on the AUTOMATIC DEPRESSURIZATION SYSTEM; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: Loss of A.C. or D.C. power to ADS valves	3.6	87
400000 Component Cooling Water											X	2.1.25 - Conduct of Operations: Ability to interpret reference materials, such as graphs, curves, tables, etc.	4.2	88
262001 AC Electrical Distribution											X	2.2.37 - Equipment Control: Ability to determine operability and/or availability of safety related equipment.	4.6	89
203000 RHR/LPCI: Injection Mode											X	2.2.40 - Equipment Control: Ability to apply technical specifications for a system.	4.7	90
259002 Reactor Water Level Control	X											K1.05 - Knowledge of the physical connections and/or cause-effect relationships between REACTOR WATER LEVEL CONTROL SYSTEM and the following: Reactor feedwater system	3.6	1
215003 IRM	X											K1.02 - Knowledge of the physical connections and/or cause-effect relationships between INTERMEDIATE RANGE MONITOR (IRM) SYSTEM and the following: Reactor manual control	3.6	2
218000 ADS										X		A4.01 - Ability to manually operate and/or monitor in the control room: ADS valves	4.4	3
263000 DC Electrical Distribution		X										K2.01 - Knowledge of electrical power supplies to the following: Major D.C. loads	3.1	4
264000 EDGs			X									K3.02 - Knowledge of the effect that a loss or malfunction of the EMERGENCY GENERATORS (DIESEL/JET) will have on following: A.C. electrical distribution	3.9	5

JAF 17-1 NRC
Written Examination Outline
Plant Systems – Tier 2 Group 1

System # / Name	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A2	A 3	A 4	G		Imp.	Q#
215004 Source Range Monitor			X									K3.01 - Knowledge of the effect that a loss or malfunction of the SOURCE RANGE MONITOR (SRM) SYSTEM will have on following: RPS	3.4	6
400000 Component Cooling Water				X								K4.01 - Knowledge of CCWS design feature(s) and or interlocks which provide for the following: Automatic start of standby pump	3.4	7
215005 APRM / LPRM				X								K4.02 - Knowledge of AVERAGE POWER RANGE MONITOR/LOCAL POWER RANGE MONITOR SYSTEM design feature(s) and/or interlocks which provide for the following: Reactor SCRAM signals	4.1	8
211000 SLC					X							K5.04 - Knowledge of the operational implications of the following concepts as they apply to STANDBY LIQUID CONTROL SYSTEM: Explosive valve operation	3.1	9
300000 Instrument Air					X							K5.13 - Knowledge of the operational implications of the following concepts as they apply to the INSTRUMENT AIR SYSTEM: Filters	2.9	10
262002 UPS (AC/DC)						X						K6.01 - Knowledge of the effect that a loss or malfunction of the following will have on the UNINTERRUPTABLE POWER SUPPLY (A.C./D.C.): A.C. electrical power	2.7	11
217000 RCIC						X						K6.03 - Knowledge of the effect that a loss or malfunction of the following will have on the REACTOR CORE ISOLATION COOLING SYSTEM (RCIC): Suppression pool water supply	3.5	12
206000 HPCI							X					A1.05 - Ability to predict and/or monitor changes in parameters associated with operating the HIGH PRESSURE COOLANT INJECTION SYSTEM controls including: Suppression pool temperature: BWR-2,3,4	4.1	13
205000 Shutdown Cooling							X					A1.02 - Ability to predict and/or monitor changes in parameters associated with operating the SHUTDOWN COOLING SYSTEM (RHR SHUTDOWN COOLING MODE) controls including: SDC/RHR pump flow	3.3	14

JAF 17-1 NRC
Written Examination Outline
Plant Systems – Tier 2 Group 1

System # / Name	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A2	A 3	A 4	G		Imp.	Q#
262001 AC Electrical Distribution								X				A2.01 - Ability to (a) predict the impacts of the following on the A.C. ELECTRICAL DISTRIBUTION; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: Turbine/generator trip	3.4	15
203000 RHR/LPCI: Injection Mode								X				A2.04 - Ability to (a) predict the impacts of the following on the RHR/LPCI: INJECTION MODE (PLANT SPECIFIC); and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: A.C. failures	3.5	16
212000 RPS									X			A3.08 - Ability to monitor automatic operations of the REACTOR PROTECTION SYSTEM including: Recirculation pump trip	3.7	17
209001 LPCS									X			A3.01 - Ability to monitor automatic operations of the LOW PRESSURE CORE SPRAY SYSTEM including: Valve operation	3.6	18
261000 SGTS										X		A4.03 - Ability to manually operate and/or monitor in the control room: Fan	3.0	19
223002 PCIS/Nuclear Steam Supply Shutoff										X		A4.05 - Ability to manually operate and/or monitor in the control room: SPDS/ERIS/CRIDS/GDS: Plant-Specific	2.5	20
239002 SRVs											X	2.4.18 - Emergency Procedures / Plan: Knowledge of the specific bases for EOPs.	3.3	21
259002 Reactor Water Level Control											X	2.1.7 - Conduct of Operations: Ability to evaluate plant performance and make operational judgements based on operating characteristics, reactor behavior, and instrument interpretation.	4.4	22
300000 Instrument Air				X								K4.01 - Knowledge of INSTRUMENT AIR SYSTEM design feature(s) and or interlocks which provide for the following: Manual/automatic transfers of control	2.8	23
262001 AC Electrical Distribution						X						K6.02 - Knowledge of the effect that a loss or malfunction of the following will have on the A.C. ELECTRICAL DISTRIBUTION: Off-site power	3.6	24

JAF 17-1 NRC
Written Examination Outline
Plant Systems – Tier 2 Group 1

System # / Name	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A2	A 3	A 4	G		Imp.	Q#
263000 DC Electrical Distribution							X					A1.01 - Ability to predict and/or monitor changes in parameters associated with operating the D.C. ELECTRICAL DISTRIBUTION controls including: Battery charging/discharging rate	2.5	25
215003 IRM		X										K2.01 - Knowledge of electrical power supplies to the following: IRM channels/detectors	2.5	26
K/A Category Totals:	2	2	2	3	2	3	3	2/2	2	3	2/3	Group Point Total:	26/5	

JAF 17-1 NRC
Written Examination Outline
Plant Systems – Tier 2 Group 2

System # / Name	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A2	A 3	A 4	G		Imp.	Q #
201006 RWM								X				A2.01 - Ability to (a) predict the impacts of the following on the ROD WORTH MINIMIZER SYSTEM (RWM) (PLANT SPECIFIC); and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: Power supply loss: P-Spec(Not-BWR6)	2.8	91
272000 Radiation Monitoring System											X	2.4.45 - Emergency Procedures / Plan: Ability to prioritize and interpret the significance of each annunciator or alarm.	4.3	92
286000 Fire Protection System								X				A2.03 - Ability to (a) predict the impacts of the following on the FIRE PROTECTION SYSTEM; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: A.C. distribution failure: Plant-Specific	3.0	93
201001 Control Rod Drive Hydraulic System	X											K1.06 - Knowledge of the physical connections and/or cause-effect relationships between CONTROL ROD DRIVE HYDRAULIC SYSTEM and the following: Component cooling water systems: Plant-Specific	2.8	27
202002 Recirculation Flow Control						X						K6.04 - Knowledge of the effect that a loss or malfunction of the following will have on the RECIRCULATION FLOW CONTROL SYSTEM: Feedwater flow inputs: BWR-3,4,5,6.	3.5	28
290003 Control Room HVAC			X									K3.03 - Knowledge of the effect that a loss or malfunction of the CONTROL ROOM HVAC will have on following: Control room temperature	2.9	29
241000 Reactor/Turbine Pressure Regulator				X								K4.03 - Knowledge of REACTOR/TURBINE PRESSURE REGULATING SYSTEM design feature(s) and/or interlocks which provide for the following: Turbine speed control	3.0	30
234000 Fuel Handling Equipment					X							K5.01 - Knowledge of the operational implications of the following concepts as they apply to FUEL HANDLING EQUIPMENT: Crane/hoist operation	2.9	31

JAF 17-1 NRC
Written Examination Outline
Plant Systems – Tier 2 Group 2

System # / Name	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A2	A 3	A 4	G		Imp.	Q #
290001 Secondary Containment						X						K6.01 - Knowledge of the effect that a loss or malfunction of the following will have on the SECONDARY CONTAINMENT: Reactor building ventilation: Plant-Specific	3.5	32
259001 Reactor Feedwater							X					A1.06 - Ability to predict and/or monitor changes in parameters associated with operating the REACTOR FEEDWATER SYSTEM controls including: Feedwater heater level	2.7	33
268000 Radwaste								X				A2.01 - Ability to (a) predict the impacts of the following on the RADWASTE; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: System rupture	2.9	34
215002 RBM									X			A3.03 - Ability to monitor automatic operations of the ROD BLOCK MONITOR SYSTEM including: Alarm and indicating lights: BWR-3,4,5	3.1	35
256000 Reactor Condensate										X		A4.01 - Ability to manually operate and/or monitor in the control room: Hotwell condensate / condensate booster pumps	3.3	36
239001 Main and Reheat Steam											X	2.4.4 - Emergency Procedures / Plan: Ability to recognize abnormal indications for system operating parameters which are entry-level conditions for emergency and abnormal operating procedures.	4.5	37
216000 Nuclear Boiler Instrumentation			X									K3.24 - Knowledge of the effect that a loss or malfunction of the NUCLEAR BOILER INSTRUMENATION will have on following: Vessel level monitoring	3.9	38
K/A Category Totals:	1	0	2	1	1	2	1	1/2	1	1	1/1	Group Point Total:		12/3

Facility:	JAF 17-1 NRC	Date:	May 2018			
Category	K/A #	Topic	RO		SRO-Only	
			IR	Q#	IR	Q#
1. Conduct of Operations	2.1.39	Knowledge of conservative decision making practices.			4.3	94
	2.1.1	Knowledge of conduct of operations requirements.	3.8	66		
	2.1.30	Ability to locate and operate components, including local controls.	4.4	67		
	Subtotal			2		1
2. Equipment Control	2.2.6	Knowledge of the process for making changes to procedures.			3.6	95
	2.2.42	Ability to recognize system parameters that are entry-level conditions for Technical Specifications.			4.6	100
	2.2.38	Knowledge of conditions and limitations in the facility license.	3.6	68		
	2.2.21	Knowledge of pre- and post-maintenance operability requirements.	2.9	69		
	2.2.13	Knowledge of tagging and clearance procedures.	4.1	75		
	Subtotal			3		2
3. Radiation Control	2.3.14	Knowledge of radiation or containment hazards that may arise during normal, abnormal, or emergency conditions or activities.			3.8	96
	2.3.11	Ability to control radiation releases.			4.3	98
	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		
	2.3.7	Ability to comply with radiation work permit requirements during normal or abnormal conditions.	3.5	71		

	Subtotal			2		2
4. Emergency Procedures / Plan	2.4.16	Knowledge of EOP implementation hierarchy and coordination with other support procedures or guidelines such as, operating procedures, AOPs and SAMGs.			4.4	97
	2.4.42	Knowledge of emergency response facilities.			3.8	99
	2.4.26	Knowledge of facility protection requirements, including fire brigade and portable fire fighting equipment usage.	3.1	72		
	2.4.14	Knowledge of general guidelines for EOP usage.	3.8	73		
	2.4.3	Ability to identify post-accident instrumentation.	3.7	74		
	Subtotal			3		2
Tier 3 Point Total				10		7

Tier / Group	Randomly Selected K/A	Reason for Rejection
The following topics / K/As were excluded from the systematic and random sampling process:		
1 / 1	295027 High Containment Temperature	This topic applies to plants with Mark III containments only. The facility has a Mark I containment.
1 / 2	295011 High Containment Temperature	This topic applies to plants with Mark III containments only. The facility has a Mark I containment.
2 / 1	207000 Isolation (Emergency) Condenser	This system is not installed at the facility.
2 / 1	209002 HPCS	This system is not installed at the facility.
2 / 2	201004 RSCS	This system is no longer installed at the facility.
2 / 2	201005 RCIS	This system is not installed at the facility.
G	2.2.3 Knowledge of the design, procedural, and operational differences between units.	This K/A applies to multi-unit facilities only.
G	2.2.4 Ability to explain the variations in control board/control room layouts, systems, instrumentation, and procedural actions between units at a facility.	This K/A applies to multi-unit facilities only.

The following K/As were rejected following the systematic and random sampling process:		
2 / 1	Question 2 215003 IRM K1.05 - Knowledge of the physical connections and/or cause-effect relationships between INTERMEDIATE RANGE MONITOR (IRM) SYSTEM and the following: Display control system: Plant-Specific	The facility does not have a "display control system". Randomly resampled K/A 215003 IRM K1.02 - Knowledge of the physical connections and/or cause-effect relationships between INTERMEDIATE RANGE MONITOR (IRM) SYSTEM and the following: Reactor manual control.
2 / 1	Question 3 218000 ADS K2.01 - Knowledge of electrical power supplies to the following: ADS logic	The randomly sampled K/A overlaps with the K/A for Question 87 (valve and logic power are the same). Randomly resampled K/A 218000 ADS A4.01 - Ability to manually operate and/or monitor in the control room: ADS valves.
2 / 2	Question 27 201006 RWM K1.06 - Knowledge of the physical connections and/or cause-effect relationships between ROD WORTH MINIMIZER SYSTEM (RWM) (PLANT SPECIFIC) and the following: Rod sequence control system: P-Spec(Not-BWR6)	The facility no longer has RSCS installed. Additionally, the randomly sampled system is also used in Question 91. Resampling system for better balance of coverage. Randomly resampled K/A 201001 Control Rod Drive Hydraulic System K1.06 - Knowledge of the physical connections and/or cause-effect relationships between CONTROL ROD DRIVE HYDRAULIC SYSTEM and the following: Component cooling water systems: Plant-Specific.
2 / 2	Question 28 202002 Recirculation Flow Control K2.01 - Knowledge of electrical power supplies to the following: Hydraulic power unit: Plant-Specific	The facility does not have hydraulic power units. Randomly resampled K/A 202002 Recirculation Flow Control K5.02 - Knowledge of the operational implications of the following concepts as they apply to RECIRCULATION FLOW CONTROL SYSTEM: Feedback signals.

2 / 2	Question 35 215002 RBM A3.01 - Ability to monitor automatic operations of the ROD BLOCK MONITOR SYSTEM including: Four rod display: BWR-3,4,5	The relationship between the RBM and the four rod display is too limited to develop an acceptable question. Randomly resampled K/A 215002 RBM A3.03 - Ability to monitor automatic operations of the ROD BLOCK MONITOR SYSTEM including: Alarm and indicating lights: BWR-3,4,5.
2 / 2	Question 36 256000 Reactor Condensate A4.12 - Ability to manually operate and/or monitor in the control room: Feedwater heater level: Plant-Specific	A question could not be developed for the randomly sampled K/A without overlapping Question 33. Randomly resampled K/A 256000 Reactor Condensate A4.01 - Ability to manually operate and/or monitor in the control room: Hotwell condensate / condensate booster pumps.
1 / 1	Question 47 295030 Low Suppression Pool Water Level EK3.05 - Knowledge of the reasons for the following responses as they apply to LOW SUPPRESSION POOL WATER LEVEL: Suppression pool make-up operation: Mark-III	The facility does not have a Mark-III containment. Randomly resampled K/A 295030 Low Suppression Pool Water Level EK3.02 - Knowledge of the reasons for the following responses as they apply to LOW SUPPRESSION POOL WATER LEVEL: HPCI operation: Plant-Specific.
1 / 1	Question 54 295016 Control Room Abandonment 2.4.31 - Knowledge of annunciator alarms, indications, or response procedures.	An operationally relevant question could not be developed for the randomly sampled generic K/A due to lack of alarms related to Control Room Abandonment. Randomly resampled K/A 295016 Control Room Abandonment 2.1.23 - Ability to perform specific system and integrated plant procedures during all modes of plant operation.

1 / 1	Question 57 295025 High Reactor Pressure EA1.08 - Ability to operate and/or monitor the following as they apply to HIGH REACTOR PRESSURE: RRCS: Plant-Specific	The facility does not have RRCS. Randomly resampled K/A 295025 High Reactor Pressure EA1.02 - Ability to operate and/or monitor the following as they apply to HIGH REACTOR PRESSURE: Reactor/turbine pressure regulating system.
1 / 2	Question 64 295012 High Drywell Temperature 2.4.11 - Knowledge of abnormal condition procedures.	The randomly sampled generic K/A no longer allowed in Tiers 1 and 2 with NUREG 1021 rev 11. Randomly resampled K/A 295012 High Drywell Temperature 2.4.1 - Knowledge of EOP entry conditions and immediate action steps.
3	Question 66 2.1.21 - Ability to verify the controlled procedure copy.	The randomly sampled K/A is better tested on the operating exam. Randomly resampled K/A 2.1.1 - Knowledge of conduct of operations requirements.
3	Question 75 2.2.37 - Ability to determine operability and / or availability of safety related equipment.	The randomly sampled K/A is also sampled in Question 55. Randomly resampled K/A 2.2.13 - Knowledge of tagging and clearance procedures.
1 / 1	Question 79 295038 High Off-site Release Rate 2.4.3 - Ability to identify post-accident instrumentation.	The randomly sampled K/A is also sampled in Question 74. Randomly resampled K/A 295038 High Off-site Release Rate 2.4.41 - Knowledge of the emergency action level thresholds and classifications.
1 / 1	Question 81 295004 Partial or Complete Loss of DC Power 2.4.1 - Knowledge of EOP entry conditions and immediate action steps.	An acceptable question could not be developed for the randomly sampled K/A at the SRO level. Randomly resampled K/A 295004 Partial or Complete Loss of DC Power 2.2.36 - Ability to analyze the effect of maintenance activities, such as degraded power sources, on the status of limiting conditions for operations.

