Facility: OCONEE Date of Exam: DECEMBER 2015

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 & Abnormal Plant Evolutions	1	3	3	3	N/A			3	3	N/A		3	18	3	3	6
	2	2	1	2				2	1			1	9	2	2	4
	Tier Totals	5	4	5				5	4			4	27	5	5	10
2. Plant Systems	1	3	3	2	3	2	2	3	2	3	2	3	28	3	2	5
	2	1	1	1	1	1	1	1	1	1	1	0	10	0 1	2	3
	Tier Totals	4	4	3	4	3	3	4	3	4	3	3	38	4	4	8

3. Generic Knowledge and Abilities Categories	RO 1	RO 2	RO 3	RO 4	RO Total	SRO 1	SRO 2	SRO 3	SRO 4	SRO Total
	2	2	3	3	10	2	1	2	2	7

Note:

1. Ensure that at least two topics from every applicable K/A category are sampled within each tier of the RO and SRO-only outlines (i.e., except for one category in Tier 3 of the SRO-only outline, the "Tier Totals" in each K/A category shall not be less than two).
2. The point total for each group and tier in the proposed outline must match that specified in the table. The final point total for each group and tier may deviate by ±1 from that specified in the table based on NRC revisions. The final RO exam must total 75 points and the SRO-only exam must total 25 points.
3. Systems/evolutions within each group are identified on the associated outline; systems or evolutions that do not apply at the facility should be deleted and justified; operationally important, site-specific systems/evolutions that are not included on the outline should be added. Refer to Section D.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 shall be selected. Use the RO and SRO ratings for the RO and SRO-only portions, respectively.
6. Select SRO topics for Tiers 1 and 2 from the shaded systems and K/A categories.

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

8. On the following pages, enter the K/A numbers, a brief description of each topic, the topics' importance ratings (IRs) for the applicable license level, and the point totals (#) for each system and category. Enter the group and tier totals for each category in the table above; if fuel handling equipment is sampled in other than Category A2 or G* on the SRO-only exam, enter it on the left side of Column A2 for Tier 2, Group 2 (Note #1 does not apply). Use duplicate pages for RO and SRO-only exams.
9. For Tier 3, select topics from Section 2 of the K/A catalog, and enter the K/A numbers, descriptions, IRs, and point totals (#) on Form ES-401-3. Limit SRO selections to K/As that are linked to 10 CFR 55.43.

KA	NAME / SAFETY FUNCTION:	IR RO	IR SRO	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
007EK2.03	Reactor Trip - Stabilization - Recovery / 1	3.5	3.6	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	Reactor trip status panel
008AA2.24	Pressurizer Vapor Space Accident / 3	2.6	2.6	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	Value at which turbine bypass valve maintains header pressure after a reactor trip
009EG2.1.20	Small Break LOCA / 3	4.6	4.6	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Ability to execute procedure steps.
011EK1.01	Large Break LOCA / 3	4.1	4.4	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	Natural circulation and cooling, including reflux boiling.
015AK3.05	RCP Malfunctions / 4	2.8	3	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	Shift of T-ave. sensors to the loop with the highest flow
022AK3.06	Loss of Rx Coolant Makeup / 2	3.2	3.3	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	RCP thermal barrier cooling
025AK2.02	Loss of RHR System / 4	3.2	3.2	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	LPI or Decay Heat Removal/RHR pumps
027AG2.2.42	Pressurizer Pressure Control System Malfunction / 3	3.9	4.6	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Ability to recognize system parameters that are entry-level conditions for Technical Specifications
029EK3.02	ATWS / 1	3.1	3.1	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	Starting a specific charging pump
038EA2.16	Steam Gen. Tube Rupture / 3	4.2	4.6	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	Actions to be taken if S/G goes solid and water enters steam line
054AK1.02	Loss of Main Feedwater / 4	3.6	4.2	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	Effects of feedwater introduction on dry S/G

KA	NAME / SAFETY FUNCTION:	IR RO	IR SRO	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
055EA1.07	Station Blackout / 6	4.3	4.5	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐	Restoration of power from offsite
056AG2.4.20	Loss of Off-site Power / 6	3.8	4.3	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of operational implications of EOP warnings, cautions and notes.
057AA1.06	Loss of Vital AC Inst. Bus / 6	3.5	3.5	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐	Manual control of components for which automatic control is lost
065AA1.01	Loss of Instrument Air / 8	2.7	2.5	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐	Remote manual loaders
077AA2.06	Generator Voltage and Electric Grid Disturbances / 6	3.4	3.5	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	Generator frequency limitations
BE04EK2.2	Inadequate Heat Transfer - Loss of Secondary Heat Sink / 4	4.2	4.2	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	Facility s heat removal systems, including primary coolant, emergency coolant, the decay heat removal systems, and relations between the proper operation of these systems to the operation of the facility.
BE05EK1.1	Steam Line Rupture - Excessive Heat Transfer / 4	3.8	3.8	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	Components, capacity, and function of emergency systems.

KA	NAME / SAFETY FUNCTION:	IR RO	IR SRO	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
001AK3.02	Continuous Rod Withdrawal / 1	3.2	4.3	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	Tech-Spec limits on rod operability
003AA1.05	Dropped Control Rod / 1	4.1	4.1	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐	Reactor power - turbine power
005AK1.03	Inoperable/Stuck Control Rod / 1	3.2	3.6	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	Xenon transient
028AG2.4.11	Pressurizer Level Malfunction / 2	4.0	4.2	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of abnormal condition procedures.
037AK1.02	Steam Generator Tube Leak / 3	3.5	3.9	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	Leak rate vs. pressure drop
059AA1.02	Accidental Liquid RadWaste Rel. / 9	3.3	3.4	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐	ARM system
060AK3.03	Accidental Gaseous Radwaste Rel. / 9	3.8	4.2	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	Actions contained in EOP for accidental gaseous-waste release
BA03AA2.2	Loss of NNI-Y / 7	4	4	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	Adherence to appropriate procedures and operation within the limitations in the facility s license and amendments.
BA05AK2.2	Emergency Diesel Actuation / 6	3.5	3.7	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	Facility's heat removal systems, including primary coolant, emergency coolant, the decay heat removal systems, and relations between the proper operation of these systems to the operation of the facility.

KA	NAME / SAFETY FUNCTION:	IR RO	IR SRO	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
003K2.02	Reactor Coolant Pump	2.5	2.6	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	CCW pumps
004K4.04	Chemical and Volume Control	3.2	3.1	☐	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	Manual/automatic transfers of control
004K6.20	Chemical and Volume Control	2.5	3.1	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐	☐	Function of demineralizer, including boron loading and temperature limits
005K2.01	Residual Heat Removal	3.0	3.2	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	RHR pumps
006K6.10	Emergency Core Cooling	2.6	2.8	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐	☐	Valves
007A1.01	Pressurizer Relief/Quench Tank	2.9	3.1	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐	Maintaining quench tank water level within limits
008A4.01	Component Cooling Water	3.3	3.1	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	☐	CCW indications and controls
010K3.01	Pressurizer Pressure Control	3.8	3.9	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	RCS
012K5.01	Reactor Protection	3.3	3.8	☐	☐	☐	☐	☑	☐	☐	☐	☐	☐	☐	DNB
013K4.21	Engineered Safety Features Actuation	3.1	3.3	☐	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	Reason for starting an additional service water booster pump for train not being tested and stopping the pump on train under test
022A3.01	Containment Cooling	4.1	4.3	☐	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	Initia tion of safeguards mode of operation

KA	NAME / SAFETY FUNCTION:	IR RO	IR SRO	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
026A1.05	Containment Spray	3.1	3.4							✓					Chemical additive tank level and concentration
026K1.01	Containment Spray	4.2	4.2	✓											ECCS
039A4.03	Main and Reheat Steam	2.8	2.8										✓		MFW pump turbines
039G2.1.32	Main and Reheat Steam	3.8	4.0											✓	Ability to explain and apply all system limits and precautions.
059A2.04	Main Feedwater	2.9	3.4								✓				Feeding a dry S/G
059A3.06	Main Feedwater	3.2	3.3									✓			Feedwater isolation
061G2.4.8	Auxiliary/Emergency Feedwater	3.8	4.5											✓	Knowledge of how abnormal operating procedures are used in conjunction with EOPs.
062K1.04	AC Electrical Distribution	3.7	4.2	✓											Off-site power sources
063G2.1.23	DC Electrical Distribution	4.3	4.4											✓	Ability to perform specific system and integrated plant procedures during all modes of plant operation.
063K1.03	DC Electrical Distribution	2.9	3.5	✓											Battery charger and battery
064K2.03	Emergency Diesel Generator	3.2	3.6		✓										Control power

KA	NAME / SAFETY FUNCTION:	IR RO	IR SRO	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
064K3.03	Emergency Diesel Generator	3.6	3.9	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	ED/G (manual loads)
073K4.01	Process Radiation Monitoring	4.0	4.3	☐	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	Release termination when radiation exceeds setpoint
073K5.03	Process Radiation Monitoring	2.9	3.4	☐	☐	☐	☐	☑	☐	☐	☐	☐	☐	☐	Relationship between radiation intensity and exposure limits
076A1.02	Service Water	2.6	2.6	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐	Reactor and turbine building closed cooling water temperatures.
078A3.01	Instrument Air	3.1	3.2	☐	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	Air pressure
103A2.04	Containment	3.5	3.6	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	Containment evacuation (including recognition of the alarm)

KA	NAME / SAFETY FUNCTION:	IR RO	IR SRO	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
001K2.03	Control Rod Drive	2.7	3.1	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	One-line diagram of power supplies to logic circuits
002K6.03	Reactor Coolant	3.1	3.6	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐	☐	Reactor vessel level indication
011K3.03	Pressurizer Level Control	3.2	3.7	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	PZR PCS
016A3.02	Non-nuclear Instrumentation	2.9	2.9	☐	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	Relationship between meter readings and actual parameter value
035K4.04	Steam Generator	2.8	3.1	☐	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	Radiation high-level isolation while draining S/G secondary to main condenser
045A1.05	Main Turbine Generator	3.8	4.1	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐	Expected response of primary plant parameters (temperature and pressure) following T/G trip
055K1.06	Condenser Air Removal	2.6	2.6	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	PRM system
071A4.10	Waste Gas Disposal	2.5	2.4	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	☐	WGDS sampling
079A2.01	Station Air	2.9	3.2	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	Cross-connection with IAS
086K5.03	Fire Protection	3.1	3.4	☐	☐	☐	☐	☑	☐	☐	☐	☐	☐	☐	Effect of water spray on electrical components

KA	NAME / SAFETY FUNCTION:	IR RO	IR SRO	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
G2.1.13	Conduct of operations	2.5	3.2	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of facility requirements for controlling vital / controlled access.
G2.1.41	Conduct of operations	2.8	3.7	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of the refueling processes
G2.2.22	Equipment Control	4.0	4.7	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of limiting conditions for operations and safety limits.
G2.2.39	Equipment Control	3.9	4.5	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of less than one hour technical specification action statements for systems.
G2.3.11	Radiation Control	3.8	4.3	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Ability to control radiation releases.
G2.3.14	Radiation Control	3.4	3.8	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of radiation or contamination hazards that may arise during normal, abnormal, or emergency conditions or activities
G2.3.4	Radiation Control	3.2	3.7	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of radiation exposure limits under normal and emergency conditions
G2.4.16	Emergency Procedures/Plans	3.5	4.4	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of EOP implementation hierarchy and coordination with other support procedures or guidelines.
G2.4.45	Emergency Procedures/Plans	4.1	4.3	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Ability to prioritize and interpret the significance of each annunciator or alarm.
G2.4.49	Emergency Procedures/Plans	4.6	4.4	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Ability to perform without reference to procedures those actions that require immediate operation of system components and controls.

KA	NAME / SAFETY FUNCTION:	IR RO	IR SRO	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
022AG2.4.20	Loss of Rx Coolant Makeup / 2	3.8	4.3	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of operational implications of EOP warnings, cautions and notes.
027AA2.04	Pressurizer Pressure Control System Malfunction / 3	3.7	4.3	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	Tech-Spec limits for RCS pressure
038EA2.01	Steam Gen. Tube Rupture / 3	4.1	4.7	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	When to isolate one or more S/Gs
057AG2.4.11	Loss of Vital AC Inst. Bus / 6	4.0	4.2	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of abnormal condition procedures.
065AG2.4.41	Loss of Instrument Air / 8	2.9	4.6	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of the emergency action level thresholds and classifications.
077AA2.07	Generator Voltage and Electric Grid Disturbances / 6	3.6	4.0	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	Operational status of engineered safety features

KA	NAME / SAFETY FUNCTION:	IR RO	IR SRO	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
003AA2.02	Dropped Control Rod / 1	2.7	2.8	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	Signal inputs to rod control system
024AA2.06	Emergency Boration / 1	3.6	3.7	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	When boron dilution is taking place
BA05AG2.2.44	Emergency Diesel Actuation / 6	4.2	4.4	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Ability to interpret control room indications to verify the status and operation of a system, and understand how operator actions and directives affect plant and system conditions
BA07AG2.4.21	Flooding / 8	4.0	4.6	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of the parameters and logic used to assess the status of safety functions

KA	NAME / SAFETY FUNCTION:	IR RO	IR SRO	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
005G2.2.25	Residual Heat Removal	3.2	4.2	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of the bases in Technical Specifications for limiting conditions for operations and safety limits.
012A2.05	Reactor Protection	3.1	3.2	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	Faulty or erratic operation of detectors and function generators
013A2.06	Engineered Safety Features Actuation	3.7	4.0	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	Inadvertent ESFAS actuation
039A2.03	Main and Reheat Steam	3.4	3.7	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	Indications and alarms for main steam and area radiation monitors (during SGTR)
062G2.2.4	AC Electrical Distribution	3.6	3.6	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	(multi-unit) Ability to explain the variations in control board layouts, systems, instrumentation and procedural actions between units at a facility.

KA	NAME / SAFETY FUNCTION:	IR RO	IR SRO	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
002G2.2.22	Reactor Coolant	4.0	4.7	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of limiting conditions for operations and safety limits.
014A2.02	Rod Position Indication	3.1	3.6	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	Loss of power to the RPIS
033G2.4.9	Spent Fuel Pool Cooling	3.8	4.2	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of low power / shutdown implications in accident (e.g. LOCA or loss of RHR) mitigation strategies.

KA	NAME / SAFETY FUNCTION:	IR RO	IR SRO	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
G2.1.39	Conduct of operations	3.6	4.3	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of conservative decision making practices
G2.1.5	Conduct of operations	2.9	3.9	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Ability to locate and use procedures related to shift staffing, such as minimum crew complement, overtime limitations, etc.
G2.2.43	Equipment Control	3.0	3.3	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of the process used to track inoperable alarms
G2.3.15	Radiation Control	2.9	3.1	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of radiation monitoring systems
G2.3.7	Radiation Control	3.5	3.6	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Ability to comply with radiation work permit requirements during normal or abnormal conditions
G2.4.18	Emergency Procedures/Plans	3.3	4.0	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of the specific bases for EOPs.
G2.4.29	Emergency Procedures/Plans	3.1	4.4	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of the emergency plan.

ILT48

Facility: **Oconee**	Date of Examination: **12/02/2015**
Examination Level: RO ☒ SRO ☐	Operating Test Number: **1**

Administrative Topic (see Note)	Type Code*	Describe activity to be performed
Conduct of Operations [KA: GEN 2.1.37 (4.3/4.6)] (20 min)	M, R	**Admin-106, Calculate Run Time For Deborating Demineralizer** (Both)
Conduct of Operations [KA: GEN 2.1.4 (3.3/3.8)] (15 min)	D, R	**ADMIN-107, Determine If RO License Requirements Are Met** (RO Only)
Equipment Control [KA: GEN 2.2.12 (3.7/4.1)] (10 min)	D, R	**Admin-203, Perform NI Surveillance And Determine Any Required Actions** (RO Only)
Radiological Control [KA: GEN 2.3.4 (3.2/3.7)] (20 min)	N, R	**Admin-303, Calculate Maximum Permissible Stay Time** (Both)
Emergency Plan		**N/A**

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

ILT48

Facility: **Oconee**	Date of Examination: **12/02/2015**
Examination Level: RO ☐ SRO ☒	Operating Test Number: **1**

Administrative Topic (see Note)	Type Code*	Describe activity to be performed
Conduct of Operations [KA: GEN 2.1.37 (4.3/4.6)] (20 min)	M, R	**Admin-106, Calculate Run Time For Deborating Demineralizer** (Both)
Conduct of Operations [KA: GEN 2.1.13 (2.5/3.2)] (15 min)	D, R	**Admin-S106, Evaluate Items For Entry Into Containment** (SRO Only)
Equipment Control [KA GEN 2.2.12 (3.7/4.1)] (20 min)	D, R	**Admin-S202, Complete a Surveillance Evaluation** (SRO Only)
Radiological Control [KA: GEN 2.3.4 (3.2/3.7)] (20 min)	N, R	**Admin-303, Calculate Maximum Permissible Stay Time** (Both)
Emergency Plan [KA GEN 2.4.38 (2.4/4.4)] (30 min)	N, R	**Admin-S403, Determine Emergency Classification And Complete The Initial Emergency Notification Form** (SRO Only)

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

Facility: **Oconee**	Date of Examination: **12/02/15**
Exam Level: **RO** [X] SRO-I [ ] SRO-U [ ]	Operating Test No.: **1**

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

System / JPM Title	Type Code*	Safety Function
a. **RO-102 Respond to a Boron Dilution Event** AP/1/A/1700/003 (Boron Dilution) [KA: APE 024 AA1.04 (3.6*/3.7)] (15 min)	N, S	**1**
b. **RO-202 Remove 1A Letdown Cooler From Service** OP/1/A/1104/002 HPI System Encl. 4.5 (Operation of Letdown Coolers) [KA: 004 G 2.2.2 (4.6/4.1)] (15 min)	D, S	**2**
c. **RO-304a Perform Rule 2 Following a LOSCM** EP/1/A/1800/001 EOP Rule 2 (Loss of SCM) [KA: E/APE 011 EA2.11 (3.9/4.3)] (10 min)	A, EN, N, S	**3**
d. **RO-P402a Start a Fourth Reactor Coolant Pump** OP/1/A/1103/006 Encl 4.4 (Starting 1B2 RCP) [KA: 003 A4.03 (2.8/2.5)] (10 min)	A, D, L, S	**4P**
e. **RO-503, Pump the Quench Tank** OP/1/A/1104/017 Encl 4.1 (Pumping QT) [KA: 007 A1.01 (2.9/3.1)] (10 min)	D, L, S	**5**
f. **RO-602, Restore Secondary Loads After Loss of Offsite Power** AP/1/A/1700/011 (Recovery from Loss of Power) [KA: 062 A4.01 (3.3/3.1)] (15 min)	N, S	**6**
g. **RO-803a, Align Intake Canal For Recirc on Dam Failure** AP/1/A/1700/013 Dam Failure [KA: 075 G2.1.23 (4.3/4.4)] (20 min)	A, D, S	**8**
h. **RO-901a Release GWD Tank** OP/1&2/A/1104/018 Encl. 4.9 (GWD Tank Release) [KA: 071 A4.26 (3.1/3.9)] (30 min)	A, D, S	**9**

In-Plant Systems@ (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)		
i. **AO-602 Startup a Vital Bus Inverter** OP/2/A/1107/004 (Operation of Vital Bus, Computer, ICS, and Auxiliary Inverters) Encl 4.2 (Startup of Vital Bus Inverters) [KA: 062 A3.04 (2.7/2.9)] (12 min)	D	**6**
j. **AO-101 Swap CRD Filters** OP/1/A/1104/008 (Component Cooling System) Encl 4.19 (Placing 1A or 1B CRD Filter in Service) [KA: 001 G2.3.13 (3.4/3.8)] (20 min)	D, R	**1**
k. **AO-802a Isolate HPSW and LPSW During an AB Flood** AP/3/A/1700/030 (Auxiliary Building Flooding) Encl 5.1 (HPSW AB Flood Isolation) and 5.2 (LPSW AB Flood Isolation) [KA: BW/A07 AA2.2 (3.3/3.7)] (16 min)	A, D, E	**8**
@ All RO and SRO-I control room (and in-plant) systems must be different and serve different safety functions; all 5 SRO-U systems must serve different safety functions; in-plant systems and functions may overlap those tested in the control room.		

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

Facility: **Oconee**		Date of Examination: **12/02/15**
Exam Level: **RO** ☐ SRO-I ☐ SRO-U ☒		Operating Test No.: **1**

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

System / JPM Title	Type Code*	Safety Function
a. **N/A**		
b. **N/A**		
c. **RO-304a Perform Rule 2 Following a LOSCM** EP/1/A/1800/001 EOP Rule 2 (Loss of SCM) [KA: E/APE011 EA2.11 (3.9/4.3)] (10 min)	A, EN, N, S	3
d. **RO-P402a Start a Fourth Reactor Coolant Pump** OP/1/A/1103/006 Encl 4.4 (Starting 1B2 RCP) [KA: 003 A4.03 (2.8/2.5)] (10 min)	A, D, L, S	**4P**
e. **N/A**		
f. **RO-602, Restore Secondary Loads After Loss of Offsite Power** AP/1/A/1700/011 (Recovery from Loss of Power) [KA: 062 A4.01 (3.3/3.1)] (15 min)	N, S	**6**
g. **N/A**		
h. **N/A**		

In-Plant Systems@ (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)		
i. **N/A**		
j. **AO-101 Swap CRD Filters** OP/1/A/1104/008 (Component Cooling System) Encl 4.19 (Placing 1A or 1B CRD Filter in Service) [KA: 001 G2.3.13 (3.4/3.8)] (20 min)	D, R	**1**
k. **AO-802a Isolate HPSW and LPSW During an AB Flood** AP/3/A/1700/030 (Auxiliary Building Flooding) Encl 5.1 (HPSW AB Flood Isolation) and 5.2 (LPSW AB Flood Isolation) [KA: BWA07 AA2.2 (3.3/3.7)] (16 min)	A, D, E	**8**

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

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

EPE007 EK2.03 - Reactor Trip

Knowledge of the interrelations between a reactor trip and the following: (CFR 41.7 / 45.7)

Reactor trip status panel ....