1 / 1	Question 82 295031 Reactor Low Water Level 2.2.39 - Knowledge of less than one hour technical specification action statements for systems.	An acceptable question could not be developed for the randomly sampled K/A at the SRO level. Randomly resampled K/A 295031 Reactor Low Water Level 2.4.6 - Knowledge of EOP mitigation strategies.
2 / 1	Question 89 262001 AC Electrical Distribution 2.1.7 - Ability to evaluate plant performance and make operational judgements based on operating characteristics, reactor behavior, and instrument interpretation.	The randomly sampled K/A is also sampled in Question 22 and does not fit well with this system. Randomly resampled K/A 262001 AC Electrical Distribution 2.2.37 - Ability to determine operability and/or availability of safety related equipment.
2 / 2	Question 92 Control Room HVAC Ability to prioritize and interpret the significance of each annunciator or alarm.	The randomly sampled system is also used in Question 29. Resampling system for better balance of coverage. Randomly resampled K/A 272000 Radiation Monitoring System 2.4.45 - Ability to prioritize and interpret the significance of each annunciator or alarm.
2 / 2	Question 93 268000 Radwaste A2.02 - Ability to (a) predict the impacts of the following on the RADWASTE; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: High turbidity water	An operationally relevant question could not be developed at the appropriate license level for the randomly sampled K/A due to lack of references for high turbidity water. Additionally, the randomly sampled system is also used in Question 34. Resampling system for better balance of coverage. Randomly resampled K/A 286000 Fire Protection System A2.03 - Ability to (a) predict the impacts of the following on the FIRE PROTECTION SYSTEM; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those abnormal conditions or operations: A.C. distribution failure: Plant-Specific.

3	Question 99 2.4.1 - Knowledge of EOP entry conditions and immediate action steps.	An acceptable question could not be developed for the randomly sampled K/A at the SRO level. Randomly resampled K/A 2.4.42 - Knowledge of emergency response facilities.
2 / 2	Question 28 202002 Recirculation Flow Control K5.02 - Knowledge of the operational implications of the following concepts as they apply to RECIRCULATION FLOW CONTROL SYSTEM: Feedback signals	An acceptable question could not be developed for the randomly sampled K/A due to modification of the Recirculation Flow Control system that eliminated speed feedback signal. Randomly resampled K/A 202002 Recirculation Flow Control K6.04 - Knowledge of the effect that a loss or malfunction of the following will have on the RECIRCULATION FLOW CONTROL SYSTEM: Feedwater flow inputs: BWR-3,4,5,6.

Appendix D	Scenario Outline	Form ES-D-1

Facility: **James A. Fitzpatrick** Scenario No.: **NRC-1** Op-Test No.: **17-1**

Examiners: _____ Operators: _____
_____ _____
_____ _____

Initial Conditions: The plant is operating at approximately 75% power. SRV A is inoperable. Circulating Water pump A operation is degraded.

Turnover: Lower Reactor power to approximately 65% using Recirc and control rods per the provided RMI. Then, secure Circulating Water pump A per OP-4 section F. The procedure is in progress up to step F.2.1.

Event No.	Malf. No.	Event Type*	Event Description
1	N/A	R – ATC, SRO	Lower Reactor Power with Recirculation Flow and Control Rods OP-26, OP-27
2	NM14:A	I – ATC, SRO	APRM Fails As-Is ARP 09-5-2-2(44), OP-16
3	N/A	N – BOP, SRO	Secure Circulating Water Pump A OP-4
4	PC05:J	I – ATC, SRO	Drywell Pressure Transmitter Fails High, then Low ARP 09-5-1-3(21), Technical Specifications
5	HP05	I – BOP, SRO	HPCI Inadvertently Initiates, Trip Pushbutton Fails to Work AOP-77, AOP-32, Technical Specifications
6	MC01	C – All	Loss of Main Condenser Vacuum AOP-31, AOP-1
7	RP01AB RP01BB RP09	M – All	Failure of RPS and ARI to Actuate EOP-2, EOP-3
8	SL01 RR13	C – ATC, SRO	First SLC Pump Delayed Trip; Recirculation Pumps Fail to Automatically Trip EOP-3
9	EG01 TC04	C – BOP, SRO	Main Generator Trip, Two Turbine Bypass Valves Fail Closed EOP-3

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

Appendix D	**Scenario Outline**	**Form ES-D-1**

Facility: **James A. Fitzpatrick**	Scenario No.: **NRC-1**	Op-Test No.: **17-1**
1. Malfunctions after EOP entry (1-2) **Events 8, 9**	2	
2. Abnormal events (2-4) **Events 5, 6**	2	
3. Major transients (1-2) **Event 7**	1	
4. EOPs entered/requiring substantive actions (1-2) **EOP-2**	1	
5. Entry into a contingency EOP with substantive actions (≥1 per scenario set) **EOP-3**	1	
6. Pre-identified critical tasks (≥2)	2	
CRITICAL TASK DESCRIPTIONS: **CT-1: Given a failure to scram with Reactor power above 2.5%, the crew will lower Reactor power by one or more of the following methods, in accordance with EOP-3:** • **Terminating and preventing all RPV injection except SLC, RCIC, and CRD** • **Tripping Recirculation pumps** • **Injecting boron** **CT-2: Given a failure to scram, the crew will initiate Control Rod insertion, in accordance with EOP-3.**		

The scenario will begin with the plant operating at approximately 75% power. SRV A is inoperable and Circulating Water pump A operation is degraded. The crew will begin by lowering power with recirculation flow and then control rods to approximately 65%. During the power reduction, it will become evident that APRM A has failed as-is. The crew will bypass APRM A per OP-16. Once the power reduction is complete, the crew will secure Circulating Water pump A per OP-4.

Drywell pressure transmitter 05PT-12A will fail momentarily high, then low. This will cause a half scram on RPS A. The crew will reset the half scram. The SRO will determine the Technical Specification impact.

HPCI will inadvertently initiate. The crew will take action to trip HPCI per AOP-77. The first method (pushbutton) will fail, so the crew will take alternate actions to trip HPCI. The SRO will determine the Technical Specification impact of the resulting HPCI inoperability.

Elevated Main Condenser air in-leakage will occur. Main Condenser vacuum will degrade. The crew will enter AOP-31 and eventually insert a manual Reactor scram.

RPS B will fail to process the scram and ARI will also fail to insert control rods. The crew will enter EOP-2 and EOP-3. The ATWS system will fail to automatically trip the Recirculation pumps when required. The crew will lower Recirculation flow to minimum and then trip the Recirculation pumps. The crew will terminate and prevent injection except CRD, SLC, and RCIC. The crew will inject boron using SLC. The first pump started will trip after a time delay. The second pump started will operate properly. The Main Turbine will be available until power lowers to approximately 40%, when a spurious turbine trip occurs. As power lowers, two Turbine Bypass Valves will fail closed, challenging Reactor pressure control and Primary Containment control. The crew will be able to manually insert control rods. Either pulling RPS fuses or venting the scram air header will result in all rods inserting.

The scenario will be terminated when control rods are being inserted or are all inserted and Reactor water level is controlled above 0”.

JAMES A. FITZPATRICK NUCLEAR POWER PLANT

LOI 17-1 NRC EXAMINATION SCENARIO 1

TITLE: **LOI 17-1 NRC EXAMINATION SCENARIO 1**

SCENARIO NUMBER: **NRC 1**

PATH: **STAND ALONE**

Validation: _____ Training: _____ Operations: _____

	CANDIDATES
CRS	
ATC	
BOP	

RECORD OF CHANGES

DATE	SOURCE OF CHANGE	BRIEF DESCRIPTION OF CHANGE	INITIATOR	REVIEWED
10/25/17	New	New Scenario	T. Hooper	D. Kelly

A. TITLE: LOI 17-1 NRC EXAMINATION SCENARIO 1

B. SCENARIO SETUP:

1. IC-151

2. Special Instructions:

   a. The Plant is operating at approximately 75% power.
   b. SRV 'A' is inoperable (yellow tag on SRV 'A' switch).
   c. Have OP-65 marked up for power reduction.
   d. Have OP-4 marked up to step F.2.1.
   e. Ensure the "1802" CRC book is in the simulator.

3. Preset Conditions:

   a. Preset, M:NM14:A, APRM channel A failure, Final=(similar to other APRMs at start)
   b. Preset, M:AD07:A, Rx press relieve vlv(2E-RV2-71A) failed closed
   c. TRIGGER 1, M:PC05:J, Drywell pressure xmtr 05PT-12A failure, Final =10
   d. TRIGGER 2, M:HP05, HPCI inadvertent initiation
   e. TRIGGER 3, M:MC01, Main Condenser air in leakage, Initial=25, Final=40, Ramp=8:00
   f. Preset, M:RP01AB, RPS Automatic Scram Failure B Side Only
   g. Preset, M:RP01BB, RPS Manual Scram Failure B Side Only
   h. Preset, M:RP09, ARI Fails to Actuate
   i. TRIGGER 16, M:SL01:A, Standby Liquid Control pump A trip, Delay=30
   j. TRIGGER 17, M:SL01:B, Standby Liquid Control pump B trip, Delay=30
   k. Preset, M:RR13:A, ATWS System Fails to Initiate
   l. Preset, M:RR13:B, ATWS System Fails to Initiate
   m. TRIGGER 4, M:EG01, Main Generator Trip
   n. TRIGGER 5, M:TC04:A Turbine Bypass Valve Failure, 0%
   o. TRIGGER 5, M:TC04:B Turbine Bypass Valve Failure, 0%
   p. TRIGGER 20, R:IA07, Scram Air Hdr Man Iso Vlv, CLOSE
   q. TRIGGER 20, M:IA01, Loss of Air Pressure to Scram Air Header, 100%, Ramp=30 seconds
   r. TRIGGER 19, R:RH40:A, Relay 10A-K45A Timer Grayboot, REMOVED
   s. TRIGGER 19, R:RH40:B, Relay 10A-K45B Timer Grayboot, REMOVED
   t. Preset, O:AD ZLO217A(1), SRV A green light, Final=OFF
   u. Preset, O:HP ZDI23AS19, HPCI turbine trip pushbutton, Final=NORMAL
   v. Event Trigger 1, Event: None, Command: mmf pc05:j (0 3) 0
   w. Event Trigger 4, Event: ycx07nmaprmaf<42, Command: None
   x. Event Trigger 5, Event: ycx07nmaprmaf<24, Command: None
   y. Event Trigger 16, Event: zdi11s1(2)==1, Command: dmf sl01:b
   z. Event Trigger 17, Event: zdi11s1(1)==1, Command: dmf sl01:a
   aa. Event Trigger 30, Event: zdi5as1(1)==1, Command: imf mc01 18

4. Consumable Forms and Procedures:
   - ♦ AOP-1, AOP-31, AOP-32, AOP-77

C. SCENARIO SUMMARY:

The scenario will begin with the plant operating at approximately 75% power. SRV A is inoperable and Circulating Water pump A operation is degraded. The crew will begin by lowering power with recirculation flow and control rods to 63-65%. During the power reduction, it will become evident that APRM A has failed as-is. The crew will bypass APRM A per OP-16. Once the power reduction is complete, the crew will secure Circulating Water pump A per OP-4.

Drywell pressure transmitter 05PT-12A will fail momentarily high, then low. This will cause a half scram on RPS A. The crew will reset the half scram. The SRO will determine the Technical Specification impact.

HPCI will inadvertently initiate. The crew will take action to trip HPCI per AOP-77. The first method (pushbutton) will fail, so the crew will take alternate actions to trip HPCI. The SRO will determine the Technical Specification impact of the resulting HPCI inoperability.

Elevated Main Condenser air in-leakage will occur. Main Condenser vacuum will degrade. The crew will enter AOP-31 and eventually insert a manual Reactor scram.

RPS B will fail to process the scram and ARI will also fail to insert control rods. The crew will enter EOP-2 and EOP-3. The ATWS system will fail to automatically trip the Recirculation pumps when required. The crew will lower Recirculation flow to minimum and then trip the Recirculation pumps. The crew will terminate and prevent injection except CRD, SLC, and RCIC. The crew will inject boron using SLC. The first pump started will trip after a time delay. The second pump started will operate properly. The Main Turbine will be available until power lowers to approximately 40%, when a spurious turbine trip occurs. As power lowers, two Turbine Bypass Valves will fail closed, challenging Reactor pressure control and Primary Containment control. The crew will be able to manually insert control rods. Either pulling RPS fuses or venting the scram air header will result in all rods inserting.

The scenario will be terminated when control rods are being inserted or are all inserted and Reactor water level is controlled above 0”.

Shift Turnover

The Plant is operating at approximately 75% power.

SRV A is inoperable due to a circuit failure.

Circulating Water pump A operation is degraded due to excessive seal leakage.

When you take the shift:

1. Lower Reactor power to 63-65% using Recirc and control rods per the provided RMI.
2. Then, secure Circulating Water pump A per OP-4 section F. The procedure is in progress up to step F.2.1.

    - Waste Sample Tank discharge to the canal is NOT in progress.
    - Chlorine pump stroke setting has been reduced to the value appropriate for 2 circulating water pumps, per Attachment 3 of OP 7A.
    - Chlorination of condenser waterboxes is secured per OP 7A.

Critical Tasks/Standards
Critical Task #1: Given a failure to scram with Reactor power above 2.5%, the crew will lower Reactor power by one or more of the following methods, in accordance with EOP-3: • Terminating and preventing all RPV injection except SLC, RCIC, and CRD • Tripping Recirculation pumps • Injecting boron
Critical Task #2: Given a failure to scram, the crew will initiate Control Rod insertion, in accordance with EOP-3.

EVENT NO.	EVENT SEQUENCE	
1.	Lower Reactor Power with Recirculation Flow and Control Rods	(Reactivity: ATC, SRO)
2.	APRM Fails As-Is	(Instrument: ATC, SRO)
3.	Secure Circulating Water Pump A	(Normal: BOP, SRO)
4.	Drywell Pressure Transmitter Fails High, then Low	(Instrument: ATC, SRO)
5.	HPCI Inadvertently Initiates, Trip Pushbutton Fails to Work	(Instrument: BOP, SRO)
6.	Loss of Main Condenser Vacuum	(Component: All)
7.	Failure of RPS and ARI to Actuate	(Major: All)
8.	First SLC Pump Trips, Recirculation Pumps Fail to Automatically Trip	(Component: ATC, SRO)
9	Main Generator Trip and Two Turbine Bypass Valves Fails Closed	(Component: BOP, SRO)

D. TERMINATION CUES:

- Control rods are being inserted or are all inserted.
- Reactor water level is being controlled above 0".

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS / EVALUATION
Simulator in RUN Recorder and Alarm Power ON Simulator Checklist Complete			
Provide Turnover (Attach. 1)			
After the shift turnover, allow no more than five minutes for panel walkdown	All	• Walkdown the control panels and assume the watch	
Event 1 Lower Reactor Power with Recirculation Flow and Control Rods	SRO	• Direct Reactor power lowered to 63-65% per RMI • Provide oversight for reactivity manipulation	SAT / UNSAT / NA
Note: The next event will be self-revealing during the power reduction.	ATC	• Lower Recirculation flow alternately with RWR MG A(B) SPEED CNTRL to obtain 43-45 Mlbm/hr • Insert control rods in the second CRAM group • Monitor APRMs, CTP, Recirc flow, Reactor water level	SAT / UNSAT / NA
Note: The second CRAM group contains the following control rods: • 26-43 • 42-23 • 26-11 • 18-39	BOP	• Assist ATC with peer checks and plant monitoring	SAT / UNSAT / NA

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS / EVALUATION
Event 2 APRM Fails As-Is	ATC	• Recognize / report APRM A is not lowering during the power reduction • Recognize / report annunciators 09-5-2-2, Rod Withdrawal Block, and 09-5-2-44, APRM Upscale, if power is lowered enough prior to bypassing APRM A	SAT / UNSAT / NA
	SRO	• Acknowledge report • Direct execution of ARPs (if annunciators received) • Determine Technical Specification Table 3.3.1.1-1 Functions 2b, c, and d are met with APRM A out of service • Determine TRM Table T3.3.B-1 Functions 1a, b, and c are met with APRM A out of service • Directs bypassing APRM A per OP-16	SAT / UNSAT / NA
	ATC	• Bypass APRM A per OP-16 Section E.16: o Place APRM BYP switch in A o Verify APRM A is bypassed using one or both of the following: ▪ APRM A BYPASS indicating light is on ▪ APRM A EPIC alarm indicates bypassed o Verify the other two APRM channels associated with the same APRM BYP switch are in service using one or both of the following: ▪ APRM BYPASS indicating lights are off for the other two APRMs ▪ No EPIC bypassed alarms for the other two APRMs	SAT / UNSAT / NA

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS / EVALUATION
Event 3 Secure Circulating Water Pump A	SRO	• Direct securing Circulating Water Pump A per OP-4	SAT / UNSAT / NA
	BOP	• Acknowledge direction • Secure Circulating Water pump A per OP-4, starting at step F.2.1: o Ensure reactor power is LESS THAN 65% o Determine Waste Sample Tank discharge to the canal is not in progress o Determine chlorine pump stroke setting has been reduced to the value appropriate for 2 circulating water pumps, per Attachment 3 of OP-7A o Determine chlorination of condenser waterboxes is secured per OP-7A o IF Circulating Water Pump A is running, THEN shut down Circulating Water Pump A 36P-1A as follows: o Stop CIRC WTR PMP A 36P-1A o Verify closed CIRC WTR PMP DISCH VLV 36MOV-100A	SAT / UNSAT / NA

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS / EVALUATION
Event 4 **On Lead Examiner Cue: ACTIVATE TRIGGER 1** Drywell Pressure Transmitter Fails High, then Low	ATC	• Recognize / report ½ scram RPS 'A' side • Recognize / report annunciators: o 09-5-1-21, RPS HI DW PRESS TRIP o 09-5-1-3, RPS A AUTO SCRAM o EPIC alarm 1217, 05PT-12A Hi-Hi	SAT / UNSAT / NA
Role Play: If asked as management whether to reset half scram or leave in, direct resetting half scram.	SRO	• Acknowledge reports • Direct ARP response • Determine Technical Specification 3.3.1.1 Condition A is applicable (place channel in trip condition within 12 hours) • Determine Technical Specification 3.3.6.1 Condition A is applicable (place channel in trip condition within 12 hours) • Determine Technical Specification 3.3.6.1 Condition B is applicable (restore isolation capability within 1 hour) • Determine Technical Specification 3.3.6.2 Condition A is applicable (place channel in trip condition within 12 hours) • Direct resetting half scram	SAT / UNSAT / NA
Role Play: If dispatched to investigate Relay Room, wait 1 minute and report MTU for 05PT-12A indicates downscale.	ATC	• Reset half scram per ARP 09-5-1-3: • Place RX SCRAM RESET switch to GROUP 2 & 3, then to GROUP 1 & 4, spring return to NORM • Verify RPS A SCRAM GROUPS 1, 2, 3, and 4 lights are on	SAT / UNSAT / NA
Role Play: If dispatched to investigate Instrument Rack, wait 1 minute and report nothing abnormal for 05PT-12A.	BOP	• Assist analyzing cause of ½ scram • Utilize ARP and\or EPIC to determine 05PT-12A failed • May observe Alarm typer printout of DW pressure spiked to 10 psig	SAT / UNSAT / NA

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS / EVALUATION
<u>Event 5</u> **On Lead Examiner Cue: ACTIVATE TRIGGER 2** HPCI Inadvertently Initiates, Trip Pushbutton Fails to Work	ALL	• Recognize / report spurious HPCI initiation • Recognize / report Reactor power rise, if applicable • Recognize / report Reactor water level rise, if applicable	SAT / UNSAT / NA
	SRO	• Acknowledge report • Enter AOP-77 (Inadvertent Initiation of ECCS or RCIC) • Verify HPCI injection not required • Direct trip of HPCI • May enter AOP-32 (Unexplained/Unanticipated Reactivity Change) • Declare HPCI inoperable • Determine Technical Specification 3.5.1 Condition C requires restoring HPCI to operable within 14 days • Declare the secured train of Standby Gas Treatment inoperable • Determine Technical Specification 3.6.4.3 Condition A requires restoring Standby Gas Treatment to operable within 7 days	SAT / UNSAT / NA
Role Play: If dispatched to investigate HPCI, wait two minutes, then report there is no obvious reason why HPCI started and there is no observable damage to the system.	BOP	• Execute AOP-77 • Observe Reactor water level and Drywell pressure indications to verify HPCI injection not required • Attempt to trip HPCI using pushbutton • Recognize / report failure of HPCI trip pushbutton to work • May lower HPCI flow rate to 0 • Take keylock switch 23A-S2A, 23MOV-16 AUTO CONTROL BYPASS, to BYPASS	SAT / UNSAT / NA

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS / EVALUATION
		• Close OUTBD STM SUPP VLV 23MOV-16 • Close STM LINE WARMING ISOL VLV 23MOV-60 • AFTER turbine comes to a complete stop, place AUX OIL PMP 23P-150 control switch in PULL-TO-LOCK • Secure one train of Standby Gas • For the running Standby Gas train, open 01-125MOV-11(12) • May execute AOP-32 (Unexplained/Unanticipated Reactivity Change) ○ Determine HPCI initiation was only cause of reactivity change	

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS / EVALUATION
<u>Event 6</u> **On Lead Examiner Cue: ACTIVATE TRIGGER 3** Loss of Main Condenser vacuum	BOP / ATC	• Recognize / report annunciator 09-3-1-28 Offgas Recombiner Trouble • Recognize / report lowering Main Condenser vacuum	SAT / UNSAT / NA
Note: A typical benchmark for directing a Reactor scram is a vacuum of 24.0" Hg.	SRO	• Acknowledge reports • Enter AOP-31 (Loss of Condenser Vacuum) • Direct power reduction per RAP-7.3.16 to maintain Main Condenser vacuum within Normal Operating Region, as time permits • Direct Reactor scram	SAT / UNSAT / NA
Role Play: If dispatched to investigate Recombiner trouble alarm, wait 2 minutes, then report that the alarm is caused by high Recombiner flow.	BOP	• Execute AOP-31 • Monitor Main Condenser vacuum • Trip Recombiner, if not yet automatically tripped • Trip H_2 addition • Close 20LCV-958 • Attempt to determine cause of vacuum degradation • Coordinate with ATC to insert 3rd group of CRAM rods, as time permits	SAT / UNSAT / NA
Note: Once a Reactor scram is attempted, a failure to scram will occur. This is scripted in the next event.	ATC	• Insert CRAM rods, as time permits • Depress manual Scram pushbuttons • Place Mode Switch to Shutdown	SAT / UNSAT / NA

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS / EVALUATION
Events 7, 8, & 9 Failure of RPS and ARI to Actuate, First SLC Pump Delayed Trip; Recirculation Pumps Fail to Automatically Trip, Main Generator Trip, Two Turbine Bypass Valves Fail Closed	ATC	• Recognize / report failure to scram • Manually initiate ARI	SAT / UNSAT / NA
Critical Task #1		**Given a failure to scram with Reactor power above 2.5%, the crew will lower Reactor power by one or more of the following methods, in accordance with EOP-3:** • **Terminating and preventing all RPV injection except SLC, RCIC, and CRD** • **Tripping Recirculation pumps** • **Injecting boron**	**Pass / Fail**
Critical Task #1 Standard:		**Terminate and prevent all injection except SLC, RCIC and CRD per EP-5** **And/or** **Trip Recirculation pumps** **And/or** **Inject boron**	

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS / EVALUATION
Critical Task #2		**Given a failure to scram, the crew will initiate Control Rod insertion, in accordance with EOP-3.**	**Pass / Fail**
Critical Task #2 Standard:		**Perform EP-3 Backup Control Rod Insertion Actions to insert control rods.**	
Note: Malfunctions will: o Trip the Main Generator when Reactor power lowers to approximately 42% o Fail closed two Turbine Bypass Valves when Reactor power lowers to approximately 24%	SRO	• Acknowledge report • Enter EOP-2 (RPV Control) on Reactor power above 2.5% or unknown when a scram is required • Determine the Reactor will NOT remain shutdown under all conditions without boron • Exit EOP-2 • Enter EOP-3 (Failure to Scram) • **Direct EP-3 Failure to Scram Actions** • Direct bypassing MSIV low RPV water level isolation interlocks per EP-2 • **Direct terminate and prevent all injection except SLC, RCIC and CRD per EP-5** • Direct RPV water level controlled between -19” and 110” with only Group 1 Water Level Control Systems (Condensate/Feedwater, CRD, HPCI, RCIC, LPCI) • Direct Reactor pressure controlled 800-1000 psig with Turbine Bypass Valves and SRVs, as required • May direct lowering Reactor pressure to allow injection with Condensate Booster pumps	SAT / UNSAT / NA **Critical Tasks #1 and #2** **Critical Task #1**

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS / EVALUATION
	ATC	• Perform EP-3 Failure to Scram Actions o Ensure Rx Mode Switch in SHUTDOWN o Ensure ARI initiated o Run Recirc flow to minimum o Determine Rx power greater than 2.5% o **Ensure Recirc pumps tripped** o Override ADS o Place ADS LOGIC OVERRIDE & RESET LOGIC A 2E-S2A in OVERRIDE o Place ADS LOGIC OVERRIDE & RESET LOGIC B 2E-S2B in OVERRIDE o Verify annunciator 09-4-1-27 ADS OVERRIDE SW IN OVERRIDE is in alarm o Verify white ADS LOGIC OVERRIDDEN 2E-DS10 light is on o Obtain CRS concurrence to inject SLC o Inject SLC o Verify white SQUIB VLVS READY lights are on o Note level on TK LVL 11LI-66 o Place SLC pup keylock switch in START SYS-A or START SYS-B o Verify red SLC pump running light is on o Verify SLC pump discharge pressure on DISCH PRESS 11PI-65 is greater than or equal to RPV pressure o Verify the following: o CLN UP SUCT 12MOV-18 is closed o CLN UP RETURN ISOL VALVE 12MOV-69 is closed	SAT / UNSAT / NA **Critical Task #1**

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS / EVALUATION
	ATC cont.	• Recognize / report trip of first SLC pump started • Start second SLC pump • Insert IRMs and SRMs • Range IRMs as necessary	SAT / UNSAT / NA
Booth Operator: When directed to install MSIV low water level jumpers, wait 2 minutes and **run** MSIVLEVEL.cae.	BOP	• Direct NPO to bypass MSIV low RPV water level isolation interlocks per EP-2 Section 5.1 • Control Reactor pressure on SRVs, as required • **Terminate and prevent all injection except SLC, RCIC, and CRD per EP-5** o Feedwater o If RFP A is running: o Ensure RFP A FLOW CNTRL 06-84A is in MAN o Lower RFP A FLOW CNTRL 06-84A to minimum o Ensure open RFP A MIN FLOW 34FCV-135A o If RFP B is running: o Ensure RFP B FLOW CNTRL 06-84B is in MAN o Lower RFP BFLOW CNTRL 06-84B to minimum o Ensure open RFP B MIN FLOW 34FCV-135B o Ensure closed: o RFP A DISCH 34MOV-100A o RFP B DISCH 34MOV-100B o Ensure FDWTR STARTUP VLV 34FCV-137 in MANUAL o Ensure closed FDWTR STARTUP VLV 34FCV-137	SAT / UNSAT / NA **Critical Task #1**

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS / EVALUATION
	BOP cont.	○ Core Spray Loop A ○ Place 14MOV-11A AUTO ACTUATION BYPASS SW 14A-S16A switch in bypass ○ Verify white 14MOV-11A AUTO ACTUATION BYPASS LT 14A-DS35A light is on ○ Ensure closed OUTBD INJ VLV 14MOV-11A ○ Ensure PMP 14P-1A is stopped ○ Core Spray Loop B ○ Place 14MOV-11B AUTO ACTUATION BYPASS SW 14A-S16B switch in bypass ○ Verify white 14MOV-11B AUTO ACTUATION BYPASS LT 14A-DS35B light is on ○ Ensure closed OUTBD INJ VLV 14MOV-11B ○ Ensure PMP 14P-1B is stopped	SAT / UNSAT / NA

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS / EVALUATION
Booth Operator: If requested to disconnect RHR timers, wait 2 minutes, then **activate Trigger 19** and report task completion.	BOP cont.	○ RHR Loop A ○ Place 10MOV-27A AUTO CONTROL BYPASS 10A-S23A ○ Verify white light above 10MOV-27A AUTO CONTROL BYPASS 10A-S23A is on ○ Ensure closed LPCI OUTBD INJ VLV 10MOV-27A ○ Ensure RHR Loop A pumps which are not required to be running are stopped ○ RHR Loop B ○ Place 10MOV-27B AUTO CONTROL BYPASS 10A-S23B ○ Verify white light above 10MOV-27B AUTO CONTROL BYPASS 10A-S23B is on ○ Ensure closed LPCI OUTBD INJ VLV 10MOV-27B ○ Ensure RHR Loop B pumps which are not required to be running are stopped • Report RPV water level is less than 110” to CRS	SAT / UNSAT / NA

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS / EVALUATION
	BOP cont.	• Control RPV water level between -19" and 110" with only Group 1 Water Level Control Systems (Condensate/Feedwater, CRD, HPCI, RCIC, LPCI) o Condensate/Feedwater o If any Reactor feed pump is running: o Ensure feedwater pump discharge pressure is less than RPV pressure by adjusting reactor feed pump speed o Lineup injection flow path by performing on or both of the following: o Adjusting FDWTR STARTUP VLV 34FCV-137 o Ensure open or throttled open Reactor feed pump discharge valve for running pump (34MOV-100A or B) o Control feed flow to RPV by performing any of the following: o Adjust RFP speed o Adjust FDWTR STARTUP VLV 34FCV-137 o Close feed pump discharge valves o If both Reactor feed pumps are shutdown, and feedwater discharge header pressure is greater than RPV pressure, then control feed flow to RPV by performing one or both of the following: o Throttling FDWTR STARTUP VLV 34FCV-137 o Throttling one or both of the following valves, only if APRMs are on scale: o RFP A DISCH 34MOV-100A o RFP B DISCH 34MOV-100B	SAT / UNSAT / NA

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS / EVALUATION
Note: HPCI was secured earlier in the scenario due to inadvertent start, but could be restarted if need for injection.	BOP cont.	○ HPCI ○ Preparation for injection: ○ Ensure SGT is running per OP-20 ○ Ensure open one of the following valves: ○ HPCI GLAND SEAL SUCT 01-125MOV-13A ○ HPCI GLAND SEAL SUCT 01-125MOV-13B ○ Ensure HPCI FLOW CNTRL 23FIC-108-1 setpoint is adjusted to minimum ○ Ensure HPCI FLOW CNTRL 23FIC-108-1 is in AUTO ○ Injection with initiation signal: ○ Depress INITIATION SIG/MAN TURB TRIP RESET 23A-S17 pushbutton ○ Verify annunciator 09-3-3-28 HPCI TURB TRIP SOLENOID ENERGIZED is clear ○ Verify HPCI auto-initiation ○ Control HPCI turbine speed in manual or automatic ○ Periodically verify HPCI turbine speed is greater than 2100 rpm ○ Injection without initiation signal: ○ Depress INITIATION SIG/MAN TURB TRIP RESET 23A-S17 pushbutton ○ Verify annunciator 09-3-3-28 HPCI TURB TRIP SOLENOID ENERGIZED is clear ○ Ensure open OUTBD STM SUPP VLV 23MOV-16 ○ Ensure GLAND SEAL CNDSR BLOWER 23P-140 is running	SAT / UNSAT / NA

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS / EVALUATION
	BOP cont.	○ HPCI cont. ○ Injection without initiation signal cont. ○ Ensure open TURB STM SUPP VLV 23MOV-14 ○ Ensure AUX OIL PMP 23P-150 is running ○ Open INJ VLV 23MOV-19 ○ Ensure closed the following valves: ○ STM LINE DRAIN TO RADW 23AOV-42 ○ STM LINE DRAIN TO RADW 23AOV-43 ○ TEST VLV TO CST 23MOV-21 ○ HPCI & RCIC TEST VLV TO CST 23MOV-24 ○ Control HPCI turbine speed in manual or automatic ○ Periodically verify HPCI turbine speed is greater than 2100 rpm	SAT / UNSAT / NA
Booth Operator: If requested to pull RPS fuses, wait 30 seconds and for lead examiner concurrence, then **run EP3_SCRAMFUSES_OUT_B .cae** and report task completion. If directed to vent Scram Air Header, wait 2 minutes and for lead examiner concurrence, then **activate Trigger 20** and report task completion.	ATC	• **Perform EP-3 Backup Control Rod Insertion Actions** ○ May de-energize scram solenoids per Subsection 5.2 ○ Determine fuses to be pulled based on lit RPS Scram Group lights ○ Pull fuses 5A-F18B, 5A-F18F, 5A-F18D, and 5A-F18H ○ May direct NPO to vent scram air header per Subsection 5.3 • Report all control rods are inserted	SAT / UNSAT / NA **Critical Task #2**

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS / EVALUATION
	SRO	• Acknowledge report • Exit EOP-3 • Enter EOP-2 • Direct Reactor water level restored and maintained 177-222.5”	SAT / UNSAT / NA
	BOP	• Begin restoring Reactor water level 177-222.5”	SAT / UNSAT / NA

Termination Criteria:

- Control rods are being inserted or are all inserted.
- Reactor water level is being controlled above 0”.

Shift Turnover

The Plant is operating at approximately 75% power.

SRV A is inoperable due to a circuit failure.

Circulating Water pump A operation is degraded due to excessive seal leakage.

When you take the shift:

1. Lower Reactor power to 63-65% using Recirc and control rods per the provided RMI.
2. Then, secure Circulating Water pump A per OP-4 section F. The procedure is in progress up to step F.2.1.

    - Waste Sample Tank discharge to the canal is NOT in progress.
    - Chlorine pump stroke setting has been reduced to the value appropriate for 2 circulating water pumps, per Attachment 3 of OP 7A.
    - Chlorination of condenser waterboxes is secured per OP 7A.