Which ONE of the following combinations of statalarms, if actuated, would illuminate the Trip Confirm Lamp on the Diamond?

A. 1SA-1/E-2 (CRD BKR A TRIP)
1SA-1/E-4 (CRD BKR C TRIP)

B. 1SA-1/E-2 (CRD BKR A TRIP)
1SA-1/E-5 (CRD BKR D TRIP)

C. 1SA-1/E-2 (CRD BKR A TRIP)
1SA-1/E-6 (CRD ELECTRONIC TRIP E)

D. 1SA-1/E-3 (CRD BKR B TRIP)
1SA-1/E-7 (CRD ELECTRONIC TRIP F)

ILT48 ONS SRO NRC Examination QUESTION 1

1

B

General Discussion

Answer A Discussion

Incorrect. CRD Breaker trip combinations are: A and B, A and D, B and C, C and D, A and Electronic Trip F, B and Electronic Trip E. Plausible in that two CRD breakers indicate tripped and if either B or D were tripped in the place of C, it would be correct.

Answer B Discussion

CORRECT. CRD Breakers A and D tripped will de-energize the CRDs and initiate a Trip Confirm, which will cause the Trip Confirm Lamp on the Diamond to illuminate.

Answer C Discussion

Incorrect. CRD Breaker trip combinations are: A and B, A and D, B and C, C and D, A and Electronic Trip F, B and Electronic Trip E. Plausible since CRD BKR A and CRD ELECTRONIC TRIP F would be correct.

Answer D Discussion

Incorrect. CRD Breaker trip combinations are: A and B, A and D, B and C, C and D, A and Electronic Trip F, B and Electronic Trip E. Plausible since CRD BKR B and CRD ELECTRONIC TRIP E would be correct.

Basis for meeting the KA

The Reactor Trip Status at Oconee is indicated by the CRD Breaker statalarms on 1SA-1 and the Trip Confirm Lamp on the Diamond. The question requires knowledge of the interrelations between a reactor trip and the CRD Breaker statalarms and Trip Confirm Lamp on the Diamond.

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Memory	NEW	

Development References

IC-CRI Obj. 05 and 14
ARG

Student References Provided

EPE007 EK2.03 - Reactor Trip
Knowledge of the interrelations between a reactor trip and the following: (CFR 41.7 / 45.7)
Reactor trip status panel ....

401-9 Comments:

Remarks/Status

APE008 AA2.24 - Pressurizer (PZR) Vapor Space Accident (Relief Valve Stuck Open)
Ability to determine and interpret the following as they apply to the Pressurizer Vapor Space Accident: (CFR: 43.5 / 45.13)
Value at which turbine bypass valve maintains header pressure after a reactor trip ....

Given the following Unit 1 conditions:

- Reactor power = 100%
- 1RC-66 fails OPEN

1) The initial Reactor Protective System trip function setpoint reached will be RCS __(1)__ pressure.

2) Following the Reactor trip, with actual SG Outlet pressure = 985 psig, the Turbine Bypass valves will be __(2)__.

Which ONE of the following completes the statements above?

ASSUME NO OPERATOR ACTIONS

A. 1. Low
   2. throttled open

B. 1. Variable Low
   2. throttled open

C. 1. Low
   2. closed

D. 1. Variable Low
   2. closed

ILT48 ONS SRO NRC Examination QUESTION 2

2

D

General Discussion

Answer A Discussion

Incorrect. First part is incorrect. Plausible since RCS pressure will decrease during this event to the point that the reactor will trip. Second part is incorrect. Plausible since it would be correct prior to the reactor trip. Normal Turbine Header Pressure setpoint = 885 psig. The Turbine Bypass Valves (TBVs) provide overpressure relief when the turbine is on-line at setpoint + 50 psig. So prior to the reactor trip, the TBVs would throttle open at 935 psig. Trip confirm inputs a + 125 psig bias. 885 + 125 = 1010 psig setpoint for TBVs following the reactor trip, so at 985 psig, the TBVs would be closed.

Answer B Discussion

Incorrect. First part is correct. 1RC-66 open at 100% is essentially a SBLOCA and will cause RCS pressure to decrease with little/no temperature decrease. This will cause a trip on Variable Low Pressure. Second part is incorrect. Plausible since it would be correct prior to the reactor trip. Normal Turbine Header Pressure setpoint = 885 psig. The Turbine Bypass Valves (TBVs) provide overpressure relief when the turbine is on-line at setpoint + 50 psig. So prior to the reactor trip, the TBVs would throttle open at 935 psig. Trip confirm inputs a + 125 psig bias. 885 + 125 = 1010 psig setpoint for TBVs following the reactor trip, so at 985 psig, the TBVs would be closed.

Answer C Discussion

Incorrect. First part is incorrect. Plausible since RCS pressure will decrease during this event to the point that the reactor will trip. Second part is correct.

Answer D Discussion

Correct. First part: 1RC-66 open at 100% is essentially a SBLOCA and will cause RCS pressure to decrease with little/no temperature decrease. This will cause a trip on Variable Low Pressure. Second part: Normal Turbine Header Pressure setpoint = 885 psig. Trip confirm inputs a + 125 psig bias. 885 + 125 = 1010 psig setpoint for TBVs following the reactor trip, so at 985 psig, the TBVs would be closed.

Basis for meeting the KA

Requires knowledge of value at which turbine bypass valves maintain header pressure following a reactor trip due to a PZR vapor space accident.

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	MODIFIED	ILT45 Q1

Development References	Student References Provided
ILT45 Q1 ICS-02 Obj. 04	

APE008 AA2.24 - Pressurizer (PZR) Vapor Space Accident (Relief Valve Stuck Open)

Ability to determine and interpret the following as they apply to the Pressurizer Vapor Space Accident: (CFR: 43.5 / 45.13)

Value at which turbine bypass valve maintains header pressure after a reactor trip ....

401-9 Comments:	Remarks/Status

EPE009 2.1.20 - Small Break LOCA
EPE009 GENERIC
Ability to interpret and execute procedure steps. (CFR: 41.10 / 43.5 / 45.12)

Given the following Unit 1 conditions:
Time = 1700

- Reactor trip from 100%

Time = 1705

- All SCMs = 0^{o}F stable
- HPI header A flow = 578 gpm stable
- 1A and 1B HPI pumps operating
- 1C HPI pump breaker failed open

1) The valve that must be opened in accordance with Rule 2 (Loss of SCM) is __(1)__.

2) In accordance with Rule 6 (HPI), once the above valve is opened the MAXIMUM total HPI flow is __(2)__ gpm.

Which ONE of the following completes the statements above?

A. 1. 1HP-409
2. 950

B. 1. 1HP-409
2. 750

C. 1. 1HP-410
2. 950

D. 1. 1HP-410
2. 750

ILT48 ONS SRO NRC Examination QUESTION 3

3

A

General Discussion

Answer A Discussion

Correct, Rule 2 provides guidance if no flow in the "B" HPI header to open 1HP-409. In addition, if 1A & 1B HPI pumps operating with 1HP-409 open, do not exceed 950 gpm total.

Answer B Discussion

Incorrect, first part is correct. Second part is incorrect. Plausible because this is the limit on HPI flow if ONLY one LPI to HPI flow path exists while in piggy back operation.

Answer C Discussion

Incorrect, first part is incorrect. Plausible because the higher number valve would normally go to the "B" header. Second part is correct.

Answer D Discussion

Incorrect, first part is incorrect. Plausible because the higher number valve would normally go to the "B" header. Second part is incorrect. Plausible because this is the limit on HPI flow if ONLY one LPI to HPI flow path exists while in piggy back operation.

Basis for meeting the KA

Question requires evaluating the plant following a SBLOCA and determining how to adjust HPI flow (Rules 2 & 6).

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	BANK	ILT45 Q2

Development References

ILT 45 Q2
EAP-LOSCM Obj. 24
Rule 2
Rule 6

Student References Provided

EPE009 2.1.20 - Small Break LOCA
EPE009 GENERIC
Ability to interpret and execute procedure steps. (CFR: 41.10 / 43.5 / 45.12)

401-9 Comments:

Remarks/Status

APE056 AK1.03 - Loss of Offsite Power

Knowledge of the operational implications of the following concepts as they apply to Loss of Offsite Power: CFR 41.8 / 41.10 / 45.3)
Definition of subcooling: use of steam tables to determine it ....

Given the following Unit 1 conditions:
Time = 1200

- Power escalation in progress
- Reactor power = 38% slowly increasing
- A Switchyard Isolation occurs

Time = 1215

- RCS pressure = 2125 psig
- Pressurizer temperature = 640°F
- Pressurizer level is stable
- All Pressurizer heaters are energized

1) At Time = 1200, an AUTOMATIC Reactor trip __(1)__ occur.

2) At Time = 1215, the pressurizer is __(2)__ .

Which ONE of the following completes the statements above?

A. 1. will
2. saturated

B. 1. will
2. subcooled

C. 1. will NOT
2. saturated

D. 1. will NOT
2. subcooled

General Discussion

Answer A Discussion

Incorrect. First part is plausible since it could be true if Reactor power were > 40%. Second part is plausible since RCS presssure is below the normal pressure of 2155 psig and Pzr temperature is below normal saturated temp of 648 degrees..

Answer B Discussion

Incorrect. First part is plausible since it could be true if Reactor power were > 40%. Second part is correct

Answer C Discussion

Incorrect. First part is correct. Second part is plausible since RCS presssure is below the normal pressure of 2155 psig and Pzr temperature is below normal saturated temp of 648 degrees..

Answer D Discussion

Correct. For load rejections <40% power the reactor will not automatically trip. Saturation temperature for 2125 psig is 645.5 degrees therefore the Pzr is subcooled.

Basis for meeting the KA

KA is met since a Loss of offsite power resulted in a plant runback which has resulted in a subcooled Pzr and the candidate has to be able to determine from the steam tables if the Pzr is subcooled as well as have a grasp on the thermodynamic properties of the Pzr and RCS pressure as a result of the Pzr being subcooled.

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	NEW	

Development References	Student References Provided
SAE-L020 Obj R2,3,4	

APE056 AK1.03 - Loss of Offsite Power

Knowledge of the operational implications of the following concepts as they apply to Loss of Offsite Power: CFR 41.8 / 41.10 / 45.3)

Definition of subcooling: use of steam tables to determine it ....

401-9 Comments:	Remarks/Status

APE015/017 AK3.05 - Reactor Coolant Pump (RCP) Malfunctions
Knowledge of the reasons for the following responses as they apply to the Reactor Coolant Pump Malfunctions (Loss of RC Flow) : (CFR 41.5,41.10 / 45.6 / 45.13)
Shift of T-ave. sensors to the loop with the highest flow ....

Given the following Unit 2 conditions:
Initial conditions:

- Reactor power = 78% stable

Current conditions:

- 2A2 Reactor Coolant Pump trips

1) Controlling Tave signal will AUTOMATICALLY switch to Loop __(1)__ Tave.

2) The reason that the Controlling Tave signal is switched is due to __(2)__.

Which ONE of the following completes the statements above?

A. 1. A
2. RCP 2A2 breaker position

B. 1. B
2. RCP 2A2 breaker position

C. 1. A
2. Loop RCS flow indication

D. 1. B
2. Loop RCS flow indication

ILT48 ONS SRO NRC Examination QUESTION 5 5 **D**

General Discussion

The stated increase in the idle loop Tc was verified on the simulator.

Answer A Discussion

1st part is is incorrect but plausible since it is one of the A loop RCP's that trip therefore it would be plausible to believe that the temperature circuit swaps to look at the affected loop.

2nd part is plausible because the input swap to Controlling Tave is based on RCS flow in the A Loop decreasing below 6.2 E6 lbm/hr. It is plausible because some RPS inputs for RC flow is based on RCP breaker position.

Answer B Discussion

1st part is correct

2nd part is plausible because the input swap to Controlling Tave is based on RCS flow in the A Loop decreasing below 6.2 E6 lbm/hr. It is plausible because some RPS inputs for RC flow is based on RCP breaker position.

Answer C Discussion

1st part is is incorrect but plausible since it is one of the A loop RCP's that trip therefore it would be plausible to believe that the temperature circuit swaps to look at the affected loop.

2nd part is correct

Answer D Discussion

Correct. The Tave circuit would monitor RCS flow and when the A Loop decreasing below 6.2 E6 lbm/hr the ciruit would swap to the other loop (Loop B).

Basis for meeting the KA

Requires knowledge of the response of the ICS Tave signal and the reason the signal swaps to the unaffected loop.

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	NEW	

Development References

IC-RCI Obj. 07
ICS-04 Obj. 01
ARG

Student References Provided

APE015/017 AK3.05 - Reactor Coolant Pump (RCP) Malfunctions

Knowledge of the reasons for the following responses as they apply to the Reactor Coolant Pump Malfunctions (Loss of RC Flow) : (CFR 41.5,41.10 / 45.6 / 45.13)

Shift of T-ave. sensors to the loop with the highest flow ....

401-9 Comments:

Remarks/Status

ILT48 ONS SRO NRC Examination QUESTION 6 6 **A**

APE022 AK3.06 - Loss of Reactor Coolant Makeup

Knowledge of the reasons for the following responses as they apply to the Loss of Reactor Coolant Makeup: (CFR 41.5, 41.10 / 45.6 / 45.13)

RCP thermal barrier cooling . . . .

Given the following Unit 1 conditions:

- Reactor power = 100%
- All HPI pumps fail
- AP/14 (Loss of Normal HPI Makeup and/or RCP Seal Injection) initiated

1) Reactor Coolant Pump thermal barrier cooling will initially be provided by __(1)__.

2) The reason thermal barrier cooling is provided is to limit __(2)__ .

Which ONE of the following completes the statements above?

A. 1. Component Cooling
   2. damage to RCP seals

B. 1. Component Cooling
   2. temperature rise in LDST

C. 1. Low Pressure Service Water
   2. damage to RCP seals

D. 1. Low Pressure Service Water
   2. temperature rise in LDST

General Discussion

Answer A Discussion

CORRECT. Thermal barrier cooling is provided by Component Cooling on a loss of HPI to prevent seal damage from the hot RCS flowing up through the seals.

Answer B Discussion

Incorrect. First part is correct. Second part is incorrect but plausible since seal return goes to the LDST. Therefore, on a loss of seal injection, the RCS flows up through the seal packages and goes to the LDST and the LDST has a maximum temperature limit. However, this is not the reason for thermal barrier cooling.

Answer C Discussion

Incorrect. First part is incorrect but plausible since Low Pressure Service Water provides cooling to the Reactor Coolant Pump motors. Second part is correct.

Answer D Discussion

Incorrect. First part is incorrect but plausible since Low Pressure Service Water provides cooling to the Reactor Coolant Pump motors. Second part is incorrect but plausible since seal return goes to the LDST. Therefore, on a loss of seal injection, the RCS flows up through the seal packages and goes to the LDST and the LDST has a maximum temperature limit. However, this is not the reason for thermal barrier cooling.

Basis for meeting the KA

Question requires knowledge of how RCP thermal barrier cooling is provided on a loss of Reactor Coolant Makeup (all HPI Pumps).

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	NEW	

Development References

PNS-CPS Obj. 3
AP/14
EAP-APG Obj. R9

Student References Provided

APE022 AK3.06 - Loss of Reactor Coolant Makeup

Knowledge of the reasons for the following responses as they apply to the Loss of Reactor Coolant Makeup: (CFR 41.5, 41.10 / 45.6 / 45.13)

RCP thermal barrier cooling . . . .

401-9 Comments:

Remarks/Status

APE025 AK2.02 - Loss of Residual Heat Removal System (RHRS)
Knowledge of the interrelations between the Loss of Residual Heat Removal System and the following: (CFR 41.7 / 45.7)
LPI or Decay Heat Removal/RHR pumps ....

Given the following Unit 1 conditions:
Time = 1200
- LPI aligned in the Normal Decay Heat Removal mode
- 1A LPI pump operating

Time = 1201
- Loss of offsite power results in Switchyard Isolation

Time = 1202
- Power restored via CT-4

1) Assuming NO operator actions, at Time = 1205 __(1)__ LPI pump(s) will be operating.

2) If NEITHER the 1A NOR the 1B LPI pumps were available at Time = 1202, manual reset of Load Shed is __(2)__ prior to starting the 1C LPI pump.

Which ONE of the following completes the statements above?

A. 1. the 1A
2. required

B. 1. the 1A
2. NOT required

C. 1. NO
2. required

D. 1. NO
2. NOT required

General Discussion

Answer A Discussion

First part is correct.

Second part is plausbile since the 1C LPI pump is not an ES component and therefore it is plausible it would respond as most other non-ES componnents and not be available until after the load shed signal had been reset.

Answer B Discussion

Correct

Since the 1A LPI pump was operating its breaker will remain closed and therefore the pump will restart once power is restored.

Pushing the Control Room MFB monitor RESET pushbuttons is not required because the signal for the 1C LPI Pump is removed 5 seconds after the Load Shed actuated if either the 1A or 1B LPI Pump is off.

Answer C Discussion

Incorrect: First part is incorrect but plausible since it would be correct if the 1C pump were operating. Additionally plausible since this is below any ECCS requirments and there are no auto start requirments for LPI pumps as it relates for DHR.
Second part is plausbile since the 1C LPI pump is not an ES component and therefore it is plausible it would respond as most other non-ES componnents and not be available until after the load shed signal had been reset.

Answer D Discussion

Incorrect: First part is incorrect but plausible since it would be correct if the 1C pump were operating. Additionally plausible since this is below any ECCS requirments and there are no auto start requirments for LPI pumps as it relates for DHR.

Second part is plausbile since the 1C LPI pump is not an ES component and therefore it is plausible it would respond as most other non-ES componnents and not be available until after the load shed signal had been reset.

Basis for meeting the KA

Requires knowledge of the relationship between a loss of DHR due to loss of power and actions or inactions required in order to restore DHR cooling following restoration of power.

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	MODIFIED	ILT44 Q6

Development References

ILT44 Q6
EL-PSL Obj 03

Student References Provided

APE025 AK2.02 - Loss of Residual Heat Removal System (RHRS)

Knowledge of the interrelations between the Loss of Residual Heat Removal System and the following: (CFR 41.7 / 45.7)

LPI or Decay Heat Removal/RHR pumps ....

401-9 Comments:

Remarks/Status

APE027 2.2.42 - Pressurizer Pressure Control System (PZR PCS) Malfunction
APE027 GENERIC
Ability to recognize system parameters that are entry-level conditions for Technical Specifications. (CFR: 41.7 / 41.10 / 43.2 / 43.3 / 45.3)

Given the following Unit 1 conditions:
Time = 1200

- Reactor in MODE 3
- RCS temperature = 450°F
- Various Breakers supplying Pzr heaters trip OPEN
- FIN24 reports 420 KW of Pressurizer heater capacity remain available

Time = 1400

- RCS temperature = 335°F stable

1) At Time = 1200, LCO 3.4.9 (Pressurizer) requirements __(1)__ met.

2) At Time = 1400, the requirements of Tech Spec 3.4.9 __(2)__ apply.

Which ONE of the following completes the statements above?

A. 1. are
2. do NOT

B. 1. are
2. do

C. 1. are NOT
2. do NOT

D. 1. are NOT
2. do

ILT48 ONS SRO NRC Examination QUESTION 8

8

B

General Discussion

Answer A Discussion

1st part is correct

2nd part is incorrect but plausible since the HPI spec applicability threshold is 350 degrees..

Answer B Discussion

Correct. The LCO of TS 3.4.9 requires 400 KW of heater capacity and the spec becomes applicable at 325 degrees

Answer C Discussion

Incoxrrect. First part is plausible since 400 KW is the required number and 420 is realtively close to that number. Also, total heater capacity is over 1600 kw therefore only having 420 kw represents a significant loss in capability.

2nd part is incorrect but plausible since the HPI spec applicability threshold is 350 degrees.

Answer D Discussion

Incoxrrect. First part is plausible since 400 KW is the required number and 420 is realtively close to that number. Also, total heater capacity is over 1600 kw therefore only having 420 kw represents a significant loss in capability.

2nd part is correct.

Basis for meeting the KA

Question requires knowledge of TS entry requirements due to Pzr Heater malfunction.

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	NEW	

Development References

ADM-ITS Obj. 7
TS 3.4.9
COLR
PNS-PZR Obj: 12

Student References Provided

APE027 2.2.42 - Pressurizer Pressure Control System (PZR PCS) Malfunction
APE027 GENERIC
Ability to recognize system parameters that are entry-level conditions for Technical Specifications. (CFR: 41.7 / 41.10 / 43.2 / 43.3 / 45.3)

401-9 Comments:

Remarks/Status

EPE029 EK3.02 - Anticipated Transient Without Scram (ATWS)
Knowledge of the reasons for the following responses as the apply to the ATWS: (CFR 41.5 / 41.10 / 45.6 / 45.13)
Starting a specific charging pump ....

Given the following Unit 1 conditions:
Initial conditions:

- Reactor power = 100%
- 1A HPI pump operating
- 1HP-27 closed

Current conditions:

- Both Main FDW pumps trip
- Reactor power 52% decreasing
- Rule 1 (ATWS/Unanticipated Nuclear Power Production) in progress

1) In accordance with Rule 1, 1B HPI pump will be started if 1HP-27 will NOT open in order to __(1)__.