Sheet 1 of 1

Reactivity/monitoring Steps – (site specific RWR control sheet format is to be used)

Power Reduction Today

Page 1 of 1

Init	Step	Action	Rod	From Notch	To Notch	Method	Cplg Chk	RSCS Grp	Notes
	1	Lower Recirc flow to 43-45 Mlbm/hr	-	-	-	RWR	NA	-	
	2	Insert	26-43	48	00	Continuous	NA	-	
	3	Insert	42-23	10	00	Continuous	NA	-	
	4	Insert	26-11	48	00	Continuous	NA	-	
	5	Insert	18-39	12	00	Continuous	NA	-	

Prepared By: _Joe Allen_
(RxEng)

SM Approval: _Dave Roe_
(Shift Manager)

Reviewed By: _Bob Jones_
(RxEng or SRO)

Stamps

CONTROL ROOM OPERATOR

Reactivity/monitoring Steps – (site specific RWR control sheet format is to be used)

Power Reduction Today

Page 1 of 1

Init	Step	Action	Rod	From Notch	To Notch	Method	Cplg Chk	RSCS Grp	Notes
	1	Lower Recirc flow to 43-45 Mlbm/hr	-	-	-	RWR	NA	-	
	2	Insert	26-43	48	00	Continuous	NA	-	
	3	Insert	42-23	10	00	Continuous	NA	-	
	4	Insert	26-11	48	00	Continuous	NA	-	
	5	Insert	18-39	12	00	Continuous	NA	-	

Prepared By: _Joe Allen_
(RxEng)

SM Approval: _Dave Roe_
(Shift Manager)

Reviewed By: _Bob Jones_
(RxEng or SRO)

Stamps

INDEPENDENT VERIFIER

Sheet 1 of 1

Reactivity/monitoring Steps – (site specific RWR control sheet format is to be used)

Power Reduction Today

Page 1 of 1

Init	Step	Action	Rod	From Notch	To Notch	Method	Cplg Chk	RSCS Grp	Notes
	1	Lower Recirc flow to 43-45 Mlbm/hr	-	-	-	RWR	NA	-	
	2	Insert	26-43	48	00	Continuous	NA	-	
	3	Insert	42-23	10	00	Continuous	NA	-	
	4	Insert	26-11	48	00	Continuous	NA	-	
	5	Insert	18-39	12	00	Continuous	NA	-	

Prepared By: _Joe Allen_
(RxEng)

SM Approval: _Dave Roe_
(Shift Manager)

Reviewed By: _Bob Jones_
(RxEng or SRO)

Stamps

CRS

Appendix D	Scenario Outline	Form ES-D-1

Facility: **James A. Fitzpatrick** Scenario No.: **NRC-2** Op-Test No.: **17-1**

Examiners: _____ Operators: _____
_____ _____
_____ _____

Initial Conditions: The plant is operating at approximately 58% power. SRV A is inoperable. Condensate pump A and Condensate Booster pump A are ready to start following breaker maintenance.

Turnover: Start Condensate pump A and Condensate Booster pump A per OP-3 section D.8. Then, secure Condensate Booster pump B and Condensate pump B per OP-3 section F.1. Then, perform a control rod pattern adjustment per the provided RMI.

Event No.	Malf. No.	Event Type*	Event Description
1	N/A	N – BOP, SRO	Swap Condensate and Condensate Booster Pumps OP-3
2	N/A	R – ATC, SRO	Perform Control Rod Pattern Adjustment OP-26
3	RR22:B	I – SRO	RPS Level Transmitter Fails High ARP 09-5-2-60, Technical Specifications
4	SW01:A	C – BOP, SRO	Loss of RBCLC Flow to RWR Pump A OP-27, AOP-8, Technical Specifications
5	FW25	C – ATC, SRO	Condensate Booster Pump A Trip, Condensate Booster Pump B Fails to Start; Delayed Trip of Condensate Booster Pump C AOP-1, EOP-2
6	RP01A RP01B RP09	I – ATC, SRO	RPS Fails to Scram, ARI Fails to Automatically Initiate AOP-1, EOP-2
7	HP01 RC02	I – BOP, SRO	HPCI and RCIC Fail to Start Automatically OP-15, OP-19, EOP-2
8	CU07 CU10 CU12 Remotes	M – All	RWCU Steam Leak into Reactor Building; RWCU Fails to Isolate Automatically and Manually EOP-5, EOP-2
9	Override	I – ATC, SRO	Bypass Opening Jack Motor Fails EOP-2

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

Appendix D	Scenario Outline	Form ES-D-1

Facility: **James A. Fitzpatrick**	Scenario No.: **NRC-2**	Op-Test No.: **17-1**
1. Malfunctions after EOP entry (1-2) **Events 7 & 9**	2	
2. Abnormal events (2-4) **Events 4, 5, 6**	3	
3. Major transients (1-2) **Event 8**	1	
4. EOPs entered/requiring substantive actions (1-2) **EOP-2, EOP-5**	2	
5. Entry into a contingency EOP with substantive actions (≥1 per scenario set) **EOP-2 Emergency Depressurization Leg**	1	
6. Pre-identified critical tasks (≥2)	2	
CRITICAL TASK DESCRIPTIONS: **CT-1: Given the plant operating at power with a loss of Feedwater injection and failure of RPS to scram the Reactor, the crew will manually initiate ARI, in accordance with AOP-1 and/or EOP-3.** **CT-2: Given an un-isolable primary system discharging into Secondary Containment and two areas exceeding Maximum Safe Temperatures, the crew will perform an emergency RPV depressurization, in accordance with EOP-5.**		

The scenario will begin with the plant operating at approximately 58% power. SRV A is inoperable. Condensate pump A and Condensate Booster pump A are ready to start following breaker maintenance. The crew will begin by starting Condensate pump A and Condensate Booster pump A per OP-3 section D.8. Next, the crew will secure Condensate Booster pump B and Condensate pump B per OP-3 section F.1. Then, the crew will perform a control rod pattern adjustment per the provided RMI, which will move four control rods from position 10 to 12 and two control rods from position 08 to 04.

Reactor water level transmitter, 02-3LT-101B, will fail upscale. This transmitter is one of the inputs to the RPS scram function. With the transmitter failed high, the SRO will determine that it cannot perform its scram function, declare that function inoperable, and determine the Technical Specification impact.

All RBCLC flow to Recirculation pump A will isolate. This will cause multiple high temperature alarms. If left unmitigated, this will cause degradation of both Recirculation pump A seals and loss of coolant into the Drywell. The crew will secure Recirculation pump A. If damage has occurred to both pump seals, the crew will also isolate Recirculation pump A to stop the loss of coolant. The crew will execute AOP-8 due to the reduction in core flow. The SRO will determine the Technical Specification impact.

Condensate Booster pump A will trip and Condensate Booster pump B will fail to start. Condensate Booster pump C will also trip after a 3 minute time delay. The crew will enter AOP-1 and insert a manual Reactor scram. On the scram attempt, the RPS pushbuttons and Mode Switch will fail to work. The crew will insert control rods by initiating ARI. The crew will enter EOP-2 and stabilize the plant. HPCI and RCIC will fail to automatically start. With all Condensate Booster and Feedwater pumps unavailable for injection, the crew will likely manually start HPCI and/or RCIC to restore Reactor water level.

RWCU will develop a steam leak. This will cause high area temperatures in the Reactor Building. RWCU will fail to automatically isolate. The crew will be able to close one isolation valve, however the breaker for the other isolation valve will trip open, preventing isolation of the steam leak. The crew will execute EOP-5. As Reactor Building area temperatures approach max safe levels, the crew will attempt to anticipate Emergency Depressurization by rapidly lowering Reactor pressure with Turbine Bypass Valves. The Bypass Opening Jack will fail to open Turbine Bypass Valves. The crew may open Turbine Bypass Valves by adjusting the pressure regulator setpoint, but this will limit how quickly Reactor pressure can be lowered. Once two max safe temperatures are exceeded, the crew will perform an Emergency Depressurization.

The scenario will be terminated when all control rods are inserted, the Emergency RPV Depressurization is in progress, and Reactor water level is controlled above 0”.

JAMES A. FITZPATRICK NUCLEAR POWER PLANT

LOI 17-1 NRC EXAMINATION SCENARIO 2

TITLE: **LOI 17-1 NRC EXAMINATION SCENARIO 2**

SCENARIO NUMBER: **NRC 2**

PATH: **STAND ALONE**

Validation: _____ Training: _____ Operations: _____

	CANDIDATES
CRS	
ATC	
BOP	

RECORD OF CHANGES

DATE	SOURCE OF CHANGE	BRIEF DESCRIPTION OF CHANGE	INITIATOR	REVIEWED
10/26/17	New	New Scenario	T. Hooper	D. Kelly

A. TITLE: LOI 17-1 NRC EXAMINATION SCENARIO 2

B. SCENARIO SETUP:

1. IC-152

2. Special Instructions:

    a. The Plant is operating at approximately 58% power.
    b. SRV A is inoperable.
    c. Condensate pump A and Condensate Booster pump A are ready to start following breaker maintenance.

3. Preset Conditions:

    a. Preset, M:AD07:A, Rx press relief vlv (2E-RV2-71A) fails closed
    b. Trigger 1, M:RR22:B, Rx Vessel Scram Level Transmitter, 100%
    c. Trigger 2, M:SW01:A, Loss of RBCLC Flow to Recirculation A
    d. Trigger 3, M:FW25:A, Condensate Booster Pump 33-P9A trip
    e. Trigger 3, M:FW25:B, Condensate Booster Pump 33-P9B trip
    f. Trigger 3, M:FW25:C, Condensate Booster Pump 33-P9C trip, Delay=1:30
    g. Preset, M:RP01A, Reactor Protection System Automatic Scram Failure
    h. Preset, M:RP01B, Reactor Protection System Manual Scram Failure
    i. Preset, M:RP09, ARI Fails to Actuate
    j. Preset, M:RC02, RCIC System Failure to Auto Start
    k. Preset, M:HP01, HPCI Failure to Auto Start
    l. Preset, M:CU10, RWCU 12MOV-18 Auto Isolation Failure
    m. Preset, M:CU12, RWCU 12MOV-15 Auto Isolation Failure
    n. Preset, M:CU11, RWCU 12MOV-15 Fails As-Is
    o. Trigger 4, M:CU07, RWCU Pipe Break Between IVs, Initial=3, Ramp=10:00, Final=25
    p. Preset, O:AD ZLO271A(1), SRV A green light, Final=off
    q. Preset, O:TC ZDIPNIBVOJI, Bypass Valve Opening Jack open pushbutton, Final=normal
    r. Event Trigger 16, Event: zdi1csari, Command: dmf rp09

4. Consumable Forms and Procedures:
    - AOP-1, AOP-8

C. SCENARIO SUMMARY:

The scenario will begin with the plant operating at approximately 58% power. SRV A is inoperable. Condensate pump A and Condensate Booster pump A are ready to start following breaker maintenance. The crew will begin by starting Condensate pump A and Condensate Booster pump A per OP-3 section D.8. Next, the crew will secure Condensate Booster pump B and Condensate pump B per OP-3 section F.1. Then, the crew will perform a control rod pattern adjustment per the provided RMI, which will move four control rods from position 10 to 12 and two control rods from position 08 to 04.

Reactor water level transmitter, 02-3LT-101B, will fail upscale. This transmitter is one of the inputs to the RPS scram function. With the transmitter failed high, the SRO will determine that it cannot perform its scram function, declare that function inoperable, and determine the Technical Specification impact.

All RBCLC flow to Recirculation pump A will isolate. This will cause multiple high temperature alarms. If left unmitigated, this will cause degradation of both Recirculation pump A seals and loss of coolant into the Drywell. The crew will secure Recirculation pump A. If damage has occurred to both pump seals, the crew will also isolate Recirculation pump A to stop the loss of coolant. The crew will execute AOP-8 due to the reduction in core flow. The SRO will determine the Technical Specification impact.

Condensate Booster pump A will trip and Condensate Booster pump B will fail to start. Condensate Booster pump C will also trip after a 90 second time delay. The crew will enter AOP-1 and insert a manual Reactor scram. On the scram attempt, the RPS pushbuttons and Mode Switch will fail to work. The crew will insert control rods by initiating ARI. The crew will enter EOP-2 and stabilize the plant. HPCI and RCIC will fail to automatically start. With all Condensate Booster and Feedwater pumps unavailable for injection, the crew will be able to manually start HPCI and/or RCIC to restore Reactor water level.

RWCU will develop a steam leak. This will cause high area temperatures in the Reactor Building. RWCU will fail to automatically isolate. The crew will be able to close 12MOV-18, however 12MOV-15 will fail to close, preventing isolation of the steam leak. The crew will execute EOP-5. As Reactor Building area temperatures approach max safe levels, the crew will attempt to anticipate Emergency Depressurization by rapidly lowering Reactor pressure with Turbine Bypass Valves. The Bypass Opening Jack will fail to open Turbine Bypass Valves. The crew may open Turbine Bypass Valves by adjusting the pressure regulator setpoint, but this will limit how quickly Reactor pressure can be lowered. Once two max safe temperatures are exceeded, the crew will perform an Emergency Depressurization.

The scenario will be terminated when all control rods are inserted, the Emergency RPV Depressurization is in progress, and Reactor water level is controlled above 0".

Shift Turnover
The plant is operating at approximately 58% power. SRV A is inoperable due to a circuit failure. Condensate pump A and Condensate Booster pump A are ready to start following breaker maintenance. When you take the shift: 1. Start Condensate pump A and Condensate Booster pump A per OP-3 section D.8. 2. Secure Condensate Booster pump B and Condensate pump B per OP-3 section F.1. 3. Perform a control rod pattern adjustment per the provided RMI.

Critical Tasks/Standards
Critical Task #1: Given the plant operating at power with a loss of Feedwater injection and failure of RPS to scram the Reactor, the crew will manually initiate ARI, in accordance with AOP-1 and/or EOP-3. Critical Task #2: Given an un-isolable primary system discharging into Secondary Containment and two areas exceeding Maximum Safe Temperatures, the crew will perform an emergency RPV depressurization, in accordance with EOP-5.

EVENT NO.	EVENT SEQUENCE	
1.	Swap Condensate and Condensate Booster Pumps	(Normal: BOP, SRO)
2.	Perform Control Rod Pattern Adjustment	(Reactivity: ATC, SRO)
3.	RPS Level Transmitter Fails High	(Instrument: SRO)
4.	Loss of RBCLC Flow to RRP Pump A	(Component: BOP, SRO)
5.	Condensate Booster Pump A Trip, Condensate Booster Pump B Fails to Start; Delayed Trip of Condensate Booster Pump C	(Component: ATC, SRO)
6.	RPS Fails to Scram, ARI Fails to Automatically Initiate	(Instrument: ATC, SRO)
7.	HPCI and RCIC Fail to Start Automatically	(Instrument: BOP, SRO)
8.	RWCU Steam Leak into Reactor Building; RWCU Fails to Isolate Automatically and Manually	(Major: All)
9.	Bypass Opening Jack Motor Fails	(Instrument: ATC, SRO)

D. TERMINATION CUES:

- All control rods are inserted
- Emergency RPV Depressurization is in progress
- Reactor water level is controlled above 0”

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS/EVALUATION
Simulator in RUN Recorder and Alarm Power ON Simulator Checklist Complete			
Provide Turnover (Attach. 1)			
After the shift turnover, allow no more than five minutes for panel walkdown	All	• Walkdown the control panels and assume the watch	
Event 1 Swap Condensate and Condensate Booster Pumps	SRO	• Perform Crew Brief • Direct BOP to start Condensate pump A and Condensate Booster pump A per OP-3 section D.8 • Direct BOP to secure Condensate Booster pump B and Condensate pump B per OP-3 section F.1	SAT / UNSAT / NA
Note: The Condensate Booster pump control switch must be held in START position until pump starts.	BOP	• Start Condensate pump A and Condensate Booster pump A per OP-3 section D.8: o Observe pump motor amps for running Condensate pumps o Start Condensate pump A o Verify load is being shared between the Condensate pumps that are running as indicated by pump motor amps o Verify all white lights for RPS A and RPS B power source selectors are on at panel 09-16 o Observe running Condensate Booster pump motor amps o Start Condensate Booster pump A o Verify running Condensate Booster pumps are sharing the load as indicated by motor amps	SAT / UNSAT / NA

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS/EVALUATION
Role Play: If directed to make Hydrogen Injection System lineup changes, wait 3 minutes and report task completion. **Role Play:** If contacted as Radwaste, acknowledge changes in Condensate lineup.	BOP cont.	○ Verify all white lights for RPS A and RPS B power source selectors are on at panel 09-16 ○ IF the Hydrogen Injection System is in service, THEN line up hydrogen to the Condensate Booster pump just started per OP-89A Section D, Placing Additional Hydrogen Injection Trains In Service • Secure Condensate Booster pump B and Condensate pump B per OP-3 section F.1: • Place and hold pump control switch for Condensate Booster pump B in STOP • WHEN Condensate Booster discharge header pressure stabilizes, allow pump control switch to return to normal • Place and hold pump control switch for Condensate pump B in STOP • WHEN Condensate discharge header pressure stabilizes, allow pump control switch to return to normal • Line up hydrogen injection for the Condensate Booster pump removed from service per Section G of OP-89A, Operation or Changing Condensate Booster Pumps in Service	SAT / UNSAT / NA

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS/EVALUATION
Event 2 Perform Control Rod Pattern Adjustment	SRO	• Direct ATC to perform control rod pattern adjustment per RMI • Provide oversight of reactivity manipulation	SAT / UNSAT / NA

Note:
The first four control rods in the pattern adjustment are 10-31, 42-31, 42-23, 10-23. These control rods are being moved from position 10 to 12.
	ATC	• While withdrawing control rods, monitor the following:
		  ○ Nuclear instrumentation
		  ○ Control rod position indication
		• Ensure ROD SEL PWR switch is in ON
		• Ensure control rod to be moved is selected by depressing rod select pushbutton on ROD SEL matrix, if necessary
		• Verify the following:
		  ○ Select pushbutton is brightly backlit
		  ○ Control rod indicating light is on
		  ○ ROD OUT PERM light is on
		• Place ROD MOVEMENT CNTRL switch to OUT NOTCH, spring return to OFF
		• Verify control rod latches in the expected even numbered position before ROD SETTLE light goes off
		• Verify ROD SETTLE light is off
		• Repeat as necessary
			SAT / UNSAT / NA

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS/EVALUATION

Note:
The last two control rods in the pattern adjustment are 26-31 and 26-23. These control rods are being moved from position 08 to 04.
		• While inserting control rods, monitor the following:
		  ○ Nuclear instrumentation
		  ○ Control rod position indication
		• Ensure ROD SEL PWR switch is in ON
		• Ensure control rod to be moved is selected by depressing rod select pushbutton on ROD SEL matrix, if necessary
		• Verify the following:
		  ○ Select pushbutton is brightly backlit
		  ○ Control rod indicating light is on
		  ○ Annunciator 09-5-2-1 RWM ROD BLOCK RPIS INOP is clear
		• Place ROD MOVEMENT CNTRL switch to IN, spring return to OFF
		• Verify control rod latches in the expected even numbered position before ROD SETTLE light goes off
		• Verify ROD SETTLE light is off
		• Repeat as necessary	

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS/EVALUATION
Event 3 **On Lead Examiner Cue: ACTIVATE TRIGGER 1** RPS Level Transmitter Fails High	ATC / BOP	• Recognize / report annunciator 09-5-2-60, ATTS RPS DIV B1 OR B2 GROSS FAIL OR TU INOP	SAT / UNSAT / NA
	SRO	• Acknowledge reports • Direct ARP response • May reference OP-27A Attachment 7 • Determine an input for the low Reactor water level RPS, PCIS, and SCIS functions is inoperable • Determine Technical Specification Table 3.3.1.1-1 Function 4 is not met • Determine Technical Specification 3.3.1.1 Condition A requires placing the channel or associated trip system in trip within 12 hours • Determine Technical Specification Table 3.3.6.1-1 Functions 2.a, 2.g, 5.e, 6.b, and 7.a are not met • Determine Technical Specification 3.3.6.1 Condition A requires placing the channel in trip within 12 hours • Determine Technical Specification 3.3.6.1 Condition B is applicable (restore isolation capability within 1 hour) • Determine Technical Specification Table 3.3.6.2-1 Function 1 is not met • Determine Technical Specification 3.3.6.2 Condition A requires placing the channel in trip within 12 hours	SAT / UNSAT / NA
Role Play: If dispatched to investigate, wait 2 minutes, then report that narrow range level MTU 02-3MTU-201B has failed upscale (225") with the gross fail light lit.	ATC / BOP	• Execute ARP 09-5-2-60: o Dispatch operator to check red gross fail lights on panel 09-92 and 94 panel MTUs o Dispatch operator to check position of calibration unit, select switches and test switches at panel 09-92 and 94	SAT / UNSAT / NA

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS/EVALUATION
Event 4 **On Lead Examiner Cue: ACTIVATE TRIGGER 2** Loss of RBCLC Flow to Recirculation Pump A	BOP / ATC	• Recognize / report EPIC low flow alarm • Recognize / report multiple annunciators, including: ○ 09-4-2-17, RWR A SEAL CLR FLOW LO ○ 09-4-2-27, RWR PMP A MTR WINDING CLR FLOW LO ○ 09-4-3-33, RWR PMP A OR B TEMP HI	SAT / UNSAT / NA
	SRO	• Acknowledge reports • Direct ARP execution • Direction shutdown of Recirculation pump A per OP-27 • Enter AOP-8 (Unexpected Change in Core Flow) • Determine TRO 3.3.B Condition C entry is required (1 hour to establish single loop limits for APRM flow biased rod block) • Determine Technical Specification 3.4.1 Condition B entry is required (24 hours)	SAT / UNSAT / NA
Note: Some indication for 15FIS-102A is available on EPIC screen RWRA1. **Role Play:** If dispatched to check RBC flow rate to RWR pump A wait 2 minutes, then report that there is no RBC flow to RWR pump A.	BOP	• Execute ARP 09-4-2-17, as time permits: ○ Monitor seal cavity temps on 02TR-031 (points 8 & 9) ○ If seal cavity temp increases to 250°F, then shutdown A RWR pump per Section G of OP-27 ○ Ensure open 15AOV-132A and 15AOV-133A ○ Verify RBC flow rate >300 gpm on 15FIS-102A ○ Monitor DW leakage for signs of seal leakage	SAT / UNSAT / NA

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS/EVALUATION
Role Play: If dispatched to close 02-2RWR-39A, wait 2 minutes, then report task completion.		• Execute ARP 09-4-2-27, as time permits: o Monitor temps on 02-2TR-31 o Verify RBC flow rate >300 gpm on 15FIS-102A o If RBC flow cannot be restored and RWR pump and motor temps are rising, then shut down RWR loop A per OP-27 Section G o Monitor DW sump levels • Execute ARP 09-4-3-33, as time permits: o Check 02-2TR-31 o Check RBC temp o Check RBC lineup and verify at least 300 gpm on 15-FIS-102A o Monitor computer and annunciators for problem o Monitor DW leakage for possible leak in RBC system o If any RWR motor bearing exceeds 220°F, then shut down RWR pump per Section G of OP-27	

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS/EVALUATION

Note:
It is expected to move to the next event before the crew addresses Recirculation loop temperature and SLO scram/rod block setpoint issues.
	BOP cont.	• Secure Recirculation pump A per OP-27:
		  ○ Close RWR PMP A DISCH 02MOV-53A
		  ○ Verify RWR PMP 02-2P-1A is tripped
		  ○ Place RWR PMP 02-2P-1A control switch in PULL TO LOCK
		  ○ Verify open RWR MG A GEN FIELD BKR
		  ○ IF loop A isolation is required, THEN ensure closed the following valves (not expected):
		  ▪ RWR PMP A DISCH 02MOV-53A
		  ▪ RWR PMP A SUCT 02MOV-43A
		  ▪ 02-2RWR-39A (RWR pump A seal purge upstr isol valve)
		• Coordinate with ATC to execute AOP-8, as time permits
		• Monitor for thermal-hydraulic instability
		• Ensure RPV water level returns to normal and stabilizes
		• Determine operating point on Power-Flow Map
		• Demand a 3D Monicore Official Program and review margin to thermal limits
			SAT / UNSAT / NA

	ATC	• Monitor Reactor power • Monitor for thermal-hydraulic instability • Monitor Feedwater response	SAT / UNSAT / NA

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS/EVALUATION
<u>Events 5, 6, & 7</u> **On Lead Examiner Cue: ACTIVATE TRIGGER 3** Condensate Booster Pump A Trip, Condensate Booster Pump B Fails to Start; Delayed Trip of Condensate Booster Pump C; RPS Fails to Scram, ARI Fails to Automatically Initiate; HPCI and RCIC Fail to Start Automatically	ATC / BOP	• Recognize / report annunciators: ○ 09-6-3-2, COND BSTR PMP 33P-9A OVERLOAD OR TRIP ○ 09-6-3-11, COND BSTR PMP 33P-9B OVERLOAD OR TRIP ○ 09-6-3-22, COND BSTR PMP 33P-9C OVERLOAD OR TRIP (90 seconds later) • Recognize / report trip of Condensate Booster pump A • Recognize / report Condensate Booster pump B fails to start • Recognize / report trip of Condensate Booster pump C (90 seconds later) • Recognize / report failure to scram using Mode Switch and RPS pushbuttons • Recognize / report failure of HPCI and RCIC to start automatically	SAT / UNSAT / NA
Critical Task #1 **Critical Task #1 Standard:**		**Given the plant operating at power with a loss of Feedwater injection and failure of RPS to scram the Reactor, the crew will manually initiate ARI, in accordance with AOP-1 and/or EOP-3.** **Manually initiate ARI.**	**Pass / Fail**

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS/EVALUATION
	SRO	• Acknowledge reports • Direct ARP response • Acknowledge report of Condensate Booster pump C trip • **Direct manual Reactor scram** • Acknowledge control rods insert with ARI • Enter AOP-1, Reactor Scram • Enter EOP-2, RPV Control • Direct Reactor pressure controlled 800 to 1000 psig using TBVs • Direct Reactor water level controlled 180 to 220 inches using HPCI and/or RCIC • Acknowledge failure of HPCI and RCIC to automatically start • May direct Reactor cooldown < 100°F/hr	SAT / UNSAT / NA **Critical Task #1**
Note: ARPs 09-6-3-11(22) are similar for the other two Condensate Booster pumps. **Role Play:** If dispatched to investigate trip of Condensate Booster pumps, wait 2 minutes and then report breaker tripped on overcurrent, but no abnormal indications at the pump.	BOP	• As time permits, performs ARP 09-6-3-2: o Evaluate entry into AOP-41 Feedwater Malfunction o IF Condensate Booster Pump 33P-9A trips, THEN ensure reactor power is within capacity of in-service condensate booster pump(s) o IF any relay flag shows or 86 device is tripped on Breaker 71-10350, THEN perform the following: o Place COND BSTR PMP 33P-9A in PULL TO LOCK o Do not reset relay flags or 86 devices until Electrical Maintenance investigates	SAT / UNSAT / NA

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS/EVALUATION
	ATC	• Depress manual Scram pushbuttons • Place Mode Switch to Shutdown • **Initiate ARI** • Report all control rods have inserted • Enter AOP-1 • Fully insert IRMs and SRMs • Observe Reactor power downscale on APRMs • Observe SDIV vent and drain valves closed • Transfer APRM/IRM recorders to IRMs • Down-range IRMs • Monitor Reactor pressure control on the Turbine Bypass Valves	SAT / UNSAT / NA **Critical Task #1**

	BOP	• Enter AOP-1
		• Control RPV water level between 180 and 220” using any of the following methods:
		  ○ Operate HPCI per OP-15:
		  ○ Ensure open 23MOV-16
		  ○ Ensure running 23P-140
		  ○ Ensure open 23MOV-14
		  ○ Perform the following steps without unnecessary delay:
		  ○ If 09-3-3-28 is in then depress 23A-S17
		  ○ Ensure running 23P-150
		  ○ Ensure open 23MOV-19
			SAT / UNSAT / NA

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS/EVALUATION
	BOP cont.	○ Operate RCIC per OP-19: ○ Verify Annunciator 09-4-0-32 RCIC LOGIC RX LVL HI is clear ○ Verify CST SUCT VLV 13MOV-18 open ○ Start VAC PMP 13P-3 ○ Open OIL CLR WTR SUPP 13MOV-132 ○ Perform the following without unnecessary delay: ○ Open TURB STM SUPP VLV 13MOV-131 ○ Open INJ VLV 13MOV-21 ○ Adjust RCIC FLOW CNTRL 13FIC-91 to desired flow rate	

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS/EVALUATION
<u>Events 8 & 9</u> **On Lead Examiner Cue:** **ACTIVATE TRIGGER 4** RWCU Steam Leak into Reactor Building; RWCU Fails to Isolate Automatically and Manually; BOJM Fails	ATC / BOP	• Recognize / report EPIC high area temperature alarms • Recognize / report multiple annunciators • Recognize / report RWCU failed to isolate	SAT / UNSAT / NA
Critical Task #2 **Critical Task #2 Standard:**		**Given an un-isolable primary system discharging into Secondary Containment and two areas exceeding Maximum Safe Temperatures, the crew will perform an emergency RPV depressurization, in accordance with EOP-5.** **Open at least 5 SRVs.**	**Pass / Fail**
<u>Note:</u> The SRO will likely anticipate Emergency Depressurization by ordering a rapid depressurization with Turbine Bypass Valves. The normal cooldown rate of 100°F/hr may be violated since area temperatures are approaching Max Safe Values.	SRO	• Acknowledge reports • Enter EOP-5, Secondary Containment Control, on high area temperatures • Direct isolation of RWCU • Direct area/building evacuation • Acknowledge manual RWCU isolation failure • May direct rapid Reactor depressurization using TBVs • Acknowledge failure of Bypass Opening Jack to open TBVs • Recognize / acknowledge two area temperature above Max Safe Value • Enter Emergency Depressurization leg of EOP-2 • **Direct all ADS valves and one additional SRV open**	SAT / UNSAT / NA **Critical Task #2**

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS/EVALUATION

Note:
The crew may attempt to isolate RWCU by closing 12MOV-15 and 12MOV-18 before referencing an ARP or OP as a backup to a failed automatic action (EN-OP-115) or based on guidance in EOP-5.
	BOP	• Attempt to isolate RWCU
		  ○ Close 12MOV-18
		  ○ Attempt to close 12MOV-15
		  ○ Recognize / report 12MOV-15 failed to close
		• Announce Reactor Building Evacuation
			SAT / UNSAT / NA

Role Play: If dispatched to investigate high temperature, wait 2 minutes, then report you see steam coming from the RWCU area and cannot access the area.	ATC / BOP	• Update crew on RB area temperatures • May attempt to open Turbine Bypass Valves to initiate cooldown or rapidly depressurize RPV in anticipation of Emergency Depressurization • Recognize / report failure of Bypass Opening Jack to open TBVs • May lower pressure regulator setpoint to initiate cooldown • Report two area temperatures above Max Safe Value • **Open all ADS valves and one additional SRV**	SAT / UNSAT / NA **Critical Task #2**

Termination Criteria:

- All control rods are inserted
- Emergency RPV Depressurization is in progress
- Reactor water level is controlled above 0”

Shift Turnover

The plant is operating at approximately 58% power.

SRV A is inoperable due to a circuit failure.

Condensate pump A and Condensate Booster pump A are ready to start following breaker maintenance.

When you take the shift:

1. Start Condensate pump A and Condensate Booster pump A per OP-3 section D.8.
2. Secure Condensate Booster pump B and Condensate pump B per OP-3 section F.1.
3. Perform a control rod pattern adjustment per the provided RMI.

Reactivity/monitoring Steps – (site specific RWR control sheet format is to be used)

Rod Sequence Exchange
Today

Page 1 of 1

Init	Step	Action	Rod	From Notch	To Notch	Method	Cplg Chk	RSCS Grp	Notes
	1	Withdraw	10-31	10	12	Notch	NA	-	
	2	Withdraw	42-31	10	12	Notch	NA	-	
	3	Withdraw	42-23	10	12	Notch	NA	-	
	4	Withdraw	10-23	10	12	Notch	NA	-	
	5	Insert	26-31	08	04	Notch	NA	-	
	6	Insert	26-23	08	04	Notch	NA	-	

Prepared By: _Joe Allen_
(RxEng)

SM Approval: _Dave Roe_
(Shift Manager)

Reviewed By: _Bob Jones_
(RxEng or SRO)

Stamps

CONTROL ROOM OPERATOR

Reactivity/monitoring Steps – (site specific RWR control sheet format is to be used)

Rod Sequence Exchange
Today

Page 1 of 1

Init	Step	Action	Rod	From Notch	To Notch	Method	Cplg Chk	RSCS Grp	Notes
	1	Withdraw	10-31	10	12	Notch	NA	-	
	2	Withdraw	42-31	10	12	Notch	NA	-	
	3	Withdraw	42-23	10	12	Notch	NA	-	
	4	Withdraw	10-23	10	12	Notch	NA	-	
	5	Insert	26-31	08	04	Notch	NA	-	
	6	Insert	26-23	08	04	Notch	NA	-	

Prepared By: _Joe Allen_
(RxEng)

SM Approval: _Dave Roe_
(Shift Manager)

Reviewed By: _Bob Jones_
(RxEng or SRO)

Stamps

INDEPENDENT VERIFIER

Sheet 1 of 1

Reactivity/monitoring Steps – (site specific RWR control sheet format is to be used)

Rod Sequence Exchange
Today

Page 1 of 1

Init	Step	Action	Rod	From Notch	To Notch	Method	Cplg Chk	RSCS Grp	Notes
	1	Withdraw	10-31	10	12	Notch	NA	-	
	2	Withdraw	42-31	10	12	Notch	NA	-	
	3	Withdraw	42-23	10	12	Notch	NA	-	
	4	Withdraw	10-23	10	12	Notch	NA	-	
	5	Insert	26-31	08	04	Notch	NA	-	
	6	Insert	26-23	08	04	Notch	NA	-	

Prepared By: _Joe Allen_
(RxEng)

SM Approval: _Dave Roe_
(Shift Manager)

Reviewed By: _Bob Jones_
(RxEng or SRO)

Stamps

CRS

Appendix D	Scenario Outline	Form ES-D-1

Facility: **James A. Fitzpatrick** Scenario No.: **NRC-3** Op-Test No.: **17-1**

Examiners: _____ Operators: _____
_____ _____
_____ _____

Initial Conditions: The plant is operating at approximately 85% power. SRV A is inoperable. RHR loop A is operating in the Torus Cooling lineup.

Turnover: Secure Torus Cooling per OP-13B. Then, raise Reactor power using control rods and Recirculation flow per the provided RMI.

Event No.	Malf. No.	Event Type*	Event Description
1	N/A	N – BOP, SRO	Secure Torus Cooling OP-13B
2	Remote RH35	C – SRO	Torus Cooling and Spray Valve (10MOV-39A) Power Loss ARP 09-3-1-3, Technical Specifications
3	N/A	R – ATC, SRO	Raise Reactor Power with Control Rods and Recirculation Flow OP-65, OP-26
4	RD11	C – ATC, SRO	Uncoupled Control Rod OP-26, AOP-25
5	ED18:A	C – BOP, SRO	Electrical Fault on 10500 Bus AOP-18, AOP-59, Technical Specifications
6	MS02:A	C – All	Steam Leak in Drywell AOP-39, AOP-1, EOP-2, EOP-4
7	ED44	C – All	Loss of Offsite Power AOP-72, EOP-2
8	RR15:A	M – All	Loss of Coolant Accident EOP-2, EOP-4
9	HP02	C – All	HPCI Trips EOP-2

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

Appendix D	Scenario Outline	Form ES-D-1

Facility: **James A. Fitzpatrick**	Scenario No.: **NRC-3**	Op-Test No.: **17-1**
1. Malfunctions after EOP entry (1-2) **Events 7, 9**	2	
2. Abnormal events (2-4) **Events 4, 5, & 6**	3	
3. Major transients (1-2) **Event 8**	1	
4. EOPs entered/requiring substantive actions (1-2) **EOP-2, EOP-4**	2	
5. EOP contingencies requiring substantive actions (0-2) **EOP-2 Alternate Level Control Leg** **EOP-2 Emergency Depressurization Leg**	2	
6. Pre-identified critical tasks (≥2)	2	
CRITICAL TASK DESCRIPTIONS: **CT-1: Given a coolant leak inside the Containment, the crew will spray the Drywell, in accordance with EOP-4.** **CT-2: Given a coolant leak, a loss of high pressure injection systems, and the inability to restore and maintain Reactor water level above the Top of Active Fuel (TAF), the crew will initiate actions for an Emergency RPV Depressurization, in accordance with EOP-2.**		

The scenario will begin at approximately 85% power with SRV A inoperable. RHR loop A is operating in the Torus Cooling lineup. The crew will begin by securing the Torus Cooling lineup per OP-13B. As the lineup is being secured, the breaker will trip for Torus Cooling and Spray Valve (10MOV-39A). The SRO will determine the Technical Specification impact of this failure.