2) In accordance with Rule 6 (HPI), CRS concurrence __(2)__ be required to throttle HPI.

Which ONE of the following completes the statements above?

A. 1. maximize flow in 1A HPI header
2. will

B. 1. utilize the HPI Cross-over header
2. will

C. 1. maximize flow in 1A HPI header
2. will NOT

D. 1. utilize the HPI Cross-over header
2. will NOT

ILT48 ONS SRO NRC Examination QUESTION 9 | 9 | B

General Discussion

Answer A Discussion
Incorrect. First part is incorrect. Plausible since HPI flow is inadequate with 1HP-27 closed and maximizing flow in 1A HPI header would increase the boration. However, the intent of the EOP is to provide flow in both headers. Second part is correct.

Answer B Discussion
CORRECT. The Standby HPI Pump (1B in this case) will be started per Rule 1 if 1HP-27 will not open and 1HP-409 (HPI cross-over) will be opened to provide flow in both headers.. CRS concurrence is required to throttle HPI when emergency boration is in effect.

Answer C Discussion
Incorrect. First part is incorrect. Plausible since HPI flow is inadequate with 1HP-27 closed and maximizing flow in 1A HPI header would increase the boration. However, the intent of the EOP is to provide flow in both headers.. Second part is incorrect. Plausible since it would be correct if not in emergency boration.

Answer D Discussion
Incorrect. First part is correct. Second part is incorrect. Plausible since it would be correct if not in emergency boration.

Basis for meeting the KA
The question requires knowledge of a reason the Standby HPI Pump is started during an ATWS.

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Memory	NEW	

Development References
EAP-UNPP Obj. R12
EAP-UNPP (Rule 1)
Rule 1

Student References Provided

EPE029 EK3.02 - Anticipated Transient Without Scram (ATWS)
Knowledge of the reasons for the following responses as the apply to the ATWS: (CFR 41.5 / 41.10 / 45.6 / 45.13)
Starting a specific charging pump ....

401-9 Comments:

Remarks/Status

EPE038 EA2.16 - Steam Generator Tube Rupture (SGTR)
Ability to determine or interpret the following as they apply to a SGTR : (CFR 43.5 / 45.13)
Actions to be taken if S/G goes solid and water enters steam line ....

Given the following Unit 1 conditions:

- Steam Generator Tube Rupture in 1B SG
- Tcold = 490°F slowly decreasing
- RB pressure = 3.1 psig slowly decreasing
- RB temperature = 203°F slowly decreasing
- 1B SG pressure = 606 psig slowly decreasing
- 1B SG Full Range level = 54% slowly increasing

1) 1B SG level __(1)__ reached the level at which water can enter the Main Steam lines.

2) Assuming 1B SG has reached the level of water in the Main Steam line, __(2)__.

Which ONE of the following completes the statements above?

REFERENCE PROVIDED

A. 1. has
2. discontinue steaming the affected SG

B. 1. has NOT
2. discontinue steaming the affected SG

C. 1. has
2. maximize steaming of the unaffected SG even if TS cooldown rates are exceeded

D. 1. has NOT
2. maximize steaming of the unaffected SG even if TS cooldown rates are exceeded

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General Discussion

Answer A Discussion

CORRECT. First part is correct. Per EOP Encl. 5.21 (reference provided), the level at which water can enter the steam line is 52.7% Full Range. 1B SG level = 54% Full Range, therefore water has reached the level of water in the steam line. Second part is correct. Once the water in MS line level is reached, steaming is discontinued per the SGTR tab.

Answer B Discussion

Incorrect. First part is incorrect. Plausible since the candidate has to determine level from Encl. 5.21 using RB temperature, pressure, and SG pressure. An error on any of the three parameters can cause the candidate to determine an incorrect level, which could indicate water has reached the level to enter the main steam lines. Second part is correct.

Answer C Discussion

Incorrect. First part is correct. Second part is incorrect. Plausible since steaming the SG even if cooldown rates are exceeded is guidance provided in the SGTR Tab if the SG is approaching overfill conditions and maximizing steaming of the unaffected SG would decrease RCS temp and pressure, which would decrease the leak size in the 1B SG.

Answer D Discussion

Incorrect. First part is incorrect. Plausible since the candidate has the determine level from Encl. 5.21 using RB temperature, pressure, and SG pressure. An error on any of the three parameters can cause the candidate to determine an incorrect level, which could indicate water has reached the level to enter the main steam lines. Second part is incorrect. Plausible since steaming the SG even if cooldown rates are exceeded is guidance provided in the SGTR Tab if the SG is approaching overfill conditions and maximizing steaming of the unaffected SG would decrease RCS temp and pressure, which would decrease the leak size in the 1B SG.

Basis for meeting the KA

The question requires knowledge of actions to be taken in accordance with the SGTR Tab when SG level reaches the point at which water can enter the MS line.

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	NEW	

Development References

EAP-SGTR Obj. R 15 & 17
SGTR
EOP Encl. 5.21

Student References Provided

EOP Encl. 5.21

EPE038 EA2.16 - Steam Generator Tube Rupture (SGTR)

Ability to determine or interpret the following as they apply to a SGTR : (CFR 43.5 / 45.13)

Actions to be taken if S/G goes solid and water enters steam line ....

401-9 Comments:

Remarks/Status

ILT48 ONS SRO NRC Examination QUESTION 11 | 11 | **A**

APE054 AK1.02 - Loss of Main Feedwater (MFW)

Knowledge of the operational implications of the following concepts as they apply to Loss of Main Feedwater (MFW): (CFR 41.8 / 41.10 / 45.3)

Effects of feedwater introduction on dry S/G ....

Given the following Unit 2 conditions:

- Loss of Heat Transfer has occurred
- Unit 2 TDEFWP is now available to feed the Steam Generators
- 2A SG level = 8" XSUR slowly decreasing
- 2A SG pressure = 412 psig slowly decreasing
- 2B SG level = 5" XSUR slowly decreasing
- 2B SG pressure = 385 psig slowly decreasing

In accordance with Rule 7 (Steam Generator Feed Control), the MAXIMUM initial feed rate allowed to EACH Steam Generator is limited to __(1)__ gpm in order to prevent excessive __(2)__ to the Steam Generator tubes.

Which ONE of the following completes the statement above?

A. 1. 100
2. excessive stresses

B. 1. 100
2. flow induced vibration damage

C. 1. 50
2. excessive stresses

D. 1. 50
2. flow induced vibration damage

General Discussion

Answer A Discussion

Correct. Rule 7 limits flow to each affected Steam Generator to 100 gpm if the SG is dry. Level below 12" along with low and decreasing SG pressure indicates that the SG is dry, The EOP TBD explains that the 100 gpm flow limit is based on protecting the SG tubes from excessive stresses.

Answer B Discussion

Incorrect. First part is correct.

Second part is plausible since it would be correct if the SG already had Heat Trasfer established since that is the basis for flow limits for a SG 'with heat transfer.

Answer C Discussion

Incorrect. First part is plausible under the misconception that the 100 gpm is a total flow limit instead of a limit to each SG. 100 gpm total flow is correct if feeding with SSF ASWP.
Second part is correct.

Answer D Discussion

Incorrect. First part is plausible under the misconception that the 100 gpm is a total flow limit instead of a limit to each SG. 100 gpm total flow is correct if feeding with SSF ASWP.
Second part is plausible since it would be correct if the SG already had Heat Trasfer established since that is the basis for flow limits for a SG 'with heat transfer.

Basis for meeting the KA

Requires knowledge of the operational implications of not adhering to the flow limits established when introducing feed to a dry SG with no heat transfer.

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	BANK	ILT46 Q10

Development References

ILT46 Q10
EAP-LOHT Obj R27
Rule 7
Rule 7 lesson plan

Student References Provided

APE054 AK1.02 - Loss of Main Feedwater (MFW)

Knowledge of the operational implications of the following concepts as they apply to Loss of Main Feedwater (MFW): (CFR 41.8 / 41.10 / 45.3)

Effects of feedwater introduction on dry S/G ....

401-9 Comments:

Remarks/Status

EPE055 EA1.07 - Loss of Offsite and Onsite Power (Station Blackout)
Ability to operate and monitor the following as they apply to a Station Blackout: (CFR 41.7 / 45.5 / 45.6)
Restoration of power from offsite ....

Given the following Unit 1 conditions:
Initial conditions:

- Reactor power = 100%
- ACB-4 closed
- A Switchyard Isolation occurs

Current conditions:

- Keowee Unit 2 Emergency lockout
- 230 KV Yellow Bus Differential lockout

Main Feeder buses will be energized __(1)__ from __(2)__.

Which ONE of the following completes the statement above?

A. 1. manually
2. CT-4

B. 1. automatically
2. CT-4

C. 1. manually
2. CT-5

D. 1. automatically
2. CT-5

General Discussion

Answer A Discussion

Correct. Since ACB-4 is closed, KHU-2 is tied to the underground (CT-4) and KHU-1 is tied to the Overhead. When the event occurs, KHU-1 is not capable of going through the overhead due to the Yellow Bus Differential lockout. KHU-2 is not available due to the emergency lockout. Encl 5.38 will direct lining up the available KHU unit (KHU-1) to the MFBs through CT-4.

Answer B Discussion

Incorrect because there are no automatic means to line up the KHU aligned to the Overhead path (KHU-1) to power the Main Feeder Busses via CT-4 under the given conditions. It is plausible because if ACB 3 were closed instead of ACB-4, it would be correct.

Answer C Discussion

Incorrect because Encl 5.38 will direct powering the Main Feeder Busses from KHU-1 through CT-4. It is plausible because if neither KHU were available, it would be correct.

Answer D Discussion

Incorrect because Encl 5.38 will direct powering the Main Feeder Busses from KHU-1 through CT-4. It is plausible because if the Standby Busses were energized from CT-5 at the time of the event, it would be correct.

Basis for meeting the KA

The applicant must be able to operate and monitor equipment associated with the restoration of power from off-site following a blackout.

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	MODIFIED	ILT39 Q11

Development References

ILT39 Q11
EL-PSL Obj. 07
ARG SA-3/C3

Student References Provided

EPE055 EA1.07 - Loss of Offsite and Onsite Power (Station Blackout)

Ability to operate and monitor the following as they apply to a Station Blackout: (CFR 41.7 / 45.5 / 45.6)

Restoration of power from offsite ....

401-9 Comments:

Remarks/Status

APE056 2.4.20 - Loss of Offsite Power
APE056 GENERIC
Knowledge of the operational implications of EOP warnings, cautions, and notes. (CFR: 41.10 / 43.5 / 45.13)

Given the following Unit 1 conditions:

- Station Blackout has occurred

Concerning the TDEFWP…

1) Oil cooling water will be supplied by __(1)__.

2) the MINIMUM steam pressure that will ensure proper operation of the pump is __(2)__ psig.

Which ONE of the following completes the statements above?

A. 1. HPSW
2. 250

B. 1. HPSW
2. 300

C. 1. LPSW
2. 250

D. 1. LPSW
2. 300

ILT48 ONS SRO NRC Examination QUESTION 13

13

A

General Discussion

Answer A Discussion

Correct. The TDEFDWP Oil Cooler is normally supplied by CCW by an AC powered oil cooling water pump that starts when MS-93 (Steam Admission Valve) opens. HPSW provides backup cooling. Since the unit has experienced a blackout, the CCW supply will not be available and HPSW will supply the oil cooler.
The minimum steam pressure that will ensure proper operation of the TDEFDW Pump is 250 psig.

Answer B Discussion

Incorrect. First part is correct. Second part is incorrect. Plausible since this is the normal pressure for the Auxiliary Steam Header which is one of the steam supplies for the TDEFDW Pump. The other is Main Steam.

Answer C Discussion

Incorrect. First part is incorrect. Plausible since LPSW supplies cooling water to the MDEFDW Pumps. Second part is correct.

Answer D Discussion

Incorrect. First part is incorrect. Plausible since LPSW supplies cooling water to the MDEFDW Pumps. Second part is incorrect. Plausible since this is the normal pressure for the Auxiliary Steam Header which is one of the steam supplies for the TDEFDW Pump. The other is Main Steam.

Basis for meeting the KA

The question requires knowledge of the EOP Caution related to minimum steam pressure required for proper TDEFDW Pump operation.

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Memory	NEW	

Development References

CF-EF Obj. 22 & 55
EOP BO Tab

Student References Provided

APE056 2.4.20 - Loss of Offsite Power
APE056 GENERIC
Knowledge of the operational implications of EOP warnings, cautions, and notes. (CFR: 41.10 / 43.5 / 45.13)

401-9 Comments:

Remarks/Status

APE057 AA1.06 - Loss of Vital AC Electrical Instrument Bus
Ability to operate and / or monitor the following as they apply to the Loss of Vital AC Instrument Bus: (CFR 41.7 / 45.5 / 45.6)
Manual control of components for which automatic control is lost ....

Given the following Unit 1 conditions:
Initial conditions:

- Reactor power = 100%
- SASS in Manual while SPOC repairs Pressurizer Level 3 transmitter
- 1HP-120 in AUTO selected to Pressurizer Level 1

Current conditions:

- Vital power to ICCM Train A fails

Which ONE of the following describes Pressurizer level control with 1HP-120?

A. Selecting Pressurizer Level 2 and depressing the AUTO pushbutton on 1HP-120 are required to restore automatic control at setpoint

B. Selecting Pressurizer Level 2 ONLY will restore automatic control at setpoint

C. Manual control using 1HP-120 Bailey controller is all that is available

D. Additional actions are NOT required since Automatic control at setpoint is retained

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ILT48 ONS SRO NRC Examination QUESTION 14

14

C

General Discussion

Answer A Discussion

Incorrect. ICCM Train A feeds both Pzr level 1 & 2. ICCM Train B feeds Pzr level 3. It is plausible to believe that since ICCM Train A feeds Pzr level 1 then ICCM Train B feeds Pzr level 2. Under this misconception it is plausible to believe that 1HP-120 would trip to Hand when power is lost to Pzr level 1 since there are multiple bailey control stations that trip to hand under various conditions.

Answer B Discussion

Incorrect. ICCM Train A feeds both Pzr level 1 & 2. ICCM Train B feeds Pzr level 3. It is plausible to believe that since ICCM Train A feeds Pzr level 1 then ICCM Train B feeds Pzr level 2 which would lead choosing this as the correct answer

Answer C Discussion

Correct. ICCM Train A feeds both Pzr level 1 & 2. ICCM Train B feeds Pzr level 3. With Pzr level 3 unavailable, if ICCM Train A fails, all auto control is lost, therefore only using 1HP-120 in hand would be correct.

Answer D Discussion

Incorrect. Plausible since this would be correct if SASS were in Auto.

Basis for meeting the KA

Requires the ability to both manually operate and monitor manual control of 1fHP-120 following a loss of Vital Power to ICCM Train A.

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Memory	BANK	ILT44 Q14

Development References

ILT44 Q14
PNS-PZR Obj. 20 & 21
OP/1/A/1105/012

Student References Provided

APE057 AA1.06 - Loss of Vital AC Electrical Instrument Bus

Ability to operate and / or monitor the following as they apply to the Loss of Vital AC Instrument Bus: (CFR 41.7 / 45.5 / 45.6)

Manual control of components for which automatic control is lost ....

401-9 Comments:

Remarks/Status

APE065 AA1.01 - Loss of Instrument Air
Ability to operate and / or monitor the following as they apply to the Loss of Instrument Air: (CFR 41.7 / 45.5 / 45.6)
Remote manual loaders ....

Given the following Unit 1 conditions:
Time = 0800:

- Reactor power = 100%
- Instrument Air pressure decreasing
- AP/22 (Loss of Instrument Air) initiated

Time = 0810:

- 1B Main Steam Line Break in containment
- Reactor Building pressure 3.2 psig slowly increasing
- Instrument Air and Auxiliary Instrument Air pressure lost

At Time = 0810…

1) In accordance with Rule 7 (SG Feed Control), 1A SG will be controlled at __(1)__ inches XSUR level.

2) 1FDW-315 __(2)__ be operated from the Control Room.

Which ONE of the following completes the statements above?

A. 1. 30
2. can

B. 1. 30
2. can NOT

C. 1. 60
2. can

D. 1. 60
2. can NOT

ILT48 ONS SRO NRC Examination QUESTION 15

15

C

General Discussion

Answer A Discussion

Incorrect. First part is incorrect. Plausible since it would be correct if RB pressure were < 3 psig. Second part is correct. 1FDW-315/316 have a nitrogen backup that will allow normal operation from the controllers in the Control Room for approximately 2 hours following a loss of IA and AIA.

Answer B Discussion

Incorrect. First part is incorrect. Plausible since it would be correct if RB pressure were < 3 psig. Second part is incorrect. Plausible since it would be correct without the nitrogen backup, or once the nitrogen supply is depleted.

Answer C Discussion

CORRECT. With degraded containment (RB pressure >/= 3 psig), abnormal containment (acc) levels apply and 30 inches is added to the SG level setpoints when on EFDW. Therefore, the SG acc level setpoint when on EFDW with RCPs operating is 60" XSUR. The operator must maintain the acc level with 1FDW-315/316 in manual since no auto control is available. Second part is correct.

Answer D Discussion

Incorrect. First part is correct. Second part is incorrect. Plausible since it would be correct without the nitrogen backup, or once the nitrogen supply is depleted.

Basis for meeting the KA

The question requires knowledge of the ability to manually operate 1FDW-315/316 controllers during a loss of Instrument Air.

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Memory	NEW	

Development References

CF-EF Obj. 41
EAP-LOHT Rule 7 Obj. R27
Rule 7

Student References Provided

APE065 AA1.01 - Loss of Instrument Air

Ability to operate and / or monitor the following as they apply to the Loss of Instrument Air: (CFR 41.7 / 45.5 / 45.6)

Remote manual loaders ....

401-9 Comments:

Remarks/Status

APE077 AA2.06 - Generator Voltage and Electric Grid Disturbances

Ability to determine and interpret the following as they apply to Generator Voltage and Electric Grid Disturbances: (CFR: 41.5 and 43.5 / 45.5, 45.7, and 45.8)

Generator frequency limitations...

Given the following Unit 1 conditions:

- Reactor power = 55% stable
- AP/34 (Generator Grid Disturbance) in progress
- Generator Frequency = 57 Hz
- Generator Output = 850 MWe and (+) 450 MVARs
- Generator Hydrogen Pressure = 60 psig
- Generator Output Voltage = 18.2 KV

1) In accordance with AP/34 the Generator output __(1)__ within the limits of the Generator Capability Curve.

2) Manually tripping the Main Turbine__(2)__ required.

Which ONE of the following completes the statements above?

REFERENCE PROVIDED

A. 1. is
2. is

B. 1. is NOT
2. is

C. 1. is
2. is NOT

D. 1. is NOT
2. is NOT

ILT48 ONS SRO NRC Examination QUESTION 16

16

A

General Discussion

Answer A Discussion

1st part is correct. The generator output is within the limits of the Generator Capability Curve (AP/34 Encl. 5.1).

2nd part is correct. An automatic main turbine trip on low frequence should have occurred at 57.6 hz and since it did not occur (based on stem conditions) it should be manually tripped.

Answer B Discussion

1st part is incorrect. It is plausible since it would be correct if power factor were leading or if Gen H2 pressure were lower.

2nd part is correct. A Reactor trip is required by AP/34 due to frequency being < 57.6 HZ and reactor power > 50%.

Answer C Discussion

1st part is correct. The generator output is within the limits of the Generator Capability Curve (AP/34 Encl. 5.1).

2nd part is incorrect because a reactor trip is required due to frequency being low. It is plausible since it would be correct if reactor power were </= 50%.

Answer D Discussion

1st part is incorrect. It is plausible since it would be correct if power factor were leading or if Gen H2 pressure were lower.

2nd part is incorrect because a reactor trip is required due to frequency being low. It is plausible since it would be correct if reactor power were </= 50%.

It is plausible to not be within the generator capability curve and not require a reactor trip because if parameters were such that you were not within the capability curve but were < 50% power, it would be correct.

Basis for meeting the KA

The question requires the ability to determine if a Generator frequency limit has been exceeded during an electric grid disturbance and whehter a reactor trip is warranted.

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	MODIFIED	ILT44 Q16

Development References

ILT44 Q16
EAP-APG (AP/34) Obj. R4 and R7
AP/1/A/1700/034

Student References Provided

AP/34 Encl. 5.1

APE077 AA2.06 - Generator Voltage and Electric Grid Disturbances

Ability to determine and interpret the following as they apply to Generator Voltage and Electric Grid Disturbances: (CFR: 41.5 and 43.5 / 45.5, 45.7, and 45.8)

Generator frequency limitations...

401-9 Comments:

Remarks/Status

BWE04 EK2.2 - Inadequate Heat Transfer

Knowledge of the interrelations between the (Inadequate Heat Transfer) and the following:
(CFR: 41.7 / 45.7)

Facility's heat removal systems, including primary coolant, emergency coolant, the decay heat removal systems, and relations between the proper operation of these systems to the operation of the facility.

Given the following Unit 1 conditions:

- Loss of Heat Transfer exists due to the loss of ALL FDW sources
- HPI Forced Cooling in progress
- RCS pressure = 2210 psig slowly decreasing
- Pzr Level = 380 inches increasing
- Core SCM = 56°F increasing

In accordance with Rule 6 (HPI), HPI flow __(1)__ be throttled because __(2)__.

Which ONE of the following completes the statement above?

A. 1. may NOT
2. RCS pressure is decreasing

B. 1. may NOT
2. CETCs are increasing

C. 1. may
2. Pzr Level is increasing

D. 1. may
2. CETCs are decreasing

General Discussion

Answer A Discussion

Incorrect: First part is incorrect. Criteria for throttling HPI during HPI cooling is based on Core SCM >0 and CETC decreasing. Plausible since decreasing RCS pressure can be an indication of overcooling.