The crew will raise Reactor power using a combination of Recirculation flow and control rods. They will begin by moving control rods 26-43 and 26-11 from position 24 to 48. When control rod 26-11 is at position 48, it will become apparent that the control rod is uncoupled. The crew will execute AOP-25 to re-couple the control rod and continue with the power ascension.

An electrical fault on the 4160 VAC 10500 bus will occur. The crew will execute AOP-18 (Loss of 10500 Bus) and AOP-59 (Loss of RPS Bus A). This will significantly impact the availability of Core Spray and RHR for the remainder of the scenario. The SRO will address Technical Specifications.

After the plant is stabilized, a steam leak inside the Drywell develops. The crew will insert a manual Reactor scram due to rising Drywell pressure.

Approximately 3 minutes after the scram, all 115KV offsite power is lost. This further degrades the availability of equipment. The crew will execute AOP-72. The crew will control Reactor water level with HPCI and/or RCIC due to the loss of all Condensate and Feedwater.

Approximately 7 minutes after the scram, the steam leak will degrade further into a significant loss of coolant accident. Rising inventory losses will require additional injection to the Reactor. Degrading Containment parameters will required Torus and then Drywell sprays.

Approximately 10 minutes after the scram HPCI will trip. The crew will maximize other injection systems (RCIC, SLC), but will be unable to keep up with lowering Reactor water level. The crew will execute the Alternate Level Control leg of EOP-2 to attempt to maintain Reactor water level above the Top of Active Fuel (zero inches).

Due to lowering Reactor water level and insufficient high pressure injection sources, the crew will perform an Emergency Depressurization to allow low pressure injection sources to restore and\or maintain Reactor water level >0 inches.

The scenario will be terminated when all control rods are inserted, Emergency Depressurization is in progress, and Reactor water level is being controlled above 0 inches.

JAMES A. FITZPATRICK NUCLEAR POWER PLANT

LOI 17-1 NRC EXAMINATION SCENARIO 3

TITLE: **LOI 17-1 NRC EXAMINATION SCENARIO 3**

SCENARIO NUMBER: **NRC 3**

PATH: **STAND ALONE**

Validation: _____ Training: _____ Operations: _____

	CANDIDATES
CRS	
ATC	
BOP	

RECORD OF CHANGES

DATE	SOURCE OF CHANGE	BRIEF DESCRIPTION OF CHANGE	INITIATOR	REVIEWED
10/30/17	New	New Scenario	T. Hooper	D. Kelly

A. TITLE: LOI 17-1 NRC EXAMINATION SCENARIO 3

B. SCENARIO SETUP:

1. IC-153

2. Special Instructions:

    a. The Plant is operating at approximately 85% power.
    b. SRV A is inoperable.
    c. RHR loop A is operating in the Torus Cooling lineup.
    d. Have ST-23B filled out to support control rod withdrawals.
    e. Ensure CRD B is running (A in Standby)

3. Preset Conditions:

    a. Preset, M:AD07:A Rx press relief vlv (2E-RV2-71A) failed closed
    b. Preset, M:RD11:26:11, Control Rod (26-11) Uncoupled
    c. Trigger 2, M:ED18:A, 4.16KV Bus 10500 Failure
    d. Trigger 3, M:MS02:A, MSL A steam leak inside Primary Containment, Ramp: 90 sec, Final: 2.5
    e. Trigger 4, M:RR15:A, Coolant A leak inside Primary Containment, Delay 7 min, Ramp: 10 min, Final: 32
    f. Trigger 4, M:ED44, Loss of 115KV system, Delay=3 min
    g. Trigger 4, M:HP02, HPCI Turbine Trip, Delay=10 min
    h. Trigger 1, R:RH35, 10-MOV-39A, RHR A Test Cooling and Spray breaker, Final=open
    i. Trigger 16, R:DG23:A, EDG-A Local Maintenance Switch, Final=maint
    j. Trigger 17, R:DG23:C, EDG-C Local Maintenance Switch, Final=maint
    k. Preset, O:AD ZLO271A(1), SRV A green light, Final=off
    l. Event Trigger 1, Event: zlo10as14a(2)==0, Command: None
    m. Event Trigger 4, Event: (zlo5ads8a == 0) && (zlo5ads8b == 0), Command: None

4. Consumable Forms and Procedures:
    - ♦ AOP-1, AOP-18, AOP-25, AOP-59, AOP-72, ST-23B

C. SCENARIO SUMMARY:

The scenario will begin at approximately 85% power with SRV A inoperable. RHR loop A is operating in the Torus Cooling lineup. The crew will begin by securing the Torus Cooling lineup per OP-13B. As the lineup is being secured, the breaker will trip for Torus Cooling and Spray Valve (10MOV-39A). The SRO will determine the Technical Specification impact of this failure.

The crew will raise Reactor power using a combination of Recirculation flow and control rods. They will begin by moving control rods 26-43 and 26-11 from position 24 to 48. When control rod 26-11 is at position 48, it will become apparent that the control rod is uncoupled. The crew will execute AOP-25 to re-couple the control rod and continue with the power ascension.

An electrical fault on the 4160 VAC 10500 bus will occur. The crew will execute AOP-18 (Loss of 10500 Bus) and AOP-59 (Loss of RPS Bus A). This will significantly impact the availability of Core Spray and RHR for the remainder of the scenario. The SRO will address Technical Specifications.

After the plant is stabilized, a steam leak inside the Drywell develops. The crew will insert a manual Reactor scram due to rising Drywell pressure.

Approximately 3 minutes after the scram, all 115KV offsite power is lost. This further degrades the availability of equipment. The crew will execute AOP-72. The crew will control Reactor water level with HPCI and/or RCIC due to the loss of all Condensate and Feedwater.

Approximately 7 minutes after the scram, the steam leak will degrade further into a significant loss of coolant accident. Rising inventory losses will require additional injection to the Reactor. Degrading Containment parameters will require Torus and then Drywell sprays.

Approximately 10 minutes after the scram HPCI will trip. The crew will maximize other injection systems (RCIC, SLC), but will be unable to keep up with lowering Reactor water level. The crew will execute the Alternate Level Control leg of EOP-2 to attempt to maintain Reactor water level above the Top of Active Fuel (zero inches).

Due to lowering Reactor water level and insufficient high pressure injection sources, the crew will perform an Emergency Depressurization to allow low pressure injection sources to restore and\or maintain Reactor water level >0 inches.

The scenario will be terminated when all control rods are inserted, Emergency Depressurization is in progress, and Reactor water level is being controlled above 0 inches.

Shift Turnover
The Plant is operating at approximately 85% power. SRV A is inoperable due to a circuit failure. RHR loop A is operating in the Torus Cooling lineup. When you take the shift: 1. Secure Torus Cooling per OP-13B. 2. Raise Reactor power using control rods and Recirculation flow per the provided RMI.

Critical Tasks/Standards
Critical Task #1: **Given a coolant leak inside the Containment, the crew will spray the Drywell, in accordance with EOP-4.** **Note:** This is required once Torus pressure exceeds 15 psig. **Critical Task #2:** **Given a coolant leak, a loss of high pressure injection system and the inability to restore and maintain Reactor water level above the Top of Active Fuel (TAF), the crew will initiate actions for an Emergency RPV Depressurization, in accordance with EOP-2.** **Note:** This is required once Reactor water level reaches 0".

EVENT NO.	EVENT SEQUENCE	
1.	Secure Torus Cooling	(Normal: BOP, SRO)
2.	Torus Cooling and Spray Valve (10MOV-39A) Power Loss	(Component: SRO)
3.	Raise Reactor Power with Control Rods and Recirculation Flow	(Reactivity: ATC, SRO)
4.	Uncoupled Control Rod	(Component: ATC, SRO)
5.	Electrical Fault on 10500 Bus	(Component: BOP, SRO)
6.	Steam Leak in Drywell	(Component: All)
7.	Loss of Offsite Power	(Component: All)
8.	Loss of Coolant Accident	(Major: All)
9.	HPCI Trips	(Component: All)

D. TERMINATION CUES:

- All control rods are inserted
- Emergency Depressurization is in progress
- Reactor water level is being controlled above 0”

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS/EVALUATION
Simulator in RUN Recorder and Alarm Power ON Simulator Checklist Complete			
Provide Turnover (Attach. 1)			
After the shift turnover, allow no more than five minutes for panel walkdown	All	• Walkdown the control panels and assume the watch	
<u>Events 1 & 2</u> **Secure Torus Cooling; Torus Cooling and Spray Valve (10MOV-39A) Power Loss**	SRO	• Perform Crew Brief • Direct BOP to secure Torus Cooling per OP-13B sections F.1 and F.7 • Acknowledge report of 10MOV-39A breaker trip • Ensure ARP execution • Declare RHR loop A inoperable for Containment Spray and Torus Cooling • Determine Technical Specification 3.6.1.9 and 3.6.2.3 Condition A requires restoring to operable status within 7 days • May discuss Technical Specification 3.6.1.3 Condition A (requires verifying the valve closed within 4 hours, but already met with valve closed and de-activated by breaker trip)	SAT / UNSAT / NA

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS/EVALUATION
Note: Trigger 1 automatically initiates when 10MOV-39A green light turns on to initiate event 2. **Role Play:** If dispatched to investigate 10MOV-39A, wait 2 minutes, then report that the supply breaker (71MCC-153-OD1) is	BOP	• Close RHR TEST & TORUS CLG 10MOV-34A • IF RHR Loop A flow is LESS THAN 1500 gpm, THEN ensure open MIN FLOW VLV 10MOV-16A • IF RHR Loop A operation is not required, THEN shut down RHR Loop A per Subsection F.7 • Ensure one of the RHR Loop A keep-full systems is in service as follows: o RHR KEEP-FULL PMP 10P-2A is running, OR o 10RHR-274 (RHR loop A reactor head spray keep-full cond xfer connection valve) is throttled open • Ensure closed the following valves: o RHR TEST & TORUS CLG 10MOV-34A o TORUS SPRAY INBD VLV 10MOV-38A o DW SPRAY INBD VLV 10MOV-31A • Ensure the following RHR pumps are stopped: o RHR PMP 10P-3A o RHR PMP 10P-3A • Ensure closed the following valves: o RHR TEST TORUS CLG & SPRAY 10MOV-39A o DW SPRAY OUTBD VLV 10MOV-26A • Recognize \ report Annunciator 09-3-1-03 (RHR A VLV OVERLOAD OR PWR LOSS) • Report 10MOV-39A indicating lights off • Dispatch operator to investigate	SAT / UNSAT / NA

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS/EVALUATION

tripped.		• Continue securing valve lineup
		• Ensure open MIN FLOW VLV 10MOV-16A
		• Ensure open HX A BYP VLV 10MOV-66A
		• IF RHRSW Loop A operation is not required, THEN shut down RHRSW Loop A as follows:
		  ○ Close RHRSW DISCH VLV FROM HX A 10MOV-89A
		  ○ Ensure the following RHRSW pumps are stopped:
		  ▪ RHRSW PMP 10P-1A
		  ▪ RHRSW PMP 10P-1C	

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS/EVALUATION
Events 3 & 4 **Raise Reactor Power with Control Rods and Recirculation Flow; Uncoupled Control Rod**	SRO	• Direct ATC to withdraw control rods per provided instructions • Provide oversight of reactivity manipulation • Acknowledge control rod 26-11 is uncoupled • Enter AOP-25, Uncoupled Control Rod • Direct recoupling the control rod per AOP-25 • Acknowledge control rod 26-11 is coupled • Direct ATC to raise Reactor power to 95% with Recirculation flow	SAT / UNSAT / NA

Note:
Control rods 26-43 and 26-11 are to be moved from position 24 to 48. Once at position 48, it will be discovered that control rod 26-11 is uncoupled.
	ATC	• While withdrawing control rods, monitor the following:
		  • Nuclear instrumentation
		  • Control rod position indication
		• Ensure ROD SEL PWR switch is in ON
		• Ensure control rod to be moved is selected by depressing rod select pushbutton on ROD SEL matrix, if necessary
		• Verify the following:
		  • Select pushbutton is brightly backlit
		  • Control rod indicating light is on
		  • ROD OUT PERM light is on
		  • IF control rod is to be withdrawn to position 48, THEN perform ST-23B to withdraw and perform coupling integrity test:
		• Place and hold ROD EMERG IN NOTCH OVERRIDE control switch in OVERRIDE
			SAT / UNSAT / NA

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS/EVALUATION

Booth Operator:
When control rod 26-11 is inserted to position 44, then **delete malfunction RD11:26:11**.
 	
Note:
It is recommended to move on to the next event after a few Recirc flow manipulations have been observed.
		• Place and hold the ROD MOVEMENT CNTRL control switch in OUT NOTCH
		• Verify the following for the selected control rod:
		  • Four rod display indicates 48
		  • Red FULL OUT light is on at FULL CORE DISPLAY
		• Verify annunciator 09-5-2-4 ROD OVERTRAVEL is clear
		• Release the following control switches:
		  • ROD MOVEMENT CNTRL
		  • ROD EMERG IN NOTCH OVERRIDE
		• Document results of coupling integrity test on Attachment 2
		• Repeat for control rod 26-11
		• Recognize / report control rod 26-11 is uncoupled
		• Re-couple control rod 26-11 per AOP-25:
		  • Insert the control rod to position 44
		  • Withdraw control rod to position 48 using notch withdrawal
		  • Perform control rod coupling integrity test per ST-23B
		• Recognize / report control rod 26-11 is coupled
		• Report completion of control rod withdrawals
		• Raise Reactor power to 95% using Recirculation flow:
		  ○ Raise Recirc flow alternately with RWR MG A(B) SPEED CNTRL
		  ○ Monitor APRMs, CTP, Recirc flow, Reactor water level	

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS/EVALUATION
<u>Event 5</u> **Electrical Fault on 10500 Bus** (on Lead Examiner Cue: ACTIVATE TRIGGER 2)	ALL	• Recognize / report loss of Bus 10500 • Recognize / report start of EDGs A and C • Recognize / report half scram	SAT / UNSAT / NA
	SRO	• Acknowledge reports • Enter AOP-18 (Loss of 10500 Bus) • Enter AOP-59 (Loss RPS A) • Determine Technical Specification 3.8.7 Condition A requires restoring Bus 10500 within 8 hours	SAT / UNSAT / NA

Role Play:
If dispatched to investigate Bus 10500, wait two minutes, then report that the normal supply breaker (10514) is tripped and appears to have some damage to the cubicle door (no smoke, no fire).
 	