Answer B Discussion

Incorrect: First part is incorrect. Criteria for throttling HPI during HPI cooling is based on Core SCM >0 and CETC decreasing. Plausible if correlation between increasing Core SCM and slowly decreasing pressure is not recognized as indication that CETC temperatures are decreasing.

Answer C Discussion

Incorrect: First part is correct. Second part is incorrect but plausible in that Pzr level increasing is part of the HPI throttling criteria if NOT in HPI F/C.

Answer D Discussion

Correct: Criteria for throttling HPI during HPI cooling is based on Core SCM >0 and CETC decreasing. Core SCM increasing with RCS pressure slowly decreasing indicates that CETC temperatures are decreasing.

Basis for meeting the KA

Requires knowledge of heat removal systems (HPI FC) and their operation during a loss of heat transfer event.

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	BANK	2009 Q18

Development References

2009 Q18
EAP-HPICD Obj. R3
Rule 6

Student References Provided

BWE04 EK2.2 - Inadequate Heat Transfer

Knowledge of the interrelations between the (Inadequate Heat Transfer) and the following:
(CFR: 41.7 / 45.7)

Facility's heat removal systems, including primary coolant, emergency coolant, the decay heat removal systems, and relations between the proper operation of these systems to the operation of the facility.

401-9 Comments:

Remarks/Status

ILT48 ONS SRO NRC Examination QUESTION 18 18 **C**

BWE05 EK1.1 - Excessive Heat Transfer
Knowledge of the operational implications of the following concepts as they apply to the (Excessive Heat Transfer)
(CFR: 41.8 / 41.10 / 45.3)
Components, capacity, and function of emergency systems.

Given the following Unit 1 conditions:
Initial conditions:

- Reactor power = 100%
- 1A Main Steam Line Break occurs

Current conditions:

- Reactor has tripped
- RCS Tave = 544°F slowly increasing
- 1A SG pressure = 0 psig
- 1B SG pressure = 990 psig slowly increasing

1) The Turbine Driven Emergency Feedwater Pump (TDEFDWP) is __(1)__.

2) The TDEFDWP can be __(2)__ AFIS is reset.

Which ONE of the following completes the statements above?

A. 1. operating
   2. secured before

B. 1. operating
   2. secured ONLY after

C. 1. NOT operating
   2. started before

D. 1. NOT operating
   2. started ONLY after

General Discussion

Answer A Discussion

Incorrect: Plausible since 1FDW-315 is closed in first step of Rule 5. This makes it plausible that AFIS would not secure the TDEFDWP so that it would be available to feed the B SG if needed.

Answer B Discussion

Incorrect: Plausible since 1FDW-315 is closed in first step of Rule 5. This makes it plausible that AFIS would not secure the TDEFDWP so that it would be available to feed the B SG if needed. Second part is plausible since many components require manual action other than just turning switch to re-position following a safety system actuation (ex: ES components).

Answer C Discussion

CORRECT: The TDEFDWP control switch will override the AFIS interlock to close TO-145. TO-145 blocks the hydraulic oil supply to MS-95 therefore stopping steam supply to the TDEFDWP. The TDEFDWP switch overrides the AFIS signal and allows the operator to restart the TDEFDWP as necessary to feed Steam Generators without resetting the AFIS signal.

Answer D Discussion

Incorrect: TDEFDWP would be off. Second part is plausible since many components require manual action other than just turning switch to re-position following a safety system actuation (ex: ES components).

Basis for meeting the KA

The question requires knowledge of the operational implications of an AFIS actuation (emergency system) on the operation of the TDEFDWP (component) during an Excessive Heat Transfer event.

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Memory	BANK	2010A Q18

Development References

2010A Q18
CF-EF Obj. 30

Student References Provided

BWE05 EK1.1 - Excessive Heat Transfer

Knowledge of the operational implications of the following concepts as they apply to the (Excessive Heat Transfer)
(CFR: 41.8 / 41.10 / 45.3)

Components, capacity, and function of emergency systems.

401-9 Comments:

Remarks/Status

APE001 AK3.01 - Continuous Rod Withdrawal

Knowledge of the reasons for the following responses as they apply to the Continuous Rod Withdrawal : (CFR 41.5,41.10 / 45.6 / 45.13)
Manually driving rods into position that existed before start of casualty ...

Given the following Unit 1 conditions:

- Reactor power = 75% stable
- Instrument failure results in rod withdrawal
- ICS is taken to hand during Plant Transient Response

In accordance with OMP 1-18 (Implementation Standard During Abnormal and Emergency Events)…

1) In order to declare the plant stable, __(1)__ power must be less than or equal to the pre-transient level.

2) When inserting control rods during PTR, the criteria to stop the initial control rod insertion is when RCS pressure and Tave __(2)__.

Which ONE of the following completes the statements above?

A. 1. NI
2. stop increasing

B. 1. NI
2. return to the pre-transient values

C. 1. Core Thermal
2. stop increasing

D. 1. Core Thermal
2. return to the pre-transient values

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C

General Discussion

Answer A Discussion

Incorrect. First part is plausible since NI's are what provide all reactor protection. Second part is correct.

Answer B Discussion

Incorrect. First part is plausible since NI's are what provide all reactor protection. Second part is plausible since Core thermal power is reduced to less than or equal to the pre-transient value during PTR.

Answer C Discussion

Correct. During Plant Transient Response (PTR), OMP 1-18 direction is to reduce Core Thermal Power to a value less than or equal to the pre-transient value and insert control rods when RCS pressure and Tave are increasing due to the heat balance mismatch.

Answer D Discussion

Incorrect. First part is correct. Second part is plausible since Core thermal power is reduced to less than or equal to the pre-transient value during PTR.

Basis for meeting the KA

This question requires knowledge of the reason control rods would be inserted during the casualty. The reason rods would be inserted at this power level would be to gain control of increasing RCS pressure (generally associated with increasing temperature).. At ONS, the focus is not returning rods to the pre-transient position but it is placing control rods in a position that match FDW flow and that is determined by RCS pressure/temperature response.

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Memory	NEW	

Development References
ADM-OMP Obj R10 OMP 1-18 Att J

Student References Provided

APE001 AK3.01 - Continuous Rod Withdrawal

Knowledge of the reasons for the following responses as they apply to the Continuous Rod Withdrawal : (CFR 41.5,41.10 / 45.6 / 45.13)

Manually driving rods into position that existed before start of casualty ...

401-9 Comments:

Remarks/Status
Preview New KA

APE003 AA1.05 - Dropped Control Rod
Ability to operate and / or monitor the following as they apply to the Dropped Control Rod: (CFR 41.7 / 45.5 / 45.6)
Reactor power - turbine power ....

Given the following Unit 1 conditions:
Initial conditions:

- Reactor power = 68% increasing

Current conditions:

- Control Rod group 6 Rod 6 = 0% withdrawn

1) An ICS Asymmetric Rod Runback will reduce power to __(1)__ .

2) If occurring, depressing the HOLD pushbutton on the LCP __(2)__ stop an ICS Asymmetric Rod Runback.

Which ONE of the following completes the statements above?

A. 1. 55%
2. will

B. 1. 55%
2. will NOT

C. 1. 60%
2. will

D. 1. 60%
2. will NOT

General Discussion

Answer A Discussion

Correct:
1st part is correct. ICS is set to reduce reactor power to 55% upon receiving an Asymmetric Rod Runback.

2nd part is correct. Depressing the HOLD button will stop an Asymmetric Rod Runback.

Answer B Discussion

1st part is correct. ICS is set to reduce reactor power to 55% upon receiving an Asymmetric Rod Runback.

2nd part is incorrect because depressing HOLD will stop an Asymmetric Rod Runback. It is plausible since depressing the HOLD pushbutton will NOT stop any other runback.

Answer C Discussion

1st part is incorrect because power will be reduced to 55% upon receiving an Asymmetric Rod Runback. It is plausible because the TS setpoint for the Asymmetric Rod Runback is <=60%.

2nd part is correct. Depressing the HOLD button will stop an Asymmetric Rod Runback.

Answer D Discussion

1st part is incorrect because power will be reduced to 55% upon receiving an Asymmetric Rod Runback. It is plausible because the TS setpoint for the Asymmetric Rod Runback is <=60%.

2nd part is incorrect because depressing HOLD will stop an Asymmetric Rod Runback. It is plausible since depressing the HOLD pushbutton will NOT stop any other runback.

Basis for meeting the KA

The question requires knowledge of if/how power changes due to a dropped control rod.

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Memory	BANK	ILT39 Q20

Development References

ILT39 Q20
IC-CRI Obj. 11

Student References Provided

APE003 AA1.05 - Dropped Control Rod

Ability to operate and / or monitor the following as they apply to the Dropped Control Rod: (CFR 41.7 / 45.5 / 45.6)

Reactor power - turbine power ....

401-9 Comments:

Remarks/Status

APE005 AK1.03 - Inoperable/Stuck Control Rod

Knowledge of the operational implications of the following concepts as they apply to Inoperable / Stuck Control Rod: (CFR 41.8 / 41.10 / 45.3)

Xenon transient ....

Given the following Unit 1 conditions:

Initial conditions:

- Reactor shutdown in progress
- Reactor power = 58% decreasing
- Control Rod 3 in Group 7 mechanically bound

Current conditions:

- 1SA-2/B-10 (CRD Asymmetric Rod Position Error) actuates
- Power decrease stopped
- Reactor power = 50% stable

1) Over the next 2 hours, Control Rod 3 in Group 7 __(1)__ become closer to the Group 7 average position.

2) If a Reactor trip occurs, Group 7 in limit __(2)__ be indicated.

Which ONE of the following completes the statements above?

ASSUME NO OPERATOR ACTIONS

A. 1. will
2. will

B. 1. will NOT
2. will

C. 1. will
2. will NOT

D. 1. will NOT
2. will NOT

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A

General Discussion

Answer A Discussion

CORRECT. With the power decrease stopped, Xenon will build in from the downpower causing Group 7 control rods to withdraw and become closer to the Rod 3 position. The Group in limit is received when any rod in that group reaches the limit switch.

Answer B Discussion

Incorrect. First part is incorrect. Plausible since it is a common error to confuse control rod movement with changes in Xenon and boron. Second part is correct. The Group in limit is received when any rod in that group reaches the limit switch.

Answer C Discussion

Incorrect. First part is correct. Second part is incorrect. Plausible to believe the Group in limit indication would require each rod in the group to be at the in limit.

Answer D Discussion

Incorrect. First part is incorrect. Plausible since it is a common error to confuse control rod movement with changes in Xenon and boron. Second part is incorrect. Plausible to believe the Group in limit indication would require each rod in the group to be at the in limit.

Basis for meeting the KA

Question requires understanding the operational implications of long term operation with a misaligned control rod.

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	NEW	

Development References
IC-CRI Obj. 07 RT-RBC Obj. 03

Student References Provided

APE005 AK1.03 - Inoperable/Stuck Control Rod

Knowledge of the operational implications of the following concepts as they apply to Inoperable / Stuck Control Rod: (CFR 41.8 / 41.10 / 45.3)
Xenon transient ....

401-9 Comments:

Remarks/Status

APE028 2.4.11 - Pressurizer (PZR) Level Control Malfunction
APE028 GENERIC
Knowledge of abnormal condition procedures. (CFR: 41.10 / 43.5 / 45.13)

Given the following Unit 1 conditions:

- Reactor power = 100%
- Pressurizer level = 210" slowly decreasing
- 1HP-120 (RC VOLUME CONTROL) failed CLOSED
- AP/14 (Loss of Normal HPI Makeup and/or RCP Seal Injection) initiated

In accordance with AP/14...

1) RCS makeup is initially provided by throttling __(1)__.

2) pressurizer level is maintained at a MINIMUM of __(2)__ inches.

Which ONE of the following completes the statements above?

A. 1. 1HP-26
2. 200

B. 1. 1HP-26
2. 80

C. 1. 1HP-122 (RC VOLUME CONTROL BYPASS)
2. 200

D. 1. 1HP-122 (RC VOLUME CONTROL BYPASS)
2. 80

General Discussion

Answer A Discussion

CORRECT: AP/14 directs throttling makeup through HP-26 to maintain PZR >200". If HP-26 fails, AO will locally open HP-122 (HP-120 bypass).

Answer B Discussion

Incorrect: First part is correct. Second part is plausible since 80" is the pressurizer level required to maintain pressurizer heater operability. Rule 6 allows throttling provided pressurizer level is increasing and with the 80" heater cutoff it could be a reasonable misconception that 80" is the low level limit.

Answer C Discussion

Incorrect: First part is incorrect. First part is plausible since 1HP-122 would be correct if 1HP-26 would not open. Second part is correct.

Answer D Discussion

Incorrect: Both parts are incorrect. First part is plausible since 1HP-122 would be correct if 1HP-26 would not open. Second part is plausible since 80" is the pressurizer level required to maintain pressurizer heater operability. Rule 6 allows throttling provided pressurizer level is increasing and with the 80" heater cutoff it could be a reasonable misconception that 80" is the low level limit.

Basis for meeting the KA

Question requires knowledge of Abnormal Procedure (AP/14) pertaining to a Pzr level control malfunction.

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	BANK	2010A Q19

Development References

2010A Q19
EAP-APG Obj. R9
AP/14

Student References Provided

APE028 2.4.11 - Pressurizer (PZR) Level Control Malfunction
APE028 GENERIC
Knowledge of abnormal condition procedures. (CFR: 41.10 / 43.5 / 45.13)

401-9 Comments:

Remarks/Status

APE037 AK1.02 - Steam Generator (S/G) Tube Leak
Knowledge of the operational implications of the following concepts as they apply to Steam Generator Tube Leak: CFR 41.8 / 41.10 / 45.3)
Leak rate vs. pressure drop ....

Given the following Unit 1 conditions:

- SGTR in the 1A SG
- SGTR tab in progress
- RCS temperature = 540°F decreasing
- 1TA and 1TB are de-energized

In accordance with the SGTR tab…

1) Core SCM is decreased during cooldown to __(1)__.

2) The method that will be used to reduce SCM is cycling __(2)__.

Which ONE of the following completes the statements above?

A. 1. minimize tensile stress on the 1A SG
2. Pzr spray

B. 1. minimize tensile stress on the 1A SG
2. the PORV

C. 1. reduce the primary to secondary leak rate
2. Pzr spray

D. 1. reduce the primary to secondary leak rate
2. the PORV

General Discussion

Answer A Discussion

Incorrect: First part is incorrect but plausible since SCM is reduced when a SG is isolated in the EHT tab to reduce tensile stress. It is not the reason in this case. Second part is incorrect but plausible since it would be correct if the RCP that provides PZR spray was operating.

Answer B Discussion

Incorrect: First part is incorrect but plausible since SCM is reduced when a SG is isolated in the EHT tab to reduce tensile stress. It is not the reason in this case. Second part is correct.

Answer C Discussion

Incorrect. First part is correct. Second part is incorrect but plausible since it would be correct if the RCP that provides PZR spray was operating.

Answer D Discussion

Correct. The purpose of reducing SCM during a SGTR is to reduce RCS pressure as much as possible while still maintaining SCM and RCP NPSH. This minimizes the differential pressure between the RCS and the affected SG(s), thus minimizing the tube leak flow
Using the PORV is a strategy used in the SGTR tab to reduce SCM in this case because the RCPs are not operating since 1TA and 1TB are de-energized.

Basis for meeting the KA

Requires knowing that SCM is reduced when a SG has a tube rupture in order to decrease RCS pressure which in turn decreases the leak rate.

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	BANK	ILT41 Q8

Development References

Q23 ILT41 Q8
EAP-SGTR Obj. R1 and 4
EOP SGTR

Student References Provided

APE037 AK1.02 - Steam Generator (S/G) Tube Leak

Knowledge of the operational implications of the following concepts as they apply to Steam Generator Tube Leak: CFR 41.8 / 41.10 / 45.3)

Leak rate vs. pressure drop ....

401-9 Comments:

Remarks/Status

APE059 AA1.01 - Accidental Liquid Radioactive-Waste Release
Ability to operate and / or monitor the following as they apply to the Accidental Liquid Radwaste Release: (CFR 41.7 / 45.5 / 45.6)
Radioactive-liquid monitor ....

Given the following Unit 1 conditions:

- AP/31 (Primary to Secondary Leakage) in progress

1) As a result of Primary to Secondary leakage, the Unit 1/2 Turbine Building Sump (TBS) pump breakers are opened __(1)__.

2) A sustained loss of power to 1RIA-54 will trip BOTH Turbine Building Sump Pumps __(2)__.

Which ONE of the following completes the statements above?

A. 1. ONLY when RIA-54 is in alarm or inoperable
2. after a 2 minute timer

B. 1. ONLY when RIA-54 is in alarm or inoperable
2. immediately

C. 1. ANYTIME AP/31 (Primary to Secondary Leakage) has been initiated
2. after a 2 minute timer

D. 1. ANYTIME AP/31 (Primary to Secondary Leakage) has been initiated
2. immediately

General Discussion

Answer A Discussion

1st part is correct. AP/31 directs opening the TB sump pump breakers if either 1RIA-54 is in alarm OR inoperable.

2nd part is plausible because there is a 2 minute timer associated with low sample pump flow that provides for an automatic backwash of the strainer on high strainer DP. It is plausible to believe it applies here since most SLC requirements for RIA's have a provision to allow in progress releases to continue on loss of the associated RIA's which makes a 2 minute timer to allow power to be restored additionally plausible.

Answer B Discussion

1st part is correct. AP/31 directs opening the TB sump pump breakers if either 1RIA-54 is in alarm OR inoperable.

2nd part is correct,

Answer C Discussion

1st part is incorrect because AP/31 does not direct opening TB Sump Pump breakers unless 1RIA-54 is in High Alarm or inoperable. It is plausible because the contaminated water from the secondary will eventually make it into the TB Sump so it would be conservative to open the breakers before the alarm is received.

2nd part is incorrect because the sump pumps will trip immediately. It is plausible because there is a 2 minute timer associated with low sample pump flow that provides for an automatic backwash of the strainer on high strainer DP. It is plausible to believe it applies here since most SLC requirements for RIA's have a provision to allow in progress

Answer D Discussion

1st part is incorrect because AP/31 does not direct opening TB Sump Pump breakers unless 1RIA-54 is in High Alarm or inoperable. It is plausible because the contaminated water from the secondary will eventually make it into the TB Sump so it would be conservative to open the breakers before the alarm is received.

2nd part is correct. A loss of power to RIA=54 will automatically trip both TBS pump breakers.

Basis for meeting the KA

Requires the ability to monitor proper operation of the Radioactive Liquid Monitor (RIA-54) to prevent an accidental release.

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Memory	MODIFIED	ILT44 Q50

Development References

ILT44 Q50
RAD-RIA Obj R2, Pg 25
AP/31

Student References Provided

APE059 AA1.01 - Accidental Liquid Radioactive-Waste Release
Ability to operate and / or monitor the following as they apply to the Accidental Liquid Radwaste Release: (CFR 41.7 / 45.5 / 45.6)
Radioactive-liquid monitor ....

401-9 Comments:

Remarks/Status

New KA

APE060 AK3.03 - Accidental Gaseous-Waste Release

Knowledge of the reasons for the following responses as they apply to the Accidental Gaseous Radwaste: (CFR 41.5,41.10 / 45.6 / 45.13)

Actions contained in EOP for accidental gaseous-waste release ....

Given the following plant conditions:

- B GWD Tank rupture occurs
- 1RIA-32 (Aux Bldg Gas) in HIGH alarm
- 1RIA-39 (Cntl Rm Gas) in HIGH alarm
- Unit 1 AP/18 (Abnormal Release of Radioactivity) has been entered

1) AP/18 directs starting __(1)__Outside Air Booster Fan(s).

2) The Outside Air Booster Fan(s) __(2)__ utilize Unit 2 Main Purge Filters.

Which ONE of the following completes the statements above?

A. 1. ONLY one
   2. will

B. 1. two
   2. will

C. 1. ONLY one
   2. will NOT

D. 1. two
   2. will NOT

General Discussion

Answer A Discussion

Incorrect.
1st part is incorrect. Plausible since following a radiological accident in the Spent Fuel Pool, only one of the two Spent Fuel Filtered Exhaust Fans are started in accordance with AP/9 (Spent Fuel Damage). Also plausible to believe that only one fan would be started since the design basis is for the Outside Air Booster Fans is the most limiting LOCA fission product release and not a GWD Tank rupture.

2nd part is incorrect because the Booster Fans have their own intake ductwork including filters. It is plausible because other equipment, such as Spent Fuel Filtered Exhaust does utilize the RB Main Purge filters.

Answer B Discussion

Incorrect.
1st part is correct. With 1RIA-39 in alarm, AP/18 directs starting both Outside Air Booster Fans.

2nd part is incorrect because the Booster Fans have their own intake ductwork including filters. It is plausible because other equipment, such as Spent Fuel Filtered Exhaust does utilize the RB Main Purge filters.

Answer C Discussion

Incorrect.
1st part is incorrect. Plausible since following a radiological accident in the Spent Fuel Pool, only one of the two Spent Fuel Filtered Exhaust Fans are started in accordance with AP/9 (Spent Fuel Damage). Also plausible to believe that only one fan would be started since the design basis is for the Outside Air Booster Fans is the most limiting LOCA fission product release.
Second part is correct.

Answer D Discussion

1st part is correct. With 1RIA-39 in alarm, AP/18 directs starting both Outside Air Booster Fans.
2nd part is correct. The Outside Air Booster fans have their own intake duct work and filter setup.

Basis for meeting the KA

The question matches the KA by requiring knowledge of the actions contained in the AP for an accidental gas release..

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Memory	NEW	

Development References

RAD-RIA Obj R16
AP/18
1SA8 B-9

Student References Provided

APE060 AK3.03 - Accidental Gaseous-Waste Release
Knowledge of the reasons for the following responses as they apply to the Accidental Gaseous Radwaste: (CFR 41.5,41.10 / 45.6 / 45.13)
Actions contained in EOP for accidental gaseous-waste release ....

401-9 Comments:

Remarks/Status

Preview

BWA03 AA2.2 - Loss of NNI-Y

Ability to determine and interpret the following as they apply to the (Loss of NNI-Y)

(CFR: 43.5 / 45.13)

Adherence to appropriate procedures and operation within the limitations in the facility's license and amendments.

Given the following Unit 1 conditions:

Time = 0800:

- Reactor power = 25%
- 1A Main Feedwater Pump is operating
- 1SA-2/B-11 (ICS AUTO POWER FAILURE) actuated
- AP/23 (Loss of ICS Power) initiated

Time = 0805:

- Reactor trips

AP/23 (Loss of ICS Power)...

1) __(1)__ require tripping the 1A Main Feedwater Pump.

2) directs using __(2)__ to control decay heat removal.

Which ONE of the following completes the statements above?

A. 1. does NOT
2. ADVs

B. 1. does
2. ADVs

C. 1. does NOT
2. TBVs

D. 1. does
2. TBVs

General Discussion

Answer A Discussion

1st part is incorrect because AP/23 has an IAAT step that directs tripping all MFW pumps if the reactor trips. It is plausible because the MFW pump will trip on its own if a loss of ICS AUTO AND HAND power occurs but in this case, it doesn't automatically trip.

2nd part is incorrect because the TBVs will be available for hea removal. It is plausible because if it were a loss of ICS AUTO AND HAND power, it would be correct.

Answer B Discussion

1st part is correct. In AP/23, section 4B (Loss of ICS AUTO Power Only) step 2, IAAT a Rx trip occurs and ICS AUTO power is unavailable, THEN trip both MFDWPs.

2nd part is incorrect because the TBVs will be available for hea removal. It is plausible because if it were a loss of ICS AUTO AND HAND power, it would be correct.

Answer C Discussion

1st part is incorrect because AP/23 has an IAAT step that directs tripping all MFW pumps if the reactor trips. It is plausible because the MFW pump will trip on its own if a loss of ICS AUTO AND HAND power occurs but in this case, it doesn't automatically trip.

2nd part is correct. With ICS HAND power available, the TBVs are available for decay heat removal.

Answer D Discussion

1st part is correct. In AP/23, section 4B (Loss of ICS AUTO Power Only) step 2, IAAT a Rx trip occurs and ICS AUTO power is unavailable, THEN trip both MFDWPs.

2nd part is correct. With ICS HAND power available, the TBVs are available for decay heat removal.

Basis for meeting the KA

Requires knowledge of guidance provided in AP/23 on operating equipment with a loss of ICS power (NNI-Y).

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	MODIFIED	ILT44 Q24

Development References

ILT44 Q24
EAP-APG Obj R9
AP23

Student References Provided

BWA03 AA2.2 - Loss of NNI-Y

Ability to determine and interpret the following as they apply to the (Loss of NNI-Y)
(CFR: 43.5 / 45.13)

Adherence to appropriate procedures and operation within the limitations in the facility's license and amendments.

401-9 Comments:

Remarks/Status

BWA05 AK2.2 - Emergency Diesel Actuation

Knowledge of the interrelations between the (Emergency Diesel Actuation) and the following:
(CFR: 41.7 / 45.7)

Facility's heat removal systems, including primary coolant, emergency coolant, the decay heat removal systems, and relations between the proper operation of these systems to the operation of the facility.

Given the following Unit 1 conditions:
Time = 0800

- Reactor trip
- SBLOCA
- ES 1-6 actuate
- CT-1 Lockout

1) At Time = 0801, Main FDW Pumps __(1)__ automatically tripped.

2) In accordance with Rule 2 (Loss of SCM), an initial EFDW flow rate of __(2)__ gpm per SG is established to remove decay heat.

A. 1. have
2. 300

B. 1. have NOT
2. 300

C. 1. have
2. 450

D. 1. have NOT
2. 450

General Discussion

Answer A Discussion

Incorrect. First part is incorrect. At Time = 0800 the hotwell and condensate booster pumps, which provide suction to the Main FDW Pumps, trip with the loss of power. When the Main FDW Pump suction pressure is </= 235 psig, a 90 second timer starts. If the condition persists for 90 seconds, then the associated FDW Pump will trip. With ES actuated, power is restored through the Keowee Underground powerpath in approx. 15 seconds (12 - 18 sec). When ES actuates, the Keowee Units receive an emergency start signal. One second later a Load Shed signal is generated, which starts a 10 second timer for Transfer to Standby for a total of 11 seconds. At the 15 second mark, the Keowee unit will be up to speed and power will be restored, although the hotwell and condensate booster pumps do not auto restart.
Second part is correct. Rule 2 initially establishes 300 gpm EFDW flow per SG.

Answer B Discussion

Correct:
At Time = 0800 the hotwell and condensate booster pumps, which provide suction to the Main FDW Pumps, trip with the loss of power. When the Main FDW Pump suction pressure is </= 235 psig, a 90 second timer starts. If the condition persists for 90 seconds, then the associated FDW Pump will trip. The time given is at the 60 second mark and therefore, the Main FDW Pumps have not tripped.
Rule 2 initially establishes 300 gpm EFDW flow per SG. If flow can only be established to 1 SG, then 450 gpm is established to that SG.

Answer C Discussion

Incorrect. First part is incorrect. At Time = 0800 the hotwell and condensate booster pumps, which provide suction to the Main FDW Pumps, trip with the loss of power. When the Main FDW Pump suction pressure is </= 235 psig, a 90 second timer starts. If the condition persists for 90 seconds, then the associated FDW Pump will trip.
Second part is incorrect. Plausible since Rule 2 directs the operator to establish 450 gpm EFDW flow to the intact SG (if both SGs are not intact) when feeding to the LOSCM setpoint.

Answer D Discussion

Incorrect.
First part is correct.
Second part is incorrect. Plausible since Rule 2 directs the operator to establish 450 gpm EFDW flow to the intact SG (if both SGs are not intact) when feeding to the LOSCM setpoint

Basis for meeting the KA

Oconee's Emergency Diesel is the Keowee Hydro Units. The question requires knowledge of the interrelations between Keowee and the Motor Driven EFDW Pumps and the required EFDW flow for the SBLOCA event.

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Memory	NEW	

Development References

EL-PSL Obj. 11
CF-FDW Obj. 06
EAP LOSCM Obj. 19
Rule 2

Student References Provided

BWA05 AK2.2 - Emergency Diesel Actuation
Knowledge of the interrelations between the (Emergency Diesel Actuation) and the following:
(CFR: 41.7 / 45.7)
Facility's heat removal systems, including primary coolant, emergency coolant, the decay heat removal systems, and relations between the proper operation of these systems to the operation of the facility.

401-9 Comments:	Remarks/Status

SYS003 K2.02 - Reactor Coolant Pump System (RCPS)
Knowledge of bus power supplies to the following: (CFR: 41.7)
CCW pumps ....

---

1) The normal power supply to the 1A CC pump is __(1)__.

2) If MFBMP circuitry is activated (power to the Main Feeder Busses is lost) and then power is restored, CC pumps with their control switches in AUTO will start __(2)__.

Which ONE of the following completes the statements above?

A. 1. 1XL
2. immediately

B. 1. 1XL
2. after a 20 second time delay

C. 1. 1XS1
2. immediately

D. 1. 1XS1
2. after a 20 second time delay

ILT48 ONS SRO NRC Examination QUESTION 28

28

A

General Discussion

Answer A Discussion

1st part is correct. 1XL is the normal power supply for the 1A CC pump.

2nd part is correct. With its switch in AUTO, after a MFBMP activation occurs, the CC pumps will receive a start signal. When power is restored, the pump will start.

Answer B Discussion

1st part is correct. 1XL is the normal power supply for the 1A CC pump.

2nd part is incorrect because the CC pump will start as soon as power is restored. It is plausible because there a 20 second time delay associated with the MFBMP logic. The MFBs have to be de-energized for 20 seconds before the MFBMP actuates.

Answer C Discussion

1st part is incorrect because the power supply is 1XL. It is plausible since 1XS1 is a motor control center that does supply major components including component cooling valve 1CC-7 however it does not supply power to the CC pumps. Second part is correct.

2nd part is correct. With its switch in AUTO, after a MFBMP activation occurs, the CC pumps will receive a start signal. When power is restored, the pump will start.

Answer D Discussion

1st part is incorrect because the power supply is 1XL. It is plausible since 1XS1 is a motor control center that does supply major components including component cooling valve 1CC-7 however it does not supply power to the CC pumps. Second part is correct.

2nd part is incorrect because the CC pump will start as soon as power is restored. It is plausible because there a 20 second time delay associated with the MFBMP logic. The MFBs have to be de-energized for 20 seconds before the MFBMP actuates.

Basis for meeting the KA

Requires knowledge of the 1A CC pump normal and emergency backup power supplies.

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Memory	MODIFIED	2010A Q35

Development References

2010A Q35
IC-ES Obj. 28
PNS-CC Obj R15

Student References Provided

SYS003 K2.02 - Reactor Coolant Pump System (RCPS)
Knowledge of bus power supplies to the following: (CFR: 41.7)
CCW pumps ....

401-9 Comments:

Remarks/Status

SYS004 K4.04 - Chemical and Volume Control System

Knowledge of CVCS design feature(s) and/or interlock(s) which provide for the following: (CFR: 41.7)

Manual/automatic transfers of control ....

Given the following Unit 1 conditions:

0800:

- Reactor power = 100%
- MSLB inside containment occurs
- RCS pressure = 1575 psig

0805:

- RCS pressure = 1800 psig increasing
- The BOP is performing Encl 5.1 (ES Actuation)

1) At 0800, Diverse HPI __(1)__ actuated.

2) ES Channels 1 & 2 MANUAL Pushbuttons __(2)__ have to be depressed prior to throttling HPI.

Which ONE of the following completes the statements above?

A. 1) has
2) do

B. 1) has
2) do NOT

C. 1) has NOT
2) do

D. 1) has NOT
2) do NOT

General Discussion

Answer A Discussion

Incorrect.
1st part is incorrect because the setpoint for Diverse HPI = 1550 psig. It is plausible because if pressure had decreased to below 1550 psig, it would be correct.
2nd part is correct.

Answer B Discussion

Incorrect.
1st part is incorrect because the setpoint for Diverse HPI = 1550 psig. It is plausible because if pressure had decreased to below 1550 psig, it would be correct.

2nd part is incorrect. Plausible because if it were the RESET P/Bs, it would be correct.

Answer C Discussion

Correct.
Diverse HPI setpoint = 1550 psig.
ES Channels 1 and 2 have to be placed in manual (manual P/Bs depressed) in order to throttle HPI.

Answer D Discussion

Incorrect.
1st part is correct. Diverse HPI setpoint = 1550 psig.

2nd part is incorrect. Plausible because if it were the RESET P/Bs, it would be correct.

Basis for meeting the KA

The question requires knowledge of the ES design features that allow for transfering from automatic to manual control.

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Memory	NEW	

Development References

IC-ES Obj 21
Encl 5.1
Encl 5.41

Student References Provided

SYS004 K4.04 - Chemical and Volume Control System
Knowledge of CVCS design feature(s) and/or interlock(s) which provide for the following: (CFR: 41.7)
Manual/automatic transfers of control ....

401-9 Comments:

Remarks/Status

ILT48 ONS SRO NRC Examination QUESTION 30 30 **B**

SYS004 K6.20 - Chemical and Volume Control System

Knowledge of the effect of a loss or malfunction on the following CVCS components: (CFR: 41.7 / 45.7)

Function of demineralizer, including boron loading and temperature limits

---

Given the following Unit 3 conditions:

- Reactor Power = 100%
- 3A Purification IX in service
- Letdown temperature increases by 5°F

1) RCS boron concentration will __(1)__ .

2) With control rods responding, assuming no other operator actions, taking ONLY the ICS Reactor Bailey station to HAND __(2)__ stop the rod motion.

Which ONE of the following completes the statements above?

A. 1. increase
 2. will

B. 1. increase
 2. will NOT

C. 1. decrease
 2. will

D. 1. decrease
 2. will NOT

General Discussion

Answer A Discussion

Incorrect.
First part is correct. Changing letdown temperature affects reactivity management due to the temperature effect on demineralizer resin. Increasing letdown temperature increases RCS boron and decreasing letdown temperature decreases RCS boron.

2nd part is plausible since the name itself implies that it controls signals to the reactor. Additionally, it does block changes in demand from getting the control rods so it would be plausible to believe that neutron error would also be blocked.

Answer B Discussion

CORRECT.
Changing letdown temperature affects reactivity management due to the temperature effect on demineralizer resin. Increasing letdown temperature increases RCS boron and decreasing letdown temperature decreases RCS boron.
Since neutron error drives control rod motion and neutron error is generated downstream of the Reactor Bailey, taking only the Rx bailey to hand will not stop the rod motion. It would freeze Rx demand but the boron would still impact neutron production therefore neutron error would still react and Control Rods would still respond.

Answer C Discussion

Incorrect. First part is incorrect. Plausible since it would be correct if letdown temperature decreased.
Second part is incorrect. Plausible since the name itself implies that it controls signals to the reactor. Additionally, it does block changes in demand from getting the control rods so it would be plausible to believe that neutron error would also be blocked.

Answer D Discussion

Incorrect. First part is incorrect. Plausible since it would be correct if letdown temperature decreased.
Second part is correct. Since neutron error drives control rod motion and neutron error is generated downstream of the Reactor Bailey, taking only the Rx bailey to hand will not stop the rod motion. It would freeze Rx demand but the boron would still impact neutron production therefore neutron error would still react and Control Rods would still respond.

Basis for meeting the KA

Requires knowledge of how a malfunction of a demineralizer (boron loading) will affect the rest of the plant. In this case the "malfunction" would be that procedurally the demineralizer should have been saturated to current RCS boron before being placed in service. An incorrectly boron saturated demineralizer being placed in service is effectively a malfunction.

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	MODIFIED	ILT46 Q30

Development References

ILT46 Q30
PNS-HPI Obj 07
ICS picture

Student References Provided

SYS004 K6.20 - Chemical and Volume Control System
Knowledge of the effect of a loss or malfunction on the following CVCS components: (CFR: 41.7 / 45.7)
Function of demineralizer, including boron loading and temperature limits

401-9 Comments:

Remarks/Status

SYS005 K2.01 - Residual Heat Removal System (RHRS)
Knowledge of bus power supplies to the following: (CFR: 41.7)
RHR pumps ....

Given the following Unit 1 conditions:

- Reactor Power = 100%
- 1TE bus lockout occurs

Which ONE of the following contains ONLY pumps that are still being powered from 4160V switchgear.

A. 1B HPIP, 1B LPIP

B. 1B HPIP, 1C LPIP

C. 1C HPIP, 1B LPIP

D. 1C HPIP, 1C LPIP

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C

General Discussion

Answer A Discussion

Incorrect. Plausible since both pumps are from the "B" trains.

Answer B Discussion

Incorrect. Plausible since one pump is from "B" train and the other from "C" train

Answer C Discussion

Correct. Neither 1C HPIP nor 1B LPIP are powered from 1TE.

Answer D Discussion

Incorrect. Plausible since ONS component power does not strictly adhere to the "train" principle of alignment.

Basis for meeting the KA

Requires knowledge of power supplies to LPI pumps

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Memory	MODIFIED	ILT46 Q31

Development References

ILT46 Q31
IC-ES Obj R20
Power Supply chart

Student References Provided

SYS005 K2.01 - Residual Heat Removal System (RHRS)
Knowledge of bus power supplies to the following: (CFR: 41.7)
RHR pumps ....

401-9 Comments:

Remarks/Status

SYS006 K6.10 - Emergency Core Cooling System (ECCS)
Knowledge of the effect of a loss or malfunction on the following will have on the ECCS: (CFR: 41.7 / 45.7)
Valves ....

Given the following Unit 1 conditions:
Time = 0400
- Reactor power = 100%

Time = 0405
- RCS pressure = 550 psig decreasing

Time = 0445
- RCS pressure = 200 psig decreasing

Time = 0450
- RCS pressure = 100 psig decreasing
- 1LP-17 is failed CLOSED

1) In accordance with OMP 1-18 Attachment A (Licensed Operator Memory Items) at Time = 0405, the LATEST time the LPI pumps are required to be secured is __(1)__.

2) At Time = 0450, LPI flow __(2)__ entering the core through BOTH LPI injection nozzles.

Which ONE of the following completes the statements above?

A. 1. 0425
2. is

B. 1. 0425
2. is NOT

C. 1. 0435
2. is

D. 1. 0435
2. is NOT

General Discussion

Answer A Discussion

Incorrect. First part is plausible in the candidate has the misconception that the time allowed is 20 minutes. 20 minutes is the time for several time critical tasks including "starting the SSF RCMUP during a HELB" and "transferring MDEFDWP suction to the hotwell" .
Second part is correct.

Answer B Discussion

Incorrect. First part is plausible if the candidate has the misconception that the time allowed is 20 minutes. 20 minutes is the time for several time critical tasks including "starting the SSF RCMUP during a HELB" and "transferring MDEFDWP suction to the hotwell" .
Second part is plausible because the main injection valve for the "A" header (1LP-17) is closed therefore without knowledge of the LPI crossover alignment downstream of 1LP-17 and 1LP-18 the candidate would make this choice.

Answer C Discussion

Correct. Per OMP 1-18 Attachment A, the LPI pumps must not operate against a shutoff head greater than 30 minutes. The LPI pumps would be manually restarted as RCS pressure decreases below 200 psig. Due to the crossover mod LPI flow will enter the core through both nozzles even with 1LP-17 closed since the LPI crossover mod connected the two LPI headers downstream of LP=17 and LP-18.

Answer D Discussion

Incorrect. First part is correct..
Second part is plausible because the main injection valve for the "A" header (1LP-17) is closed therefore without knowledge of the LPI crossover alighnment downstream of 1LP-17 and 1LP-18 the candidate would make this choice.

Basis for meeting the KA

Question requires knowledege of ECCS response when a valve is failed closed. 1LP-17 is an ECCS valve in the 1A LPI header.

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	BANK	ILT41 Q32

Development References

ILT41 Q32
EAP-ESA Obj R12, R17
OMP 1-18

Student References Provided

SYS006 K6.10 - Emergency Core Cooling System (ECCS)
Knowledge of the effect of a loss or malfunction on the following will have on the ECCS: (CFR: 41.7 / 45.7)
Valves ....

401-9 Comments:

Remarks/Status

SYS007 A1.01 - Pressurizer Relief Tank/Quench Tank System (PRTS)
Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the PRTS controls including: (CFR: 41.5 / 45.5)
Maintaining quench tank water level within limits ....

Given the following Unit 2 conditions:

- Reactor power = 100%
- Quench Tank is being pumped to 2A BHUT using the Quench Tank Pump AND the Component Drain Pump

1) In accordance with OP/2/A/1104/017 (Quench Tank Operations), Quench Tank Level shall be maintained at a MAXIMUM of __(1)__ inches.

2) If ES -1/2 actuates, this flow path __(2)__ automatically isolate.

Which ONE of the following completes the statements above?

A. 1. 90
2. will

B. 1. 90
2. will NOT

C. 1. 100
2. will

D. 1. 100
2. will NOT

General Discussion

Answer A Discussion

1st part is correct. IAW OP/1104/017 limits and precautions, QT level shall be maintained between 80 and 90 inches.

2nd part is correct. Upon receiving an ES signal, 2CS-5 (ES-1) and 2CS-6 (ES-2) will close and isolate the flow path.

Answer B Discussion

1st part is correct. IAW OP/1104/017 limits and precautions, QT level shall be maintained between 80 and 90 inches.

2nd part is incorrect because if you are pumping the QT to the 2A BHUT (OP/2/A/1104/017 Encl 4.1) 2CS-5 and 2CS-6 will close upon receiving an ES 1 & 2 signal. It is plausible because if you were pumping from the 2A BHUT TO the Quench Tank (OP/2/A/1104/017 Encl 4.2), it would be correct because this flow path is performed with manual valves that will not isolate upon receiving an ES 1/2 signal.

Answer C Discussion

1st part is incorrect because Unit 2 upper limit is 90 inches. It is plausible because if it were Unit 1, it would be correct.

2nd part is correct. Upon receiving an ES signal, 2CS-5 (ES-1) and 2CS-6 (ES-2) will close and isolate the flow path.

Answer D Discussion

1st part is incorrect because Unit 2 upper limit is 90 inches. It is plausible because if it were Unit 1, it would be correct.

2nd part is incorrect because if you are pumping the QT to the 2A BHUT (OP/2/A/1104/017 Encl 4.1) 2CS-5 and 2CS-6 will close upon receiving an ES 1 & 2 signal. It is plausible because if you were pumping from the 2A BHUT TO the Quench Tank (OP/2/A/1104/017 Encl 4.2), it would be correct because this flow path is performed with manual valves that will not isolate upon receiving an ES 1/2 signal.

Basis for meeting the KA

Requires knowledge of Quench Tank level limits associated with the system.

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Memory	MODIFIED	ILT46 Q34

Development References

ILT46 Q34
PNS-CS Obj 10
1104/17

Student References Provided

SYS007 A1.01 - Pressurizer Relief Tank/Quench Tank System (PRTS)

Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the PRTS controls including: (CFR: 41.5 / 45.5)

Maintaining quench tank water level within limits ....

401-9 Comments:

Remarks/Status

SYS008 A4.01 - Component Cooling Water System (CCWS)
Ability to manually operate and/or monitor in the control room: (CFR: 41.7 / 45.5)
CCW indications and controls ....