Role Play:
As NPO when dispatched to 93ECP-A(C), use REMOTE **Triggers 16 and 17** to place EDG A (C) control switch to MAINT, report completed.
	BOP	• Execute AOP-18
		• Dispatch NPO to EDGs
		• Start DW Cooling Fan 68FN-2D
		• Shutdown EDG A and C:
		  ○ Ensure EDG A LOAD BKR 10502 (512) is tripped and placed in PULL TO LOCK
		  ○ Ensure EDG A & C TIE BKR 10504 is tripped
		  ○ Place EDG A (C) CONTROL SWITCH in MAINT at panel 93ECP-A(C)
		  ○ Place EDG A(C) CNTRL control switch to STOP at panel 09-8
		• Executes AOP-59 (Loss of RPS Bus A Power)
		• Verify SBGT B start per OP-20
		  ○ Verify the following:
			SAT / UNSAT / NA

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS/EVALUATION
Role Play: if dispatched to restore RPS power, report preparations \ briefs will begin.		▪ White light for AIR HTR 01-125E-5B is on ▪ Red light for AIR HTR 01-125E-5B is on ▪ BELOW EL 369' SUCT 01-125MOV-12 is open ▪ TRAIN B CLG VLV 01-125MOV-100B is closed ▪ TRAIN B INLET 01-125MOV-14B is open ▪ FN DISCH 01-125MOV-15B is open ▪ TRAIN A FN 01-125FN-1B is running o If SGT Train A is shutdown, then verify flow rate on SGT FLOW 01-125FI-106A: ▪ RB un-isolated – Approximately 6000 scfm ▪ RB isolated – Approximately 5600 to 5800 scfm	

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS/EVALUATION
<u>Event 6</u> **Steam Leak in Drywell** (on Lead Examiner Cue: ACTIVATE TRIGGER 3)	ALL	• Recognize / report rising Drywell pressure and temperature • Recognize / report EPIC alarm 358, DW Cam Hi Rad	SAT / UNSAT / NA
	SRO	• Acknowledge reports • As time permits, may direct rapid Reactor power reduction in anticipation of Reactor scram • Direct Reactor scram • Enter AOP-1 (Reactor Scram) • Enter AOP-39 (Loss of Coolant) • Enter EOP-2 (RPV Control) on low Reactor water level and high Drywell pressure (as they occur) • Enter EOP-4 (Primary Containment Control) on high Drywell pressure and high Drywell temperature (as they occur) • Direct Reactor water level controlled 180-220” using Feedwater and Condensate • Direct Reactor pressure controlled 800-1000# using Turbine Bypass Valves • Direct Control Room and Relay Room Ventilation isolated per OP-55B Section G within 30 minutes • Direct TSC filtered ventilation started per Section D of OP-59B within 60 minutes • May direct Core Spray and RHR injection prevented per EP-5	SAT / UNSAT / NA

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS/EVALUATION
	ATC	• If directed, rapidly lower Reactor power with Recirculation flow and/or CRAM rods • Enter AOP-1 • Depress MANUAL SCRAM A and MANUAL SCRAM B pushbuttons • Place RX MODE switch in SHUTDOWN • Fully insert IRMs and SRMs • Observe Reactor power lowering • Ensure closed SDIV vent and drain valves • Ensure Main Turbine is tripped • Verify 4KV loads (10300 Bus) transfer to reserve power • May begin Reactor depressurization	SAT / UNSAT / NA
	BOP	• Enter AOP-1 • Control Reactor water level 180-220” using Feedwater and Condensate	SAT / UNSAT / NA

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS/EVALUATION
Event 7 **Loss of Offsite Power** **Note:** This event is automatically initiates approximately 3 minutes after the scram.	ALL	• Recognize / report loss of offsite power • Recognize / report loss of Buses 10100, 10200, 10300, and 10400	SAT / UNSAT / NA
	SRO	• Enter AOP-72 (115 KV Grid Loss, Instability, or Degradation), as time permits • Direct Reactor water level controlled 180-220" using HPCI, RCIC, CRD and/or SLC • Update crew on status of available equipment • May direct closing MSIVs	SAT / UNSAT / NA
	BOP	• Control Reactor water level 180-220" using HPCI, RCIC, CRD and/or SLC • If needed to manually start HPCI, then per OP-15: o Ensure reset RPV high level light o Ensure desired suction path open o Ensure open 23MOV-16 o Ensure running 23P-140 o Perform the following steps without unnecessary delay: o If 09-3-3-28 is in, then depress 23A-S17 o Ensure running 23P-150 o Ensure open 23MOV-19 o Adjust thumbwheel for desired flow	

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS/EVALUATION
		• If needed to manually start RCIC, then per OP-19: ○ Verify Annunciator 09-4-0-32 RCIC LOGIC RX LVL HI is clear ○ Verify CST SUCT VLV 13MOV-18 open ○ Start VAC PMP 13P-3 ○ Open OIL CLR WTR SUPP 13MOV-132 ○ Perform the following without unnecessary delay: ○ Open TURB STM SUPP VLV 13MOV-131 ○ Open INJ VLV 13MOV-21 ○ Adjust RCIC FLOW CNTRL 13FIC-91 to desired flow rate	

<u>Events 8 & 9</u> **Loss of Coolant Accident; HPCI Trips** **Note:** The loss of coolant accident automatically initiates ~7 minutes after the Reactor scram. The HPCI trip automatically initiates ~10 minutes after the Reactor scram.	All	• Recognize / report rising Drywell pressure and lowering Reactor water level • Recognize / report trip of HPCI (~3 min later)	SAT / UNSAT / NA

Critical Task #1 **Critical Task #1 Standard:**	**Given a coolant leak inside the Containment, the crew will spray the Drywell, in accordance with EOP-4.** **Spray the Drywell.**	**Pass / Fail**
Critical Task #2 **Critical Task #2 Standard:**	**Given a coolant leak, a loss of high pressure injection systems, and the inability to restore and maintain Reactor water level above the Top of Active Fuel (TAF), the crew will initiate actions for an Emergency RPV Depressurization in accordance with EOP-2.** **Open at least 5 SRVs.**	**Pass / Fail**

	SRO	• Acknowledge reports • Re-enter EOP-2 (RPV Control) on low Reactor water level, as necessary • When Primary Containment pressure exceeds 2.7 psig and before Torus pressure exceeds 15 psig, direct initiation of Torus Spray • **When Torus pressure exceeds 15 psig, direct Drywell spray** • Determine Reactor water level cannot be maintained above 0” • Enter Alternate RPV Level Control leg of EOP-2 • Direct override of ADS • Direct SLC injection, if not done previously • **When Reactor water level reaches 0”, enter Emergency RPV Depressurization leg of EOP-2** • Direct opening all ADS valves • Direct opening one additional SRV • Direct Reactor water level restored and maintained 180-220” using Core Spray and/or LPCI • As time allows, directs re-start of Drywell spray	SAT / UNSAT / NA **Critical Task #1** **Critical Task #2**
	ATC / BOP	• Recognize / report trip of HPCI • Attempt to control Reactor water level 180-220” using RCIC, CRD, and/or SLC • Recognize / report inability to maintain Reactor water level with available injection systems	SAT / UNSAT / NA

Note: Once the crew has sprayed the Drywell, the lead examiner may direct tripping HPCI earlier than previously programmed to move the scenario along. Additionally, the lead examiner may direct ramping the coolant leak faster than previously programmed.	ATC / BOP	• Initiate Torus spray: ▪ Place SPRAY CNTRL 10A-S17B switch to MANUAL, spring return to normal ▪ Verify white SPRAY PERM 10A-DS67B light is on ▪ Ensure available RHR pumps in RHR Loop B are running (recognize/report failure to automatically start) ▪ Open RHR TEST TORUS CLG & SPRAY 10MOV-39B ▪ Throttle TORUS SPRAY INBD VLV 10MOV-38B to establish desired torus spray flow rate ▪ WHEN RHR Loop B flow is GREATER THAN 1500 gpm, ensure closed MIN FLOW VLV 10MOV-16B ▪ Throttle RHR TEST & TORUS CLG 10MOV-34B to divert excess flow to the torus to maintain > 6,500 gpm RHR Loop B flow with one RHR pump operating or > 13,000 gpm RHR Loop B flow with two RHR pumps operating • Establish RHRSW flow and temperature control: • Loop B: ▪ Establish RHRSW flow and temperature control: ▪ Start one of the RHRSW pumps ▪ Throttle RHRSW DISCH VLV FROM HX B 10MOV-89B to establish 2500 to 4000 gpm ▪ Start the second RHRSW pump if desired ▪ Throttle RHRSW DISCH VLV FROM HX B 10MOV-89B to establish 2500 to 4000 gpm per RHRSW pump • IF drywell or torus sprays are in service, THEN establish 4000 gpm per RHRSW pump • Close HX B BYP VLV 10MOV-66B	SAT / UNSAT / NA

	ATC / BOP	• Ensure Recirc pumps tripped • Ensure Drywell Cooling fans tripped • **Initiate Drywell spray:** • Place SPRAY CNTRL 10A-S17B switch to MANUAL, spring return to normal ▪ Verify white SPRAY PERM 10A-DS67B light is on ▪ Ensure available RHR pumps in RHR Loop B are running ▪ Open DW SPRAY OUTBD VLV 10MOV-26B ▪ Throttle DW SPRAY INBD VLV 10MOV-31B to establish desired drywell spray flow rate • Override ADS: ▪ Place ADS LOGIC OVERRIDE & RESET LOGIC A 2E-S2A in OVERRIDE ▪ Place ADS LOGIC OVERRIDE & RESET LOGIC B 2E-S2B in OVERRIDE ▪ Verify annunciator 09-4-1-27 ADS OVERRIDE SW IN OVERRIDE is in alarm ▪ Verify white ADS LOGIC OVERRIDDEN 2E-DS10 light is on • Initiate SLC injection, if not done previously • Verify isolations per AOP-15 • As time permits, execute AOP-39 (Loss of Coolant)	SAT / UNSAT / NA **Critical Task #1**

	ATC / BOP	• **Open all ADS valves and one additional SRV** • Restore and maintain Reactor water level 180-220” using available injection systems • Control LPCI injection by throttling 10MOV-27A(B) • Control CS injection by throttling 14MOV-12B • Secure RHR pumps if needed	SAT / UNSAT / NA **Critical Task #2**

Termination Criteria:

All control rods are inserted, Emergency Depressurization is in progress and Reactor water level is being controlled above 0 inches.

Shift Turnover

The Plant is operating at approximately 85% power.

SRV A is inoperable due to a circuit failure.

RHR loop A is operating in the Torus Cooling lineup.

When you take the shift:

1. Secure Torus Cooling per OP-13B.
2. Raise Reactor power using control rods and Recirculation flow per the provided RMI.

Sheet 1 of 1

Reactivity/monitoring Steps – (site specific RWR control sheet format is to be used)

Power Ascension Today

Page 1 of 1

Init	Step	Action	Rod	From Notch	To Notch	Method	Cplg Chk	RSCS Grp	Notes
	1	Withdraw	26-43	24	48	Continuous	Yes	-	
	2	Withdraw	26-11	24	48	Continuous	Yes	-	
	3	Raise **power** to 95% RTP	-	-	-	RWR	NA	-	

Prepared By: _Joe Allen_
(RxEng)

SM Approval: _Dave Roe_
(Shift Manager)

Reviewed By: _Bob Jones_
(RxEng or SRO)

Stamps

CONTROL ROOM OPERATOR

Sheet 1 of 1

Reactivity/monitoring Steps – (site specific RWR control sheet format is to be used)

Power Ascension Today

Page 1 of 1

Init	Step	Action	Rod	From Notch	To Notch	Method	Cplg Chk	RSCS Grp	Notes
	1	Withdraw	26-43	24	48	Continuous	Yes	-	
	2	Withdraw	26-11	24	48	Continuous	Yes	-	
	3	Raise **power** to 95% RTP	-	-	-	RWR	NA	-	

Prepared By: _Joe Allen_
(RxEng)

SM Approval: _Dave Roe_
(Shift Manager)

Reviewed By: _Bob Jones_
(RxEng or SRO)

Stamps

INDEPENDENT VERIFIER

Sheet 1 of 1

Reactivity/monitoring Steps – (site specific RWR control sheet format is to be used)

Power Ascension Today

Page 1 of 1

Init	Step	Action	Rod	From Notch	To Notch	Method	Cplg Chk	RSCS Grp	Notes
	1	Withdraw	26-43	24	48	Continuous	Yes	-	
	2	Withdraw	26-11	24	48	Continuous	Yes	-	
	3	Raise **power** to 95% RTP	-	-	-	RWR	NA	-	

Prepared By: _Joe Allen_
(RxEng)

SM Approval: _Dave Roe_
(Shift Manager)

Reviewed By: _Bob Jones_
(RxEng or SRO)

Stamps

CRS

Facility: **James A. Fitzpatrick** Scenario No.: **NRC-4** Op-Test No.: **17-1**

Examiners: _____ Operators: _____
_____ _____
_____ _____

Initial Conditions: The plant is operating at approximately 5% power during a startup.

Turnover: Continue power ascension by withdrawing control rods. Then, transition to Mode 1.

Event No.	Malf. No.	Event Type*	Event Description
1	N/A	R – ATC, SRO	Withdraw Control Rods OP-65, OP-26
2	NM08:E	I – ATC, SRO	IRM Fails Inop ARPs, OP-16, Technical Specifications
3	N/A	N – BOP, SRO	Transition to Mode 1 OP-65
4	PC04:B	C – BOP, SRO	Standby Gas Treatment Fan B Trips ARP 09-75-2-24(32), OP-20, Technical Specifications
5	EP02 Remote ED23	I – BOP, SRO	Seismic Event, LPCI Inverter Trips AOP-14, ARP 09-8-3-2, Technical Specifications
6	OG03	C – All	Explosion in Air Ejector Discharge ARP 09-6-1-7(15), AOP-4, AOP-1, EOP-2
7	EP01 RH10 Overrides	M – All	Second Seismic Event; RHR Suction Piping Leak; RHR Suction Fails to Isolate EOP-2, EOP-4
8	Overrides	C – ATC, SRO	Feedwater Low Flow Control Valve Fails Closed EOP-2
9	RP03	I – All	MSIVs Spuriously Isolate EOP-2

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

Appendix D	**Scenario Outline**	**Form ES-D-1**

Facility: **James A. Fitzpatrick**	Scenario No.: **NRC-4**	Op-Test No.: **17-1**
1. Malfunctions after EOP entry (1-2) **Events 8, 9**	2	
2. Abnormal events (2-4) **Events 5, 6**	2	
3. Major transients (1-2) **Event 7**	1	
4. EOPs entered/requiring substantive actions (1-2) **EOP-2, EOP-4**	2	
5. Entry into a contingency EOP with substantive actions (≥1 per scenario set) **EOP-2 Emergency Depressurization Leg**	1	
6. Pre-identified critical tasks (≥2)	2	
CRITICAL TASK DESCRIPTIONS: **CT-1: Given an un-isolable Torus water leak and the inability to maintain Torus water level above 10.75', the crew will initiate a manual HPCI turbine trip, in accordance with EOP-4.** **CT-2: Given an un-isolable Torus water leak and the inability to maintain Torus water level above 9.58', the crew will perform an Emergency RPV Depressurization, in accordance with EOP-2.**		

The scenario will begin at approximately 5% power during a startup. The crew will begin by raising Reactor power by withdrawing control rods. During control rod withdrawals, IRM E will fail. The crew will bypass IRM E and reset a half scram in order to continue with the startup. Then, the crew will continue by transitioning to Mode 1 and withdrawing all IRMs per OP-65.

Standby Gas Treatment fan B will trip. The crew will swap Standby Gas Treatment trains and the SRO will determine the Technical Specification impact.

A small seismic event will occur. The AC input to the A LPCI inverter will fail. The crew will transfer the A LPCI inverter to the alternate AC supply. The crew will execute AOP-14 in response to the earthquake. The SRO will determine the Technical Specification impact.

A hydrogen explosion will occur in the Steam Jet Air Ejector discharge piping. The crew will enter AOP-4 and insert a manual Reactor scram. The crew will takes actions per AOP-1 and/or EOP-2 to stabilize the plant.

A second, larger seismic event will occur. This will cause the suction pipe from the Torus to the RHR system to break. The crew will attempt to isolate the leak, but a valve failure will result in the break being un-isolable. The crew will initiate Torus makeup, but Torus water level will continue to lower. The crew will trip HPCI as Torus water level lowers. The MSIVs will spuriously isolate, limiting the crew's ability to anticipate Emergency Depressurization. The crew will determine that Torus water level cannot be maintained above 9.58 feet and will perform an Emergency Depressurization.

The scenario will be terminated when all Control Rods are inserted, a Rapid/Emergency Depressurization is in progress and RPV level is controlled above zero inches.

JAMES A. FITZPATRICK NUCLEAR POWER PLANT

LOI 17-1 NRC EXAMINATION SCENARIO 4

TITLE: **LOI 17-1 NRC EXAMINATION SCENARIO 4**

SCENARIO NUMBER: **NRC 4**

PATH: **STAND ALONE**

Validation: _____ Training: _____ Operations: _____

	CANDIDATES
CRS	
ATC	
BOP	

RECORD OF CHANGES

DATE	SOURCE OF CHANGE	BRIEF DESCRIPTION OF CHANGE	INITIATOR	REVIEWED
10/31/17	New	New Scenario	T. Hooper	D. Kelly

A. TITLE: LOI 17-1 NRC EXAMINATION SCENARIO 4

B. SCENARIO SETUP:

1. IC-155

2. Special Instructions:

    a. The Plant is operating at approximately 5% power during a startup.
    b. OP-65 is “open” and place-kept up and including step D.20.2.d.
    c. Ensure Rod Withdrawal Sequence A1-2 is “open” and place-kept up to the correct rod.
    d. Have multiple copies of the control rod movement sheets.

3. Preset Conditions:

    a. Trigger 1, M:NM08:E, IRM Channel E Inoperative
    b. Trigger 2, M:PC04:B, SBGT Fan 1B Trip
    c. Trigger 3, M:EP02, Earthquake - Minor
    d. Trigger 3, R:ED23, LPCI AC Input Bkr ‘A’ (71-INV-3A), Final=open
    e. Trigger 4, M:OG03, Explosion in Air Ejector Discharge Piping
    f. Trigger 5, M:RH10:A, RHR loop A suction line pipe failure, Ramp: 30 sec, Final: 20
    g. Trigger 5, M:EP01, Earthquake – Major, Delay=2:00
    h. Trigger 5, M:RP03, Inadvertent Group 1 Isolation, Delay=4:00
    i. Trigger 25, R:RH46, RHR keepfull normal lineup valve, Final: 100
    j. Trigger 26, R: RH47, RHR keepfull normal lineup valve, Final: 100
    k. Trigger 16, O:RH ZDI10AS4C, Torus suction valve, Delay: 5 sec, Final: Open
    l. Trigger 16, O: RH ZLO10AS4C(1), RHR pump 10P-3C suction valve, Delay: 5 sec, Final: Off
    m. Trigger 16, O: RH ZLO10AS4C(2), RHR pump 10P-3C suction valve, Delay: 5 sec, Final: Off
    n. Preset, O:FW ZDI6130 Fdwtr Startup Vlv, Final=Manual
    o. Trigger 5, O:FW ZAI6130(1), Feedwater Low Flow Cntrl, Delay=2 min, Final=0
    p. Event Trigger 5, Event: (zlo5ads8a ==0) && (zlo5ads8b == 0), Command: none
    q. Event Trigger 16, Event: zdi10as4c==0, Command: imf rh10:a 100 5:00

4. Consumable Forms and Procedures:
    - AOP-1, AOP-4, AOP-14

C. SCENARIO SUMMARY:

The scenario will begin at approximately 5% power during a startup. The crew will begin by raising Reactor power by withdrawing control rods. During control rod withdrawals, IRM E will fail. The crew will bypass IRM E and reset a half scram in order to continue with the startup. Then, the crew will continue by transitioning to Mode 1 and withdrawing all IRMs per OP-65.

Standby Gas Treatment fan B will trip. The crew will swap Standby Gas Treatment trains and the SRO will determine the Technical Specification impact.

A small seismic event will occur. The AC input to the A LPCI inverter will fail. The crew will transfer the A LPCI inverter to the alternate AC supply. The crew will execute AOP-14 in response to the earthquake. The SRO will determine the Technical Specification impact.