Given the following Unit 1 conditions:
Time = 0400:

- Reactor power = 100%
- Component Cooling Return Flow = 563 gpm decreasing
- 1SA-09/C-1 (Component Cooling Return Flow Low) actuates

Time = 0402

- Component Cooling Return Flow = 103 gpm decreasing
- The Standby CC pump has NOT started
- CC Surge Tank level = 18 inches stable

1) At Time = 0400, Statalarm 1SA-09/C-1 __(1)__ valid.

2) At Time = 0402, in accordance with 1SA-09/C-1 ARG, the Standby CC pump __(2)__ be manually started.

Which ONE of the following completes the statements above?

A. 1. is
2. will

B. 1. is
2. will NOT

C. 1. is NOT
2. will

D. 1. is NOT
2. will NOT

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A

General Discussion

Answer A Discussion

Correct. 1SA-09/C-1 set point is 575 gpm. The Standby CC pump did not start and should be started after verifying that CC surge tank level is > 12 inches.

Answer B Discussion

Incorrect. First part is correct. Second part is plausible because it would be correct if CC level were less than 12 inches.

Answer C Discussion

Incorrect. First part is plasuible because it is above the setpoint for Statalarm 1SA-09/B-1 (CRD Return Flow Low) of 138 gpm. Second part is correct.

Answer D Discussion

Incorrect. First part is plasuible because it is above the setpoint for Statalarm 1SA-09/B-1 (CRD Return Flow Low) of 138 gpm. Second part is plausible because it would be correct if CC level were less than 12 inches.

Basis for meeting the KA

Question requires knowledge of Component Cooling related indications and controls it the control room.

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	BANK	ILT42 Q7

Development References

ILT42 Q7
PNS-CC Obj 08
ARG

Student References Provided

SYS008 A4.01 - Component Cooling Water System (CCWS)

Ability to manually operate and/or monitor in the control room: (CFR: 41.7 / 45.5)

CCW indications and controls ....

401-9 Comments:

Remarks/Status

SYS010 K3.01 - Pressurizer Pressure Control System (PZR PCS)
Knowledge of the effect that a loss or malfunction of the PZR PCS will have on the following: (CFR: 41.7 / 45.6)
RCS ....

Given the following Unit 1 conditions:
Initial conditions:

- Reactor power = 100%
- 1RC-1 failed OPEN
- RCS pressure = 2150 psig decreasing
- AP/44 (Abnormal Pressurizer Pressure Control) initiated

Current conditions:

- 1RC-3 failed OPEN

1) Pressurizer heaters __(1)__ be able to maintain RCS pressure above the RPS trip setpoint.

2) AP/44 will <u>initially</u> direct stopping the __(2)__ to help mitigate the failure.

Which ONE of the following completes the statements above?

A. 1. will NOT
2. 1A1 RCP ONLY

B. 1. will NOT
2. 1A1 and 1A2 RCPs

C. 1. will
2. 1A1 RCP ONLY

D. 1. will
2. 1A1 and 1A2 RCPs

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B

General Discussion

Answer A Discussion

Incorrect. First part is correct. Second part is plausible because the 1A1 RCP is the "spray" pump.

Answer B Discussion

Correct. Heaters will not maintain pressure with the Spray valve open. Pressure will continue to decrease. AP/44 will initially stop the 1A1 and 1A2 RCPs.

Answer C Discussion

Incorrect. First part is plausible because the candidate may have the misconception that Pzr heaters could overcome Pzr spray. Second part is plausible because the 1A1 RCP is the "spray" pump.

Answer D Discussion

Incorrect. First part is plausible because the candidate may have the misconception that Pzr heaters could overcome Pzr spray. Second part is correct.

Basis for meeting the KA

Question requires knowledge of how a failure of Pressurizer pressure control system (PZR spray) would affect RCS pressure.

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	BANK	ILT45 Q37

Development References

ILT45 Q37
PNS-PZR Obj. 11
EAP-APG Obj. R9
AP/44

Student References Provided

SYS010 K3.01 - Pressurizer Pressure Control System (PZR PCS)
Knowledge of the effect that a loss or malfunction of the PZR PCS will have on the following: (CFR: 41.7 / 45.6)
RCS ....

401-9 Comments:

Remarks/Status

SYS012 K5.01 - Reactor Protection System (RPS)
Knowledge of the operational implications of the following concepts as the apply to the RPS: (CFR: 41.5 / 45.7)
DNB ....

The DNBR Safety Limit is applicable in MODE(s) __(1)__ and the High flux RPS trip setpoint __(2)__ designed to prevent exceeding that limit.

Which ONE of the following completes the statement above?

A. 1. one ONLY
2. is

B. 1. one ONLY
2. is NOT

C. 1. one AND two
2. is

D. 1. one AND two
2. is NOT

ILT48 ONS SRO NRC Examination QUESTION 36

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C

General Discussion

Answer A Discussion

Incorrect. First part is incorrect but plausible since the Safety Limits do apply in MODE 1. Also it would be plausible to question the logic of a DNBR limit being in place in MODE 2 since power is limited to 5% in that MODE.
Second part is correct.

Answer B Discussion

Incorrect. First part is incorrect but plausible since the Safety Limits do apply in MODE 1. Also it would be plausible to question the logic of a DNBR limit being in place in MODE 2 since power is limited to 5% in that MODE.
Second part is plausible since the High Flux trip is also designed to protect the fuel centerline temperature Safety Limit therefore under the misconception that a trip only protects against one safety limit it would be more logical to choose the High Temperature trip as the DNBR protection and high flux as the fuel centerline melt protection.

Answer C Discussion

Correct. The DNBR and fuel centerline temperature Safety Limits are applicable in both Mode 1 and 2. The High flux RPS trip is designed to protect against exceeding both the DNBR and Fuel Centerline temperature Safety Limits.

Answer D Discussion

Incorrect. First part is correct.
Second part is plausible since the High Flux trip is also designed to protect the fuel centerline temperature Safety Limit therefore under the misconception that a trip only protects against one safety limit it would be more logical to choose the High Temperature trip as the DNBR protection and high flux as the fuel centerline melt protection.

Basis for meeting the KA

Question requires knowledge of the operational implications of exceeding RPS trip setpoints as they relate to DNBR.

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Memory	MODIFIED	ILT42 Q38

Development References	Student References Provided
ILT42 Q38 IC-RPS Obj R4	

SYS012 K5.01 - Reactor Protection System (RPS)
Knowledge of the operational implications of the following concepts as the apply to the RPS: (CFR: 41.5 / 45.7)
DNB ....

401-9 Comments:	Remarks/Status

SYS013 K4.12 - Engineered Safety Features Actuation System (ESFAS)
Knowledge of ESFAS design feature(s) and/or interlock(s) which provide for the following : (CFR: 41.7)
Safety injection block ....

Given the following Unit 1 conditions:

- RCS cooldown in progress
- RCS pressure = 1730 psig slowly decreasing

1) 1SA-7/D-6 (ES HPI Bypass Permit) __(1)__ actuated.

2) Once bypassed, HPI ES __(2)__ AUTOMATICALLY reinstate when RCS pressure is returned to normal operating pressure.

Which ONE of the following completes the statements above?

A. 1. is
2. does

B. 1. is
2. does NOT

C. 1. is NOT
2. does

D. 1. is NOT
2. does NOT

ILT48 ONS SRO NRC Examination QUESTION 37

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C

General Discussion

Answer A Discussion

Incorrect. First part is incorrect. Plausible since pressure is below 1740 psig which is the pressure where it is reinstated. Second part is correct.

Answer B Discussion

Incorrect. First part is incorrect. Plausible since pressure is below 1740 psig which is the pressure where it is reinstated. Second part is incorrect. Plausible since other safety systems like AFIS do not auto reinstate once actuated.

Answer C Discussion

CORRECT. 1SA-7/D6 (ES HPI Bypass Permit) actuates at 1715 psig decreasing RCS pressure. Once actuated, it will reset at 1740 psig RCS pressure increasing. Therefore with RCS pressure 1730 psig decreasing , the alarm is not actuated.
If HPI ES is bypassed, it will auto reinstate when RCS pressure increases above 1740 psig.

Answer D Discussion

Incorrect. First part is correct. Second part is incorrect. Plausible since other safety systems like AFIS do not auto reinstate once actuated.

Basis for meeting the KA

Question requires knowledge of design features and interlock operation of the HPI portion of ES as it relates to blocking actuation.

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Memory	BANK	ILT45 Q32

Development References
ILT45 Q32 EC-ES Obj 05

Student References Provided

SYS013 K4.12 - Engineered Safety Features Actuation System (ESFAS)
Knowledge of ESFAS design feature(s) and/or interlock(s) which provide for the following : (CFR: 41.7)
Safety injection block ....

401-9 Comments:	Remarks/Status

SYS022 A3.01 - Containment Cooling System (CCS)
Ability to monitor automatic operation of the CCS, including: (CFR: 41.7 / 45.5)
Initiation of safeguards mode of operation ....

Given the following Unit 1 Conditions:
Time = 0500:

- Reactor power = 25% stable
- 1A and 1C RBCUs operating in HIGH speed
- 1B RBCU is operable and OFF

Time = 0501:

- A LOCA occurs
- ES channels 1-5 actuate
- ES channel 6 fails to actuate
- A LOOP occurs

Time = 0505:

- Offsite power is restored to Unit 1

At Time = 0506, 1C RBCU is __(1)__ and 1B RBCU is __(2)__.

Which ONE of the following completes the statement above?

A. 1. operating in LOW speed
2. operating in LOW speed

B. 1. operating in LOW speed
2. OFF

C. 1. OFF
2. operating in LOW speed

D. 1. OFF
2. OFF

General Discussion

Answer A Discussion

INCORRECT. First part is plausible if the applicant misapplies the 3-minute time delay AND confuses which RBCU restarts from ES-5. (A RBCU restarts from ES-5 and C RBCU restarts from ES-6). Second part is plausible if the applicant misapplies the 3-minute time delay and starts the clock at ES actuation rather than restoration of power.

Answer B Discussion

INCORRECT. First part is plausible if the applicant misapplies the 3-minute time delay AND confuses which RBCU restarts from ES-5. (A RBCU restarts from ES-5 and C RBCU restarts from ES-6). Second part is correct.

Answer C Discussion

INCORRECT. First part is correct. Second part is plausible if the applicant misapplies the 3-minute time delay and starts the clock at ES actuation rather than restoration of power.

Answer D Discussion

CORRECT. In the case of a simultaneous LOCA and LOOP, the 3-minute time delay starts when power is restored (rather than when ES actuates). Therefore only 1 minute has passed since power was restored.

Basis for meeting the KA

The question requires the applicant to know that ES-5/6 actuate on high containment pressure, and then determine the RBCU configuration as a result of the actuation, including the 3 minute time delay. The mixed speed circuit stops all running RBCUs on receipt of ES Ch-5/6 actuation, and after a 3-minute time delay, restarts them in LOW. In the case of a simultaneous LOCA and LOOP, the 3-minute time delay starts when power is restored (rather than when ES actuates).

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	BANK	ILT43 Q39

Development References

ILT43 Q39
PNS-RBC Obj. 01

Student References Provided

SYS022 A3.01 - Containment Cooling System (CCS)
Ability to monitor automatic operation of the CCS, including: (CFR: 41.7 / 45.5)
Initiation of safeguards mode of operation ....

401-9 Comments:

Remarks/Status

SYS026 A1.05 - Containment Spray System (CSS)

Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the CSS controls including: (CFR: 41.5 / 45.5)

Chemical additive tank level and concentration ....

Following a LBLOCA, __(1)__ is added to the Reactor Building Emergency Sump to __(2)__.

Which ONE of the following completes the statement above?

A. 1. LIOH (Lithium Hydroxide)
   2. minimize Hydrogen production from the Boric Acid reaction with Zircoloy

B. 1. LIOH (Lithium Hydroxide)
   2. aid in keeping Iodine in solution, ultimately reducing offsite dose

C. 1. TSP (Trisodium Phosphate Dodecahydrate)
   2. minimize Hydrogen production from the Boric Acid reaction with Zircoloy

D. 1. TSP (Trisodium Phosphate Dodecahydrate)
   2. aid in keeping Iodine in solution, ultimately reducing offsite dose

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ILT48 ONS SRO NRC Examination QUESTION 39

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D

General Discussion

Answer A Discussion

Incorrect. First part is plausible because TSP is added to the Emergency sump to control PH and LIOH is added to RCS to control PH. Second part is plausible since it does inhibit H2 production due to the boric acid reaction with Zinc and Aluminum.

Answer B Discussion

Incorrect. First part is plausible because TSP is added to the Emergency sump to control PH and LIOH is added to RCS to control PH. Second part is correct.

Answer C Discussion

First part is correct. Second part is plausible since it does inhibit H2 production due to the boric acid reaction with Zinc and Aluminum.

Answer D Discussion

Correct. TSP is added to the Emergency Sump by way of TSP baskets as containment water level increases following a LOCA. The TSP is added to control PH which controls the amount of Iodine that comes out of solution which reduces offsite doses.

Basis for meeting the KA

CE stated that asking question regarding the TSP baskets could be used to match this KA. Requires the ability to monitor changes in parameters (offsite doses) based on addition of TSP. The TSP is added to containment water which is utilized by the RBS system.

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Memory	BANK	ILT43 Q40

Development References

ILT43 Q40
PNS-RBS Obj 1

Student References Provided

SYS026 A1.05 - Containment Spray System (CSS)

Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the CSS controls including: (CFR: 41.5 / 45.5)

Chemical additive tank level and concentration ....

401-9 Comments:

Remarks/Status

ILT48 ONS SRO NRC Examination QUESTION 40 40 **B**

SYS026 K1.01 - Containment Spray System (CSS)

Knowledge of the physical connections and/or cause-effect relationships between the CSS and the following systems: (CFR: 41.2 to 41.9 / 45.7 to 45.8)

ECCS ....

---

1) The actual SETPOINT for Reactor Building Spray actuation is __(1)__ psig.

2) The 1BS-2 position if ES Channel 8 fails to actuate is __(2)__.

Which ONE of the following completes the statements above?

A. 1. 10
2. Open

B. 1. 10
2. Closed

C. 1. 15
2. Open

D. 1. 15
2. Closed

General Discussion

Answer A Discussion

Incorrect: First part is correct. Second part is plausbile since there are mulitiple ES valve components that are normally in their ES position. (Ex. HP-27 is C HPI pump disch valve and is normally open). Also plausble since the pump suction valves are MOV's and are normally open. Also plausble since we leave BS-15 (BS header drain valve located in RB) open to ensure we do not spray down containment at power.

Answer B Discussion

Correct: ES-7&8 actual setpoint is 10 psig and the RB Spray pump discharge valves (BS-1&2) are normally closed and are required to open on ES signal.

Answer C Discussion

Incorrect: First part is plausible since <15 psig is the TS required setpoint. Second part is plausbile since there are mulitiple ES valve components that are normally in their ES position. (Ex. HP-27 is C HPI pump disch valve and is normally open). Also plausble since the pump suction valves are MOV's and are normally open. Also plausble since we leave BS-15 (BS header drain valve located in RB) open to ensure we do not spray down containment at power.

Answer D Discussion

Incorrect: First part is plausible since <15 psig is the TS required setpoint. Second part is correct.

Basis for meeting the KA

Requires knowledge of the relationship between CSS (building spray) and ECCS (initiation).

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Memory	BANK	ILT40 Q43

Development References

ILT40 Q43
PNS-BS Obj. 03 & 06

Student References Provided

SYS026 K1.01 - Containment Spray System (CSS)

Knowledge of the physical connections and/or cause-effect relationships between the CSS and the following systems: (CFR: 41.2 to 41.9 / 45.7 to 45.8)

ECCS ....

401-9 Comments:

Remarks/Status

SYS039 A4.03 - Main and Reheat Steam System (MRSS)
Ability to manually operate and/or monitor in the control room: (CFR: 41.7 / 45.5 to 45.8)
MFW pump turbines ....

Given the following plant conditions:
Time = 1200

- Unit 2 Reactor power = 75%
- Reactor Diamond, BOTH FDW masters, and the Main and Startup FDW valves are in HAND

Time = 1215

- Reactor trip occurs

1) At Time = 1200, the Unit 2 Main Feedwater Pump Turbines are being controlled by their associated __(1)__.

2) At Time = 1215, runback of Main Feedwater flow __(2)__ occur AUTOMATICALLY.

Which ONE of the following completes the statements above?

A. 1. Motor Gear Unit
2. will

B. 1. Motor Gear Unit
2. will NOT

C. 1. Motor Speed Changer
2. will

D. 1. Motor Speed Changer
2. will NOT

ILT48 ONS SRO NRC Examination QUESTION 41

41

A

General Discussion

Answer A Discussion

Correct.
1st part is correct because the Motor Gear Unit (MGU) is the normal speed control for the Main FDW Pumps. At 75% power, both Main FDW Pumps are operating and since there is no mention of the Hand Jack switch, the FDWPs are being controlled by the MGU. In order for the FDWP to be controlled by the Motor Speed Changer (MSC), the FDWP would have to be on the Hand Jack. The Hand Jack switch is used when it is necessary to remove the MGU from service for maintenance, etc. while the FDWP is operating. Placing the FDWP on Hand Jack simulates the MGU on the high speed stop. FDWP control is the lowest speed signal called for, which when on the Hand Jack, would be the MSC.
2nd part is correct because upon receiving a reactor trip signal, the MFWPTs, Main & Startup FDW valves will transfer to AUTO and process the runback signal.

Answer B Discussion

Incorrect.
1st part is correct.
2nd part is incorrect because the upon receiving a reactor trip signal, the MFWPTs, Main & Startup FDW valves will transfer to AUTO and process the runback signal. It is plausible becasuse if they did not receive a separate signal on a reactor trip, the runback signal from the ICS "Integrated Master" would not pass through the Loop Masters to runback feedwater and this answer would be correct.

Answer C Discussion

Incorrect.
1st part is incorrect. Plausible since it would be correct if the FDWPTs were on the Hand Jack.
2nd part is correct because upon receiving a reactor trip signal, the MFWPTs, Main & Startup FDW valves will transfer to AUTO and process the runback signal.

Answer D Discussion

Incorrect.
1st part is incorrect. Plausible since it would be correct if the FDWPTs were on the Hand Jack.
2nd part is incorrect because the upon receiving a reactor trip signal, the MFWPTs, Main & Startup FDW valves will transfer to AUTO and process the runback signal. It is plausible because if they did not receive a separate signal on a reactor trip, the runback signal from the ICS "Integrated Master" would not pass through the Loop Masters to runback feedwater and this answer would be correct.

Basis for meeting the KA

Requires the ability to monitor for proper steam supply to the main feedwater pumps. Reheat Steam is consistent with D bleed.

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	NEW	

Development References

CF-FPT obj 02
STG-ICS

Student References Provided

SYS039 A4.03 - Main and Reheat Steam System (MRSS)
Ability to manually operate and/or monitor in the control room: (CFR: 41.7 / 45.5 to 45.8)
MFW pump turbines ....

401-9 Comments:

Remarks/Status

SYS039 2.1.32 - Main and Reheat Steam System (MRSS)
SYS039 GENERIC
Ability to explain and apply system limits and precautions. (CFR: 41.10 / 43.2 / 45.12)

In accordance with Limits and Precautions of OP/1/A/1106/014 (Moisture Separator Reheater), the MAXIMUM allowed side to side delta Temperature across the Low Pressure Turbines during normal operation is __(1)__ degrees F and we ensure this limit is not exceeded by throttling valves controlling the steam supply to the __(2)__ as power level changes.

Which ONE of the following completes the statement above?

A. 1. 50
   2. First Stage Reheaters

B. 1. 50
   2. Second Stage Reheaters

C. 1. 100
   2. First Stage Reheaters

D. 1. 100
   2. Second Stage Reheaters

General Discussion

Answer A Discussion

Incorrect, First part is correct. Second part is plausible since this method would control side to side delta T's on the LP turbine however the this is not how it is controlled

Answer B Discussion

Correct. Per L&P's 50 degrees is the maximum side to side delta T allowed and this is controlled by throttling MS-112 and 173 with power level. These valves control the steam being supplied to the SSRH's and therefore the steam temperature being admitted to the LP turbines.

Answer C Discussion

Incorrect. First part is plausible since 100 degrees/hr is the maximum SSRH tube HUR allowed by L&P's.
Second part is plausible since this method would control side to side delta T's on the LP turbine however the this is not how it is controlled

Answer D Discussion

Incorrect. First part is plausible since 100 degrees/hr is the maximum SSRH tube HUR allowed by L&P's.
Second part is correct..

Basis for meeting the KA

Requires the knowledge of a system L&P in the MSR procedure and how we apply that limit during power maneuvering (how we control the temperature below the limit).

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Memory	NEW	

Development References

STG-MSR obj 08
1106/14

Student References Provided

SYS039 2.1.32 - Main and Reheat Steam System (MRSS)
SYS039 GENERIC
Ability to explain and apply system limits and precautions. (CFR: 41.10 / 43.2 / 45.12)

401-9 Comments:

Remarks/Status

SYS059 A2.07 - Main Feedwater (MFW) System

Ability to (a) predict the impacts of the following malfunctions or operations on the MFW; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: (CFR: 41.5 / 43.5 / 45.3 / 45.13)

Tripping of MFW pump turbine ....

Given the following Unit 1 conditions:

- Reactor power = 80% stable
- Reactor Diamond and both Feedwater masters are in HAND
- Feedwater Transient occurs which results in one of the Main Feedwater Pumps tripping on High Discharge Pressure

1) The Main Feedwater Pump with the LOWER Discharge Pressure trip setpoint is the __(1)__ Main Feedwater Pump.

2) In accordance with AP/1 (Unit Runback), a Manual power reduction to a MINIMUM of __(2)__ % power will be performed.

Which ONE of the following completes the statements above?

A. 1. 1A
2. 65

B. 1. 1A
2. 74

C. 1. 1B
2. 65

D. 1. 1B
2. 74

ILT48 ONS SRO NRC Examination QUESTION 43

43

C

General Discussion

Answer A Discussion

Incorrect. First part is plausible since there are only 2 MFDWP's and since 1A is first alphabetically it would be logical to assume it would be the one you want to trip first if you did not know the specific setpoints.
Second part is correct.

Answer B Discussion

Incorrect. First part is plausible since there are only 2 MFDWP's and since 1A is first alphabetically it would be logical to assume it would be the one you want to trip first if you did not know the specific setpoints.
Second part is plausible since it would be correct for a RCP trip.

Answer C Discussion

Correct. The 1B MFDWP disch pressure setpoint is 1240 psig and the 1A MFDWP disch pressure trip setpoint is 1275 psig.

Answer D Discussion

Incorrect. First part is correct.
Second part is plausible since it would be correct for a RCP trip.

Basis for meeting the KA

Question requires the candidate to predict which FDW pump will trip first during a malfucntion that impacts FDWP discharge pressure and then use procedures to mitigate the consequences.

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Memory	NEW	

Development References	Student References Provided
CF-FPT Obj 14 AP/1	

SYS059 A2.07 - Main Feedwater (MFW) System

Ability to (a) predict the impacts of the following malfunctions or operations on the MFW; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: (CFR: 41.5 / 43.5 / 45.3 / 45.13)

Tripping of MFW pump turbine ....

401-9 Comments:	Remarks/Status
	NEW KA

SYS059 A3.06 - Main Feedwater (MFW) System
Ability to monitor automatic operation of the MFW, including: (CFR: 41.7 / 45.5)
Feedwater isolation ....

Given the following Unit 1 conditions:
Initial Conditions:

- Reactor power = 100%
- Two AFIS pressure transmitters on 1A SG fail high

Current Conditions:

- 1A Main Steam Line break occurs
- 1A SG pressure = 480 psig rapidly decreasing

1) AFIS __(1)__ actuated.

2) Rule 5 (Main Steam Line Break) will direct the operator to __(2)__.

Which ONE of the following completes the statements above?

A. 1. is
2. open 1AS-40 while closing 1MS-47

B. 1. is
2. select OFF for 1A MD EFDW Pump

C. 1. is NOT
2. open 1AS-40 while closing 1MS-47

D. 1. is NOT
2. select OFF for 1A MD EFDW Pump

ILT48 ONS SRO NRC Examination QUESTION 44 44 **B**

General Discussion

Answer A Discussion
Incorrect. First part is correct. Second part is plausible since it would be correct if the MSLB were in the B SG. With the leak in the A SG, Rule 5 will not direct transfer of the CSAE steam supply.

Answer B Discussion
Correct: AFIS uses 4 transmitters. Any two of the 4 decreasing to 550 psig will result in an AFIS actuation therefore AFIS will still automatically initiate as long as there are two PTs available. Rule 5 will direct placing the switch for the 1A MD EFDWP in OFF.

Answer C Discussion
Incorrect: AFIS will auto initiate. Plausible if AFIS Logic is assumed to be disabled with 2 pressure switches failed which is the case for numerous instrument strings (2/3 logic to mitigate a single failure). Second part is plausible since it would be correct if the MSLB were in the B SG. With the leak in the A SG, Rule 5 will not direct transfer of the CSAE steam supply.

Answer D Discussion
Incorrect: AFIS will auto initiate. Plausible if AFIS Logic is assumed to be disabled with 2 pressure switches failed which is the case for numerous instrument strings (2/3 logic to mitigate a single failure). Second part is correct. Additionally, second part is plausible if you believe that AFIS has not actuated since the MDEFWP is placed in OFF anytime there is a MSLB on its associated SG. This means that even if pressure does not
decrease to the AFIS setpoint you would still place the MDEFWP in OFF.

Basis for meeting the KA
Requires knowledge of design features and automatic operation of the Main Feedwater system as it relates to the Automatic Feedwater Isolation System.

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	BANK	2009B NRC Exam Q43

Development References
2009B NRC Exam Q43
CF-FDW Obj. 19
EAP-EHT Obj. R14
EOP Rule 5

Student References Provided

SYS059 A3.06 - Main Feedwater (MFW) System
Ability to monitor automatic operation of the MFW, including: (CFR: 41.7 / 45.5)
Feedwater isolation ....

401-9 Comments:

Remarks/Status

SYS061 2.4.8 - Auxiliary / Emergency Feedwater (AFW) System
SYS061 GENERIC
Knowledge of how abnormal operating procedures are used in conjunction with EOPs. (CFR: 41.10 / 43.5 / 45.13)

Given the following Unit 1 conditions:

- Reactor power = 100%
- Confirmed flooding of the Turbine Building is in progress

1) The EOP TBF tab __(1)__ state that AP/10 (Turbine Building Flood) will be performed in parallel with the tab.

2) Actions taken in accordance with AP/10 will require that __(2)__ Feedwater be used for a long term source of water to the Steam Generators.

Which ONE of the following completes the statements above?

A. 1. does
2. Emergency

B. 1. does
2. Main

C. 1. does NOT
2. Emergency

D. 1. does NOT
2. Main

ILT48 ONS SRO NRC Examination QUESTION 45

45

A

General Discussion

Answer A Discussion

CORRECT. A note at the beginning of AP/10 and the EOP TBF tab states that the AP will be used in parallel with the EOP. The AP attempts to identify and stop the source of the water while the EOP focuses on core protection. AP/10 directs securing the CCW pumps in order to stop or reduce the in leakage. A note in the AP explains that this will cause a loss of vacuum and therefore a loss of the Main Feedwater pumps.

Answer B Discussion

Incorrect. First part is correct. In the case of AP/10, both the AP and the EOP TBF tab state that AP/10 is to be performed in parallel with the EOP TBF tab.
Second part is plausible since without considering the loss of Vacuum caused by the securing of CCW pumps directed in AP/10, Main FDW would be available for long term DHR as needed.

Answer C Discussion

Incorrect. First part is incorrect. Plausible since it would be correct for other Aps, which are not performed in parallel with the EOP.
Second part is correct.

Answer D Discussion

Incorrect. First part is incorrect. Plausible since it would be correct for other APs, which are not performed in parallel with the EOP.
Second part is plausible since without considering the loss of Vacuum caused by the securing of CCW pumps directed in AP/10, Main FDW would be available for long term DHR as needed.

Basis for meeting the KA

Required knowledge of how the EOP and AP/10 are used in conjunction with each other with consequences being EFDW being used as long term SG feedwater source.

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	NEW	

Development References

EAP-APG R9
AP/10

Student References Provided

SYS061 2.4.8 - Auxiliary / Emergency Feedwater (AFW) System
SYS061 GENERIC
Knowledge of how abnormal operating procedures are used in conjunction with EOPs. (CFR: 41.10 / 43.5 / 45.13)

401-9 Comments:

Remarks/Status

SYS062 K1.04 - AC Electrical Distribution System

Knowledge of the physical connections and/or cause-effect relationships between the ac distribution sys- tem and the following systems : (CFR: 41.2 to 41.9)

Off-site power sources ....

---

1) Automatic control circuits will close the associated feeder breakers of 1X7, 2X4 & 3X4 after a load shed has occurred and a __(1)__ second timer has timed out.

2) The reason 1X7, 2X4 & 3X4 load shed is to __(2)__.

Which ONE of the following completes the statements above?

A. 1. 30
2. ensure the integrity of the RCP seals

B. 1. 30
2. prevent overloading the CT-4 or CT-5 transformers

C. 1. 60
2. ensure the integrity of the RCP seals

D. 1. 60
2. prevent overloading the CT-4 or CT-5 transformers

ILT48 ONS SRO NRC Examination QUESTION 46 46 **D**

General Discussion

Answer A Discussion

INCORRECT. First part is plausible because X5 & X6 load centers are load shed under certain conditions and the auto reclose time delay for these is 30 seconds. Second part is plausible because this is one of the purposes of the Main Feeder Bus Monitor Panels. MFBMP's assure the integrity of the RCP seals by insuring that seal injection and component cooling flows are regained following a loss of power.

Answer B Discussion

INCORRECT. First part is plausible because X5 & X6 load centers are load shed under certain conditions and the auto reclose time delay for these is 30 seconds. Second part is correct, the purpose of the load shed system is the shedding non-essential loads
reducing the load on the Main Feeder Bus to within the capacity of the standby transformers (CT4 and CT5).

Answer C Discussion

INCORRECT. First part is correct; the time delay for 1X7, 2X4 & 3X4 after a load shed is 60 seconds to reenergize. Second part is plausible because this is one of the purposes of the Main Feeder Bus Monitor Panels. MFBMP's assure the integrity of the RCP seals by insuring that seal injection and component cooling flows are regained following a loss of power

Answer D Discussion

CORRECT. The time delay for 1X7, 2X4 & 3X4 after a load shed is 60 seconds to reenergize. The purpose of the load shed system is the shedding non-essential loads reducing the load on the Main Feeder Bus to within the capacity of the standby transformers (CT4 and CT5).

Basis for meeting the KA

Requires knowledge of the relationship between a portion of the AC Distribution System (1X7, 2X4, 3X4) and Offsite Power source CT-5.

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Memory	BANK	ILT43 Q15

Development References

ILT43 Q15
EL-PSL Obj. 03

Student References Provided

SYS062 K1.04 - AC Electrical Distribution System

Knowledge of the physical connections and/or cause-effect relationships between the ac distribution sys- tem and the following systems : (CFR: 41.2 to 41.9)

Off-site power sources ....

401-9 Comments:

Remarks/Status

Nobody missed it on 43

SYS063 2.1.23 - DC Electrical Distribution System
SYS063 GENERIC
Ability to perform specific system and integrated plant procedures during all modes of plant operation. (CFR: 41.10 / 43.5 / 45.2 / 45.6)

Given the following station conditions:
Initial conditions:

- All three units Reactor power = 100%

Current conditions:

- All Unit's 4160v Main Feeder Busses are de-energized
- Unit 1, 2, and 3 EOP Blackout tabs in progress

Which ONE of the following describes the required status of Unit 1 Essential Inverters per EOP Enclosure 5.38 (Restoration of Power) and why?

Unit 1's Essential Inverters _______.

A. remain energized to provide power to ES channels

B. remain energized to provide control power to 4160v

C. are de-energized to prevent inverter damage

D. are de-energized to extend the life of available batteries

---

ILT48 ONS SRO NRC Examination QUESTION 47

47 D

General Discussion

Answer A Discussion

Incorrect.: Plausible if ES Channels (are vital loads from KVIA,B,C,D) are confused with essential loads (from KI, KU, KX); vital loads must be differentiated from essential loads.

Answer B Discussion

Incorrect: Plausible if control power (ex. for breakers, switches, etc) are incorrectly assumed to be essential inverter loads

Answer C Discussion

Incorrect: Incorrect but plausible in that inverters could be damaged due to high current as input voltages start to decrease.

Answer D Discussion

Correct: Essential Inverters KI, KU, & KX DC input breakers are opened to extend battery life per direction given from the EOP SBO tab and Encl. 5.38.

Basis for meeting the KA

Requires knowledge of required actions within procedures and the correlation of the impact of high battery load on available battery capacity as the bases for actions directed in the EOP

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Memory	BANK	ILT45 Q49

Development References

ILT45 Q49
EAP-BO Obj. R8
EOP Encl. 5.38

Student References Provided

SYS063 2.1.23 - DC Electrical Distribution System
SYS063 GENERIC
Ability to perform specific system and integrated plant procedures during all modes of plant operation. (CFR: 41.10 / 43.5 / 45.2 / 45.6)

401-9 Comments:

Remarks/Status

SYS063 K1.03 - DC Electrical Distribution System

Knowledge of the physical connections and/or cause-effect relationships between the DC electrical system and the following systems: (CFR: 41.2 to 41.9 / 45.7 to 45.8)

Battery charger and battery ....

Given the following plant conditions:

- 3CA Battery Charger fails - output voltage = 0 VDC
- 3CA Battery voltage = 120 VDC
- 3DCB Bus voltage = 123 VDC
- Unit 1 DCA/DCB Bus voltage = 125 VDC
- Unit 2 DCA/DCB Bus voltage = 127 VDC

Which ONE of the following will automatically supply power to 3DIA panelboard?

A. 3CA Battery

B. Unit 1 DC Bus

C. 3DCB Bus

D. Unit 2 DC Bus

ILT48 ONS SRO NRC Examination **QUESTION 48** 48 **B**

General Discussion

Answer A Discussion

Incorrect. Plausible because the 3CA battery will supply power to the bus if its voltage is higher than the backup source. In this case it is not. Unit 1's voltage is higher.

Answer B Discussion

Correct, The voltage from Unit 1 is higher than the 3CA battery voltage since Unit 1 is being supplied from the charger, so Unit 1 will supply power.

Answer C Discussion

Incorrect. For the Vital DC system, the 3DCB bus is not aligned to the 3DCA bus. Plausible because 3DCB Bus is aligned to backup the essential inverters

Answer D Discussion

Incorrect. Unit 2's DC Bus is not connected to Unit 3. Plausible because Unit 2 is adjacent to Unit 3 and supplies backup power to Unit 3 for other equipment such as the Unit 3 Control Rod Drive System.

Basis for meeting the KA

Requires knowledge of relationships between the control battery, battery charger, and DC Electrical System.

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	BANK	ILT44 Q75

Development References	Student References Provided
ILT44 Q75 EL-DCD Obj. 06	

SYS063 K1.03 - DC Electrical Distribution System

Knowledge of the physical connections and/or cause-effect relationships between the DC electrical system and the following systems: (CFR: 41.2 to 41.9 / 45.7 to 45.8)

Battery charger and battery ....

401-9 Comments:	Remarks/Status

SYS064 K2.03 - Emergency Diesel Generator (ED/G) System
Knowledge of bus power supplies to the following: (CFR: 41.7)
Control power ....

Given the following plant conditions:
Time = 1200

- All three units at 50% power
- ACB-3 is closed

Time = 1245

- LOCA occurs on Unit 1
- ES channels 1 and 2 actuate on Unit 1
- CT-1 lockout occurs

At Time = 1250, KHU 1 control power is supplied by ________.

Which ONE of the following completes the statement above?

A. CX Transformer from Keowee Unit 1

B. 1X Transformer from Keowee Unit 1

C. CX Transformer from Keowee Unit 2

D. 1X Transformer from 230 KV Switchyard

ILT48 ONS SRO NRC Examination QUESTION 49

49

A

General Discussion

Answer A Discussion

Correct. 3 sources of power are normally available to the 1X Load Center, which in turn supplies control power to the Keowee unit. The power supplies are: 1) 1X Transformer from the 230KV switchyard; 2) 1X Transformer from KHU 1 through ACB-1; 3) CX Transformer from 1TC Switchgear. For the Underground unit, CX Transformer is the normal supply and 1X Transformer is the alternate supply. If the normal supply is lost for 36 seconds and the alternate supply is available, the alternate supply will close in. If the normal source returns during the 36 seconds, the logic returns to the normal source. In this question, KHU 1 is the underground unit. With the reactor trip and CT-1 lockout, power is lost to Unit 1 and thus 1TC (CX Transformer), but returns from KHU 1 in less than 36 seconds.

Answer B Discussion

Incorrect. . Plausible because it would be true if this was the overhead unit and a Switchyard Isolation occurred (KHU 1 running with ACB-1 closed).

Answer C Discussion

Incorrect. Plausible because it would be correct if KHU 2 were supplying power to Unit 1.

Answer D Discussion

Incorrect. Plausible because it would be correct if power were lost to 1TC (CX Transformer) for > 36 seconds.

Basis for meeting the KA

The question requires knowledge of the bus power supply to control power for the Keowee Hydro Units, which is Oconee's equivalent of Emergency Diesel Generator (ED/G) System, during various plant conditions.

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	NEW	

Development References
EL-KHU Obj. 01

Student References Provided

SYS064 K2.03 - Emergency Diesel Generator (ED/G) System

Knowledge of bus power supplies to the following: (CFR: 41.7)

Control power ....

401-9 Comments:

Remarks/Status
Preview

SYS064 K3.03 - Emergency Diesel Generator (ED/G) System
Knowledge of the effect that a loss or malfunction of the ED/G system will have on the following: (CFR: 41.7 / 45.6)
ED/G (manual loads) ....

Given the following Unit 1 conditions:
Time = 1200

- Reactor power = 100%
- ACB-4 Closed
- Large Break LOCA occurs coincident with a total loss of offsite power

Time = 1205

- Keowee Hydro Unit (KHU)-2 Emergency Lockout occurs

At Time = 1210 the __(1)__ power path is being used to supply Unit 1 ECCS systems and __(2)__ LPI pumps are operating.

Which ONE of the following completes the statements above?

ASSUME NO OPERATOR ACTIONS

A. 1. Overhead
2. ONLY 2

B. 1. Overhead
2. ALL 3

C. 1. Underground
2. ONLY 2

D. 1. Underground
2. ALL 3

General Discussion

Answer A Discussion

Correct. ACB-4 closed indicates that KHU-2 is aligned to the underground power path. Following the LOCA/LOOP, MFB would be energized by KHU-2 through the underground power path. With a subsequent loss of KHU-2, retransfer to startup logic would transfer power to the overhead power path which would be supplied by KHU-1.
Although there are 3 LPI pumps, only the A and B are ECCS pumps therefore only 2 would be operating.

Answer B Discussion

Incorrect. First part is correct. Second part is plausible since there are 3 LPI pumps and other ECCS systems with 3 major components require all 3 (HPI, LPSW, RBCU's).

Answer C Discussion

Incorrect. ACB-4 closed indicates that KHU-2 is aligned to the underground power path. Following the LOCA/LOOP, MFB would be energized by KHU-2 through the underground power path. With a subsequent loss of KHU-2, retransfer to startup logic would transfer power to the overhead power path which would be supplied by KHU-1. However, if the Startup source were not available KHU-1 would be aligned to the Underground Powerpath by closing ACB-3.
Second part is correct

Answer D Discussion

Incorrect. ACB-4 closed indicates that KHU-2 is aligned to the underground power path. Following the LOCA/LOOP, MFB would be energized by KHU-2 through the underground power path. With a subsequent loss of KHU-2, retransfer to startup logic would transfer power to the overhead power path which would be supplied by KHU-1. However, if the Startup source were not available KHU-1 would be aligned to the Underground Powerpath by closing ACB-3.
Second part is plausible since there are 3 LPI pumps and other ECCS systems with 3 major components require all 3 (HPI, LPSW, RBCU's).

Basis for meeting the KA

Our "EDG system" is our Keowee Hydro Units. This question requires knowledge of the effect that a loss of one of the KHU's will have on ONS plant loads and the other KHU. You have to know that when KHU is supplying emergency power to CT-4 following a loca/loop and that KHU is lost, the retransfer to startup will align the other KHU through the overhead power path to the units Main Feeder Buses which are supplying ECCS loads.

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	MODIFIED	ILT46 Q49

Development References

ILT46 Q49
EL-PSL Obj 07
PNS-LPI

Student References Provided

SYS064 K3.03 - Emergency Diesel Generator (ED/G) System
Knowledge of the effect that a loss or malfunction of the ED/G system will have on the following: (CFR: 41.7 / 45.6)
ED/G (manual loads) ....

401-9 Comments:

Remarks/Status

SYS073 K4.01 - Process Radiation Monitoring (PRM) System
Knowledge of PRM system design feature(s) and/or interlock(s) which provide for the following: (CFR: 41.7)
Release termination when radiation exceeds setpoint ....

Given the following Unit 1 conditions:

- Unit 1 startup in progress
- RB Purge in progress
- 1RIA-45 (Norm Vent Gas) determined to be inoperable

1) Automatic termination of RB Purge operation due to increasing activity __(1)__ available.

2) If automatic termination of RB Purge occurs, __(2)__ will close.

Which ONE of the following completes the statements above?

A. 1. is
2. 1PR-2 through 1PR-5 ONLY

B. 1. is
2. 1PR-1 through 1PR-6

C. 1. is NOT
2. 1PR-2 through 1PR-5 ONLY

D. 1. is NOT
2. 1PR-1 through 1PR-6

General Discussion

Answer A Discussion

Correct In case of a failure of RIA-45 HIGH alarm, RIA-46 HIGH alarm (via the switchover function) will actuate the required interlock functions which will trip the RB Purge Fan and close 1PR-2 through 1PR-5.

Answer B Discussion

Incorrect, First part is correct. In case of a failure of RIA-45 HIGH alarm, RIA-46 HIGH alarm (via the switchover function) will actuate the required interlock functions.
Second part is incorrect. Plausible since 1PR-1 and 1PR-6 are containment isolation valves and are closed by an ES actuation.

Answer C Discussion

Incorrect. First part is plausible since 1RIA-45 provides the normal means of automatic isolation of RB purge based on increasing activity therefore it would be plausible to assume that if 1RIA-45 did not auto terminate RB Purge then manual termination would be required.
Second part is correct.

Answer D Discussion

Incorrect. First part is plausible since 1RIA-45 provides the normal means of automatic isolation of RB purge based on increasing activity therefore it would be plausible to assume that if 1RIA-45 did not auto terminate RB Purge then manual termination would be required.
Second part is incorrect. Plausible since 1PR-1 and 1PR-6 are containment isolation valves and are closed by an ES actuation.

Basis for meeting the KA

Requires knowledge of the effect that a loss of RIA-45 will have on the availability of automatic termination if RIA setpoint is exceeded.