A hydrogen explosion will occur in the Steam Jet Air Ejector discharge piping. The crew will enter AOP-4 and insert a manual Reactor scram. The crew will take actions per AOP-1 and/or EOP-2 to stabilize the plant.

A second, larger seismic event will occur. This will cause the suction pipe from the Torus to the RHR system to break. The crew will attempt to isolate the leak, but a valve failure will result in the break being un-isolable. The crew will initiate Torus makeup, but Torus water level will continue to lower. The crew will trip HPCI as Torus water level lowers. The MSIVs will spuriously isolate, limiting the crew's ability to anticipate Emergency Depressurization. The crew will determine that Torus water level cannot be maintained above 9.58 feet and will perform an Emergency Depressurization.

The scenario will be terminated when all Control Rods are inserted, a Rapid/Emergency Depressurization is in progress and RPV level is controlled above zero inches.

Shift Turnover

The Plant is operating at approximately 5% power with the Mode Switch in STARTUP.

The Drywell has been verified to be clear of personnel.

Feedwater is being controlled in manual on FCV-137.

Standby Gas Treatment train B is running for inerting purposes.

When you take the shift:

1. Continue control rod withdrawals per the startup control rod sequence:

    - The next movement is A1-2 Sequence
    - RSCS Group 11
    - Step 24
    - Control Rod 18-27
    - Complete Step 24, and then stop while transitioning to Mode 1.

1. Transition to Mode 1 per OP-65 step D.20.3 (it is desired to have the SNO-2 (BOP) perform these actions).

2. Continue OP-65, up to and including, step D.20.6 to withdraw all IRMs.

Critical Tasks/Standards	
Critical Task #1:	**Given an un-isolable Torus water leak and the inability to maintain Torus water level above 10.75 feet, the crew will initiate a manual HPCI turbine trip, in accordance with EOP-4.**
Critical Task #2:	**Given an un-isolable Torus water leak and the inability to maintain Torus water level above 9.58 feet, the crew will perform an Emergency RPV Depressurization, in accordance with EOP-2.**

EVENT NO.	EVENT SEQUENCE	
1.	Withdraw Control Rods	(Reactivity : ATC, SRO)
2.	IRM Fails Inop	(Instrument: ATC, SRO)
3.	Transition to Mode 1	(Normal: BOP, SRO)
4.	Standby Gas Treatment Fan B Trips	(Component: BOP, SRO)
5.	Seismic Event, LPCI Inverter Trips	(Instrument: BOP, SRO)
6.	Explosion in Air Ejector Discharge	(Component: ALL)
7.	Second Seismic Event, RHR Suction Piping Leak, RHR Suction Fails to Isolate	(Major: ALL)
8.	Feedwater Low Flow Control Valve Fails Closed	(Component: ATC, SRO)
9.	MSIVs Spuriously Isolate	(Instrument: ALL)

D. TERMINATION CUES:

- All Control Rods are inserted, a Rapid/Emergency Depressurization is in progress and RPV level is controlled above zero inches.

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS/EVALUATION
Simulator in RUN Recorder and Alarm Power ON Simulator Checklist Complete			
Provide Turnover (Attach. 1)			
After the shift turnover, allow no more than five minutes for panel walkdown	All	• Walkdown the control panels and assume the watch	
<u>Event 1</u> **Withdraw Control Rods**	SRO	• Perform Crew Brief • Direct ATC to continue control rod withdrawals • Provide oversight of reactivity manipulation	SAT / UNSAT / NA

Note:
The first four control rods in the withdrawal sequence are 18-27, 26-35, 34-27, and 26-19. These control rods are being moved from position 06 to 08. It is recommended to insert Trigger 1 to initiate Event 2 after the 2nd control rod has been withdrawn.
	ATC	• While withdrawing control rods, monitor the following:
		  ○ Nuclear instrumentation
		  ○ Control rod position indication
		• Ensure ROD SEL PWR switch is in ON
		• Ensure control rod to be moved is selected by depressing rod select pushbutton on ROD SEL matrix, if necessary
		• Verify the following:
		  ○ Select pushbutton is brightly backlit
		  ○ Control rod indicating light is on
		  ○ ROD OUT PERM light is on
		• Place ROD MOVEMENT CNTRL switch to OUT NOTCH, spring return to OFF
			SAT / UNSAT / NA

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS/EVALUATION
		• Verify control rod latches in the expected even numbered position before ROD SETTLE light goes off • Verify ROD SETTLE light is off • Repeat as necessary	
Event 2 **IRM Fails Inop** (on Lead Examiner Cue: ACTIVATE TRIGGER 1)	ALL	• Recognize / report annunciators: o 09-5-1-3, RPS A AUTO SCRAM o 09-5-1-41, NEUTRON MON SYSTEM TRIP o 09-5-2-2, ROD WITHDRAWN BLOCK o 09-5-2-52, IRM TRIP SYS. A INOP OR UPSCALE TRIP • Recognize / report INOP trip on IRM E • Recognize / report half scram on RPS A	SAT / UNSAT / NA
	SRO	• Acknowledge reports • Direct ARP response • Determine Technical Specification 3.3.1.1 and TRM 3.3.B are satisfied with IRM E bypassed • Direct bypassing IRM E • Direct resetting half scram • Direct continuing with control rod withdrawals	SAT / UNSAT / NA

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS/EVALUATION
	ATC	• Bypass IRM E per OP-16: o Place IRM BYP switch in (*) o Verify IRM (*) is bypassed using one or both of the following: o IRM (*) BYPASS indicating light is on o IRM (*) EPIC alarm indicates bypassed o Verify the other three IRM channels associated with the same IRM BYP switch are in service using one or both of the following: o BYPASS indicating lights for the other three IRMs are off o No EPIC bypassed alarms for the other three IRMs • Reset half scram per ARP 09-5-1-3: o Place RX SCRAM RESET switch to GROUP 2 & 3, then to GROUP 1 & 4, spring return to NORM o Verify RPS A SCRAM GROUPS 1, 2, 3, and 4 lights are on	SAT / UNSAT / NA

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS/EVALUATION
<u>Event 3</u> **Transition to Mode 1**	SRO	• Direct transition to Mode 1 per OP-65 steps D.20.3 thru D.20.6	SAT / UNSAT / NA

	BOP	• Place RX MODE switch in RUN
		• Ensure all personnel out of drywell (NOTE: status provided on turnover sheet)
		• Withdraw IRMs to full out per OP-16:
		  ○ Ensure POWER ON light is on
		  ○ Ensure IRMs that will be withdrawn are selected
		  ○ Verify IRM RETRCT PERMIT lights are on for IRMs that will be withdrawn
		  ○ Depress DRIVE OUT/DRIVING OUT pushbutton
		  ○ Verify DRIVE OUT light is on
		  ○ Verify DRIVING OUT light comes on
		  ○ WHEN IRMs are at desired position OR detector OUT light comes on, depress DRIVE OUT/DRIVING OUT pushbutton
		  ○ Verify the following lights are off:
		  ▪ DRIVE OUT
		  ▪ DRIVING OUT
		  ○ WHEN operation of IRMs is no longer desired, ensure IRMs are de-selected
			SAT / UNSAT / NA

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS/EVALUATION

Event 4
Standby Gas Treatment Fan B Trips
(on Lead Examiner Cue: ACTIVATE TRIGGER 2)
	BOP	• Recognize / report annunciators:
		  ○ 09-75-2-24, SGT SYS B MTR OVERLOAD OR PWR LOSS
		  ○ 09-75-2-32, SGT SYS FLOW LO
		• Recognize / report trip of SBGT fan B
			SAT / UNSAT / NA

Role Play: If asked about need for SGT to be running, state that it is required for Drywell inerting operations.	SRO	• Acknowledge reports • Direct ARP response • Direct start of SGT fan A per OP-20 • Determine Technical Specification 3.6.4.3 Condition A entry is required (restore SGT fan B to operable within 7 days)	SAT / UNSAT / NA

Role Play:
If dispatched to check SBGT fan B breaker, wait 2 minutes and then report that the breaker is tripped on overload, but there are no other abnormal indications.
 	
Role Play:
If asked as NPO about Drywell venting / SGT alignment, report that Drywell venting lineup remains properly aligned.
	BOP	• Start SGT fan A per OP-20:
		• Ensure open ABOVE EL 369' SUCT 01-125MOV-11
		• Ensure open TRAIN A INLET 01-125MOV-14A
		• Verify the following:
		  ○ White light for AIR HTR 01-125E-5A is on
		  ○ Red light for AIR HTR 01-125E-5A is on
		  ○ TRAIN A CLG VLV 01-125MOV-100A is closed
		  ○ FN DISCH 01-125MOV-15A is open
		  ○ TRAIN A FN 01-125FN-1A is Running
		• IF standby gas treatment is being placed in service to support any of the following:
		  ○ Torus venting
		  ○ Drywell venting
			SAT / UNSAT / NA

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS/EVALUATION
		○ HPCI operation ○ Main Steam Leakage Collection System operation ○ Auxiliary Gas Treatment System operation THEN ensure required standby gas treatment suction valves are lined up per the applicable procedure prior to proceeding to Step D.1.5 • IF SGT Train B is shutdown, THEN perform the following: ○ Verify open TRAIN B CLG VLV 01-125MOV-100B ○ Verify flow rate on SGT FLOW 01-125FI-106A: ▪ RB un isolated Approximately 6000 scfm ▪ RB isolated Approximately 5600 to 5800 scfm	

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS/EVALUATION
<u>Event 5</u> **Seismic Event, LPCI Inverter Trips** (on Lead Examiner Cue: ACTIVATE TRIGGER 3)	BOP \ ATC	• Recognize / report EPIC seismic alarm • Recognize / report annunciator 09-8-3-02, LPCI MOV IPS A 71INV-3A AC INPUT LOSS	SAT / UNSAT / NA
Role Play: If dispatched to check LPCI inverter breaker, wait 2 minutes and then report that the LPCI inverter AC input breaker is tripped, but there are no other abnormal indications.	SRO	• Acknowledge reports • Direct execution of AOP-14, Earthquake • Direct ARP response • Determine Technical Specification 3.8.4 Condition D requires LPCI A to be declared inoperable immediately • Declare LPCI A inoperable (TS 3.5.1 Condition A)	SAT / UNSAT / NA
Role Plays: If asked about seismic indications in Relay Room, wait one minute, then report that the Seismic Relay Alarm light is lit, but the OBE Exceeded light is NOT lit. If asked about position of CAD valves, report 27SOV-129A is open. If contacted as Nine Mile Point about seismic event, report that you have also felt a seismic event and had actuation of seismic alarms.	BOP	• Execute ARP 09-8-3-02: ○ IF alarm is not anticipated, AND LPCI MOV A PWR SUPP control switch is not in ALT PULL TO LOCK at panel 09-8, THEN place LPCI MOV Bus A on alternate feed as follows: ▪ Verify L-15 is energized at panel 09-8 ▪ Place LPCI MOV A PWR SUPP switch in ALT PULL TO LOCK at panel 09-8 • Execute AOP-14 (Earthquake) ○ Ensure open one of the following valves at Panel 27CAD: ▪ 27SOV-129A, 27SOV-129B ○ Confirm seismic event using any of the following sources: ▪ JAF seismic instrumentation (Any TRIGGER LED on seismic indicator panel), NMP 2 seismic instrumentation, National Earthquake Information Center	SAT / UNSAT / NA

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS/EVALUATION

<u>Event 6</u>
Explosion in Air Ejector Discharge
(on Lead Examiner cue, insert Trigger 4)
	BOP / ATC	• Recognize / report annunciators:
		  ○ 09-6-1-7, OFF GAS LINE PRESS HI
		  ○ 09-6-1-15, OFF GAS LINE TEMP HI
		• Recognize / report SJAE isolation valves closed
			SAT / UNSAT / NA

Note: EOP-2 entry may not be immediately required due to low initial Reactor power level.	SRO	• Enter AOP-4, Explosion in Air Ejector Discharge Piping • Direct a manual Reactor scram • Enter AOP-1, Reactor Scram • May enter EOP-2, RPV Control, if Reactor water level lowers below 177” • Direct Reactor pressure controlled 800 to 1000 psig using TBVs • Direct Reactor water level controlled 180 to 220 inches using Feedwater • May direct Reactor cooldown < 100°F/hr	SAT / UNSAT / NA
	BOP	• Execute AOP-4 • Report need for a manual Reactor scram to crew	SAT / UNSAT / NA

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS/EVALUATION
Note: Further actions in AOP-4 may be performed if time permits, but will likely be delayed beyond the end of the scenario due to other complications.	ATC	• Enter AOP-1 • Depress MANUAL SCRAM A and MANUAL SCRAM B pushbuttons • Place RX MODE switch in SHUTDOWN • Fully insert IRMs and SRM • Observe Reactor power downscale on APRMs • Observe SDIV vent and drain valves closed • Transfer APRM/IRM recorders to IRMs, down-range IRMs	SAT / UNSAT / NA
	BOP	• Enter AOP-1 o Control RPV water level between 180 and 220” using any of the following methods: o Take manual control of reactor feed pump and adjust FDWTR STARTUP VLV (34FCV-137)	SAT / UNSAT / NA

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS/EVALUATION
<u>Events 7, 8, & 9</u> **Second Seismic Event; RHR Suction Piping Leak; RHR Suction Fails to Isolate; Feedwater Low Flow Control Valve Fails Closed; MSIVs Spuriously Isolate**	ALL	• Recognize / report seismic event alarm • Recognize / report lowering Torus water level	SAT / UNSAT / NA

Critical Task #1	**Given an un-isolable Torus water leak and the inability to maintain Torus water level above 10.75', the crew will initiate a manual HPCI turbine trip, in accordance with EOP-4.**	**Pass / Fail**
Critical Task #1 Standard:	**Insert manual HPCI trip signal**	
Critical Task #2	**Given an un-isolable Torus water leak and the inability to maintain Torus water level above 9.58', the crew will perform an Emergency RPV Depressurization, in accordance with EOP-2.**	**Pass / Fail**
Critical Task #2 Standard:	**If Torus water level is above 5.5', open 7 SRVs.** **OR** **If Torus water level is below 5.5', rapidly depressurize the RPV using one or more Group 2 Pressure Control systems.**	

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS/EVALUATION
Booth Operator: When Torus makeup actions are complete and/or attempted isolation of RHR pump C suction line is complete (and with Lead Examiner concurrence), ramp malfunction RH10A from 20% to 100% over 5 minutes.	SRO	• Enter EOP-4 on low Torus water level • Enter EOP-5 on high sump / area water levels • Direct leak isolation • Acknowledge inability to isolate leak • Direct make-up water to the Torus using OP-13B • Acknowledge MSIV closure • Direct Reactor pressure control with SRVs • Direct Reactor water level control with RCIC or Condensate Booster pumps • Monitor for 10.75 feet and 9.58 feet Torus water level • Determine Torus water level cannot be maintained > 10.75 feet • **Direct HPCI turbine tripped** • Enter EOP-2 • May direct rapid depressurization using TBVs • Determine Torus water level cannot be maintained > 9.58 feet • Determine Emergency Depressurization required • Enter EOP-2 Emergency Depressurization Leg • **If Torus water level is above 5.5 ft, direct opening of all 7 ADS valves** • **If Torus water level is below 5.5 ft, direct rapidly depressurize the RPV using one or more Group 2 Pressure Control Systems**	SAT / UNSAT / NA **Critical Task #1** **Critical Task #2**

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS/EVALUATION

Role Play:
When dispatched as operator to investigate Torus leak, wait 3 minutes, then report that there is a large leak on RHR pump C suction between the pump and the suction valve.
 	
If requested to close MOV-151A, wait 2 more minutes, then report that MOV-151A is stuck open.
 	
Role Play:
When dispatched to open 10RHR-260/274, wait 1 minute and insert Remotes to open directed valve (Triggers 25/26).
	ATC / BOP	• Attempt to close RHR pump C suction valve
		• Recognize / report failure of RHR pump C suction valve to close
		• Attempt to lineup Torus makeup per OP-13B section G.3(4)
		  ○ Ensure open 10RHR-274(260) (RHR loop A(B) containment spray keep-full cond xfer connection valve)
		  ○ Open HX A INBD VENT VLV 10MOV-166A(B)
		  ○ Open HX A OUTBD VENT VLV 10MOV-167A(B)
		• Recognize / report MSIV closure
		• Control Reactor pressure with SRVs
		• Control Reactor water level with RCIC and/or Condensate Booster pumps
		• **Insert manual HPCI trip signal prior to 10.75 feet**
		• May rapidly depressurize Reactor using Turbine Bypass Valves
		• **If Torus water level is above 5.5 feet, open 7 SRVs**
		OR
		• **If Torus water level is below 5.5 feet, rapidly depressurize RPV using one or more Group 2 Pressure Control Systems**
			SAT / UNSAT / NA
			
			Critical Task #1
			
			Critical Task #2

Termination Criteria:

All Control Rods are inserted, an Emergency Depressurization is in progress, and RPV level is controlled above zero inches.

Shift Turnover

The Plant is operating at approximately 5% power with the Mode Switch in STARTUP.

The Drywell has been verified to be clear of personnel.

Feedwater is being controlled in manual on FCV-137.

Standby Gas Treatment train B is running for inerting purposes.

When you take the shift:

1. Continue control rod withdrawals per the startup control rod sequence:
    - The next movement is A1-2 Sequence
    - RSCS Group 11
    - Step 24
    - Control Rod 18-27
    - Complete Step 24, and then stop while transitioning to Mode 1.
2. Transition to Mode 1 per OP-65, begin at step D.20.3 (it is desired to have the SNO-2 (BOP) perform these actions).
3. Continue OP-65, up to and including, step D.20.6 to withdraw all IRMs.