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	MODIFIED	ILT44 Q41

Development References

ILT44 Q41
RAD-RIA obj 08
ARG 1SA-8/B9

Student References Provided

SYS073 K4.01 - Process Radiation Monitoring (PRM) System
Knowledge of PRM system design feature(s) and/or interlock(s) which provide for the following: (CFR: 41.7)
Release termination when radiation exceeds setpoint ....

401-9 Comments:

Remarks/Status

SYS073 K5.03 - Process Radiation Monitoring (PRM) System
Knowledge of the operational implications as they apply to concepts as they apply to the PRM system: (CFR: 41.5 / 45.7)
Relationship between radiation intensity and exposure limits ....

Given the following plant conditions:
Time = 1200

- Spent Fuel Pool level = 0.1 foot stable

Time = 1215

- Spent Fuel Pool level = -3.4 feet decreasing
- 1RIA-6 (Spent Fuel Pool Area Monitor) in HIGH alarm
- 1RIA-41 (Spent Fuel Pool Building Gas) in HIGH alarm
- An AO is being dispatched to the SFP area to investigate the cause.
- The AO's dose for this year is 525 mrem
- The AO has NOT received a dose extension for this year

Which ONE of the following is the MAXIMUM TEDE dose (mrem) allowed for the AO while performing the assigned task?

A. 1475

B. 4475

C. 5,000

D. 10,000

General Discussion

Answer A Discussion
Incorrect. Plausible since this would be correct if EDL's were not in effect.

Answer B Discussion
Incorrect. Plausible since this would be correct under the misconception that the 5 rem EDL limit included normal occupational exposure for the associated year.

Answer C Discussion
Correct. 5 rem is the EDL limit for individual exposure

Answer D Discussion
Incorrect. Plausible since this is the limit for all activities during an EDL event and could be correct if the Shift Manager were consulted to allow exceeding the 5 Rem or if the actions were specifically to protect valuable property.

Basis for meeting the KA
Meets the KA because a process monitor is being used to determine the operational implications of exposure limits. RIA-41 is a process monitor which is indicating an increase in radiation intensity and that increase in intensity is (in part) a determining factor for what exposure limits apply. Since there is no direct relationship between radiation exposure limits and radiation intensity (e.g. dose limits are not variable based on radiation intensity), making the connection between an accident that causes increased radiation intensity which also impacts exposure limits is used to match the KA.

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	NEW	

Development References
EAP-TCA obj R6
AP/35

Student References Provided

SYS073 K5.03 - Process Radiation Monitoring (PRM) System

Knowledge of the operational implications as they apply to concepts as they apply to the PRM system: (CFR: 41.5 / 45.7)

Relationship between radiation intensity and exposure limits ....

401-9 Comments:

Remarks/Status

SYS076 A1.02 - Service Water System (SWS)

Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the SWS controls including: (CFR: 41.5 / 45.5)

Reactor and turbine building closed cooling water temperatures. ....

Given the following Unit 3 conditions:
Time = 1200

- Reactor power = 100%
- 3A Letdown cooler tube leak rate = 0.1 gpm

Time = 1230

- 3A Letdown cooler tube leak rate = 5.0 gpm

1) LPSW flow to the Component Coolers would be required to__(1)__ in order to maintain 3A Letdown Cooler Component Cooling outlet temperature constant from 1200 – 1230.

2) The MINIMUM RCS letdown temperature that will result in an AUTOMATIC isolation of letdown is __(2)__°F.

Which ONE of the following completes the statements above?

A. 1. increase
2. 130

B. 1. increase
2. 135

C. 1. remain approximately the same
2. 130

D. 1. remain approximately the same
2. 135

General Discussion

Answer A Discussion

First part is correct. Second part is plausible since this is the high letdown temperature alarm setpoint.

Answer B Discussion

Correct. Since RCS is at a higher temperature and pressure than Component Cooling and the Letdown Coolers are located before the RCS pressure breakdown orifice in the letdown line the tube leakage would be RCS leaking into the CC system (CC pump disch pressure approx. 150 psig), That means that CC temperature would be increasing requiring LPSW flow to increase in order to maintain CC temp constant. If letdown temperature reaches 135 degrees, 1HP-5 will automatically close isolating letdown.

Answer C Discussion

First part is plausible for two reasons. If the candidate confuses the other closed loop cooling system (RCW) as the Letdown cooler cooling medium then they would pick LPSW flow to remain unchanged. However the more likely plausibility comes from the location of the Letdown coolers in the letdown line. If the coolers were downstream of the letdown orifice then leakage would be by way of CC leaking into the RCS which would make LPSW flow remaining approximately unchanged the correct choice.
Second part is plausible since this is the high letdown temperature alarm setpoint.

Answer D Discussion

First part is plausible for two reasons. If the candidate confuses the other closed loop cooling system (RCW) as the Letdown cooler cooling medium then they would pick LPSW flow to remain unchanged. However the more likely plausibility comes from the location of the Letdown coolers in the letdown line. If the coolers were downstream of the letdown orifice then leakage would be by way of CC leaking into the RCS which would make LPSW flow remaining approximately unchanged the correct choice.
Second part is correct.

Basis for meeting the KA

The SWS is our LPSW system. This question requires the ability to predict a parameters response (3A Letdown Cooler CC outlet temp) associated with operating the LPSW controls since LPSW is the cooling medium for the CC system. CC (Component Cooling) is the Reactor closed loop cooling water system at Oconee,

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	NEW	

Development References
PNS-CC Obj 03, 04, 06 PNS-HPI

Student References Provided

SYS076 A1.02 - Service Water System (SWS)

Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the SWS controls including: (CFR: 41.5 / 45.5)

Reactor and turbine building closed cooling water temperatures. ....

401-9 Comments:	Remarks/Status

ILT48 ONS SRO NRC Examination QUESTION 54 54 **C**

SYS078 A3.01 - Instrument Air System (IAS)
Ability to monitor automatic operation of the IAS, including: (CFR: 41.7 / 45.5)
Air pressure ....

Given the following plant conditions:
Initial conditions:

- Time = 0400
- Primary IA compressor tripped

Current conditions:

- Time = 0405
- Instrument Air pressure = 91 psig decreasing

At Time = 0405…

1) Auxiliary IA Compressors are __(1)__.

2) Backup IA compressors are __(2)__.

Which ONE of the following completes the statements above?

A. 1. OFF
2. OFF

B. 1. Operating
2. OFF

C. 1. OFF
2. Operating

D. 1. Operating
2. Operating

ILT48 ONS SRO NRC Examination QUESTION 54

54

C

General Discussion

Backup IA Compressors switches are maintained in STBY 1 during normal operation.
Backup IA Compressors in STBY 1 start at ≈ 93 psig.
Unit 1 Aux IA Compressor starts at ≈ 88 psig.
Sullair Service Air Compressors start at 95 psig.
SA-141 (SA to IA Controller) automatically regulates IA header pressure to 85 psig.
Diesel Air Compressors in Auto start at ≈ 90 psig.

Answer A Discussion

Incorrect:. First part is correct. Second part is incorrect. The Backup IA Compressors are normally in STBY 1 and auto start at 93 psig decreasing. Plausible because it would be correct if the Backup IA Compressor switches were in STBY 2. In STBY 2 the auto start setpoint is 90 psig decreasing.

Answer B Discussion

Incorrect:. First part is incorrect. Plausible because it would be correct for the Sullair Service Air Compressors, which auto start at 95 psig decreasing SA pressure. Second part is incorrect. The Backup IA Compressors are normally in STBY 1 and auto start at 93 psig decreasing. Plausible because it would be correct if the Backup IA Compressor switches were in STBY 2. In STBY 2 the auto start setpoint is 90 psig decreasing.

Answer C Discussion

Correct:. Backup IA compressors started at 93 psig and the AIA compressors are still off because they start at 88 psig.

Answer D Discussion

Incorrect.First part is incorrect. Plausible because it would be correct for the Sullair Service Air Compressors, which auto start at 95 psig decreasing SA pressure. Second part is correct.

Basis for meeting the KA

Question requires knowledge of how Instrument Air System components respond to changes in instrument air pressure.

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Memory	BANK	ILT41 Q52

Development References

ILT41 Q52
SSS-IA Obj. 16 & 25
AP/22

Student References Provided

SYS078 A3.01 - Instrument Air System (IAS)
Ability to monitor automatic operation of the IAS, including: (CFR: 41.7 / 45.5)
Air pressure ....

401-9 Comments:

Remarks/Status

ILT48 ONS SRO NRC Examination QUESTION 55 55 **B**

SYS103 A2 04 - Containment System

Ability to (a) predict the impacts of the following malfunctions or operations on the containment system and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations (CFR: 41.5 / 43.5 / 45.3 / 45.13)

Containment evacuation (including recognition of the alarm) ....

Given the following Unit 1 conditions:

Time = 1200

- Reactor in MODE 5
- RCS Loops dropped
- Pressurizer level = 340" stable
- RB Purge in progress
- Reactor Building Normal Sump is being pumped

Time = 1205

- 1RIA-48 (Reactor Building Iodine) in HIGH alarm
- 1RIA-49 (Reactor Building Gas) in HIGH alarm

1) The Containment Evacuation alarm __(1)__ AUTOMATICALLY actuate.

2) __(2)__ will provide guidance to complete the system isolation initiated by 1RIA-49.

Which ONE of the following completes the statements above?

A. 1. will
2. OP/1/A/1102/014 (RB Purge)

B. 1. will
2. OP/1/A/1104/007 (LWD System)

C. 1. will NOT
2. OP/1/A/1102/014 (RB Purge)

D. 1. will NOT
2. OP/1/A/1104/007 (LWD System)

General Discussion

Answer A Discussion

Incorrect. First part is correct. Second part is incorrect. Plausible since it would be correct on a 1RIA-45 high alarm.

Answer B Discussion

CORRECT. 1RIA-49 HIGH alarm does actuate the RB Evacuation alarm. 1RIA-49 HIGH alarm also closes 1LWD-2 to isolate the RBNS. The procedure used to pump the RBNS is OP/1/A/1104/007 (LWD System) and provides guidance to ensure the RBNS Pumps are off and 1LWD-1 is closed.

Answer C Discussion

Incorrect. First part is incorrect. Plausible since some other RIA's in the RB do NOT actuate the Containment Evacuation alarm (Ex. RIA-3, 57, 58). Second part is incorrect. Plausible since it would be correct on a 1RIA-45 high alarm.

Answer D Discussion

Incorrect. First part is incorrect. Plausible since some other RIA's in the RB do NOT actuate the Containment Evacuation alarm (Ex. RIA-3, 57, 58). Second part is correct.

Basis for meeting the KA

Question requires predicting actuation of the Containment Evacuation alarm and using procedures to complete the isolation of the RBNS.

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	MODIFIED	ILT46 Q54

Development References

ILT46 Q54
RAD-RIA Obj. 08
OP/1/A/1104/007

Student References Provided

SYS103 A2 04 - Containment System

Ability to (a) predict the impacts of the following malfunctions or operations on the containment system and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations (CFR: 41.5 / 43.5 / 45.3 / 45.13)

Containment evacuation (including recognition of the alarm) ....

401-9 Comments:

Remarks/Status

PREVIEW

SYS001 K2.03 - Control Rod Drive System
Knowledge of bus power supplies to the following: (CFR: 41.7)
One-line diagram of power supplies to logic circuits ....

Which ONE of the following describes ALL of the MCCs which supply power to Unit 1's Control Rod Drive System?

A. 1X9 and 2X1

B. 1X9 and 2X2

C. 1X1 and 2X9

D. 1X1 and 3X9

ILT48 ONS SRO NRC Examination QUESTION 56 56 **A**

General Discussion

Answer A Discussion
Correct. Normal CRD supply is 1X9. Alternate supply is 2X1.

Answer B Discussion
Incorrect. Plausible because 1X9 is correct and 2X2 is plausible because 2X2 is Unit 3s Alternate supply.

Answer C Discussion
Incorrect. Plausible because would be correct for Unit 2.

Answer D Discussion
Incorrect. Plausible if the candidate had the misconception that Unit 3 backed up Unit 1. That misconception is plausible since the Unit 3 DC system does back up Unit 1s DC system.

Basis for meeting the KA
Question requires knowledge of the normal and alternate power supplies for the CRD system which includes the logic circuits used to ensure power to CRD's is available or removed as required.

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Memory	BANK	ILT41 Q56

Development References
ILT41 Q56
IC-RPS obj R27

Student References Provided

SYS001 K2.03 - Control Rod Drive System
Knowledge of bus power supplies to the following: (CFR: 41.7)
One-line diagram of power supplies to logic circuits ....

401-9 Comments:

Remarks/Status

SYS002 K6.03 - Reactor Coolant System (RCS)
Knowledge of the effect or a loss or malfunction on the following RCS components: (CFR: 41.7 / 45.7)
Reactor vessel level indication ....

Given the following Unit 1 conditions:

- Reactor in MODE 5
- Reactor Vessel level = 80" stable
- Reactor Vessel Cold Leg Ultrasonic level NOT available

1) In accordance with SD 1.3.5 (Shutdown Protection Plan), reducing the reactor vessel level to 40" __(1)__ allowed.

2) Improper venting of the RCS results in RCS pressure greater than Containment pressure and LT-5 readings that are __(2)__ than actual.

Which ONE of the following completes the statements above?

A. 1. is
2. greater

B. 1. is
2. less

C. 1. is NOT
2. greater

D. 1. is NOT
2. less

ILT48 ONS SRO NRC Examination QUESTION 57

57

C

General Discussion

Answer A Discussion

Incorrect. First part is incorrect. Plausible since it would be correct if level were not going below 50 inches.
Second part is correct. LT-5 contains a dp transmitter filled reference leg that is open to the containment atmosphere. If RCS pressure is greater than containment pressure, LT-5 will indicate greater than actual level.

Answer B Discussion

Incorrect. First part is incorrect. Plausible since it would be correct if level were not going below 50 inches.
Second part is incorrect. LT-5 contains a dp transmitter filled reference leg that is open to the containment atmosphere. If RCS pressure is greater than containment pressure, LT-5 will indicate greater than actual level. It would be correct if containment pressure were greater than RCS pressure.

Answer C Discussion

Correct.
First part is correct. SD 1.3.5 requires that all 4 RV level indications be operable prior to going below 50" RV level.
Second part is correct. LT-5 contains a dp transmitter filled reference leg that is open to the containment atmosphere. If RCS pressure is greater than containment pressure, LT-5 will indicate greater than actual level.

Answer D Discussion

Incorrect. First part is correct. SD 1.3.5 requires that all 4 RV level indications be operable prior to going below 50" RV level.
Second part is incorrect. LT-5 contains a dp transmitter filled reference leg that is open to the containment atmosphere. If RCS pressure is greater than containment pressure, LT-5 will indicate greater than actual level. It would be correct if containment pressure were greater than RCS pressure.

Basis for meeting the KA

Requires knowledge of RV level restrictions as a result of a loss of one of the RV level indications. With the loss of the Reactor Vessel cold leg Ultrasonic level, the RCS drain procedure will not allow reducing the reactor vessel level < 50".

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	NEW	

Development References

ADM-SPP Obj 10
SD 1.3.5
CP-RCD Obj 10

Student References Provided

SYS002 K6.03 - Reactor Coolant System (RCS)

Knowledge of the effect or a loss or malfunction on the following RCS components: (CFR: 41.7 / 45.7)

Reactor vessel level indication ....

401-9 Comments:

Remarks/Status

SYS011 K3.03 - Pressurizer Level Control System (PZR LCS)
Knowledge of the effect that a loss or malfunction of the PZR LCS will have on the following: (CFR: 41.7 / 45.6)
PZR PCS ....

Given the following Unit 1 conditions:
Time = 1200

- Plant is stable following a Reactor trip
- Pressurizer (Pzr) level = 100" stable

Time = 1230

- 1HP-120 fails closed
- Pressurizer level decreasing at 1" per minute

1) Assuming no operator actions, the EARLIEST time that Pzr heaters will become unavailable is __(1)__.

2) Based on the conditions above, AP/14 (Loss of Normal HPI Makeup And/Or RCP Seal Injection) __(2)__ direct closing 1HP-5 while 1HP-120 is being repaired.

A. 1. 1245
2. will

B. 1. 1245
2. will NOT

C. 1. 1250
2. will

D. 1. 1250
2. will NOT

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58

D

General Discussion

Answer A Discussion

Incorrect. First part is incorrect. Plausible since this time equates to 85" which would be correct if asking about SSF Pzr heaters.
Second part is incorrect. Plausible since AP/14 does direct closing 1HP-5 when suction is lost to the HPI Pumps.

Answer B Discussion

Incorrect. First part is incorrect. Plausible since this time equates to 85" which would be correct if asking about SSF Pzr heaters.
Second part is correct

Answer C Discussion

Incorrect. First part is correct.
Second part is incorrect. Plausible since AP/14 does direct closing 1HP-5 when suction is lost to the HPI Pumps.

Answer D Discussion

Correct. This time equates to 80" Pzr level which is the low level cutoff for the Pzr heaters. AP/14 will not direct closing 1HP-5 under the given conditions.

Basis for meeting the KA

Required knowledge of the effect that 1HP-120 failing closed will have on Pressurizer heaters.

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	NEW	

Development References

EAP-APG R9
PNS-Pzr obj R7
AP/14

Student References Provided

SYS011 K3.03 - Pressurizer Level Control System (PZR LCS)
Knowledge of the effect that a loss or malfunction of the PZR LCS will have on the following: (CFR: 41.7 / 45.6)
PZR PCS ....

401-9 Comments:

Remarks/Status

SYS016 A3.02 - Non-Nuclear Instrumentation System (NNIS)
Ability to monitor automatic operation of the NNIS, including: (CFR: 41.7 / 45.5)
Relationship between meter readings and actual parameter value ....

Given the following Unit 1 conditions:

- Main Steam Line Break on the 1A Steam Generator
- Reactor Building pressure = 6.3 psig very slowly decreasing
- Indicated 1B SG XSUR level = 75” decreasing
- ALL Subcooling Margins = 65°F stable

1) Actual 1B SG level is __(1)__ indicated XSUR level.

2) 1B SG level __(2)__ AUTOMATICALLY be controlled at the desired level in accordance with Rule 7 (SG Feed Control).

Which ONE of the following completes the statements above?

A. 1. lower than
   2. will

B. 1. lower than
   2. will NOT

C. 1. approximately the same as
   2. will

D. 1. approximately the same as
   2. will NOT

General Discussion

Answer A Discussion

Incorrect: First part is correct.
Second part is plausible for three reasons. 1. If SG pressure did not exceed 3 psig it would be correct. 2. It would be plausible to believe that the SG level control system setpoint would change when ACC conditions exist and therefore control at the level designated in Rule 7. 3. SG level will be automatcially controlled in this case, only it will be controlled at 30" instead of 60" as required by Rule 7.

Answer B Discussion

Correct. Since XSUR is not temperature compensated, as RB temperatures increase, actual level becomes lower than indicated level. As RB pressure exceeds 3 psig, ACC conditions are determined to exist and Rule 7 will direct controlling available steam generators at 60" XSUR. This requires manually controlling level since auto level control will attempt to control at 30" XSUR.

Answer C Discussion

Incorrect: First part is plausible since it would be correct if asking about SG Operating Range level since it is temperature compensated.
Second part is plausible for three reasons. 1. If SG pressure did not exceed 3 psig it would be correct. 2. It would be plausible to believe that the SG level control system setpoint would change when ACC conditions exist and therefore control at the level designated in Rule 7. 3. SG level will be automatcially controlled in this case, only it will be controlled at 30" instead of 60" as required by Rule 7

Answer D Discussion

Incorrect: First part is plausible since it would be correct if asking about SG Operating Range level since it is temperature compensated.
Second part is correct.

Basis for meeting the KA

Requires the ability to determine the relationship between actual SG level and indicated SG level following a MSLB inside containment. Also requires the ability to monitor automatic operation of SG level control system and determine if it is controlling at the desired level following a MSLB.

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	NEW	

Development References

EAP-EHT obj R13
Rule 7

Student References Provided

SYS016 A3.02 - Non-Nuclear Instrumentation System (NNIS)
Ability to monitor automatic operation of the NNIS, including: (CFR: 41.7 / 45.5)
Relationship between meter readings and actual parameter value ....

401-9 Comments:

Remarks/Status

SYS035 K4.01 - Steam Generator System (S/GS)
Knowledge of S/GS design feature(s) and/or interlock(s) which provide for the following: (CFR: 41.7)
S/G level control ....

Given the following Unit 1 conditions:
Initial conditions:

- Reactor power = 100%

Current conditions:

- Condenser vacuum = 18.5 inches Hg stable
- 1TB de-energized

Which ONE of the following is the Steam Generator level that will be automatically maintained?

A. 25 inches Startup Range

B. 30 inches XSUR

C. 50% Operating Range

D. 240 inches XSUR

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60

B

General Discussion

Answer A Discussion

Incorrect. Plausible since it would be correct if Main Feedwater were still available

Answer B Discussion

Correct. With Vacuum at 18.5 inches, Main Feedwater pumps have already tripped on low vacuum. Since there are still 2 RCP's operating EFDW will control level at 30" on XSUR.

Answer C Discussion

Incorrect. Plausible since this would be correct if Main Feedwater were still available and all 4 RCP's were tripped.

Answer D Discussion

Incorrect. Plausible since it would be correct if both 1TA and 1TB had been de-energized.

Basis for meeting the KA

Requires knowledge of automatic Steam Generator level control design.

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	MODIFIED	ILT46 Q45

Development References

ILT46 Q45
CF-EF Obj 31
CF-FW Obj 11

Student References Provided

SYS035 K4.01 - Steam Generator System (S/GS)

Knowledge of S/GS design feature(s) and/or interlock(s) which provide for the following: (CFR: 41.7)

S/G level control ....

401-9 Comments:

Remarks/Status

New K/A

ILT48 ONS SRO NRC Examination QUESTION 61 61 **D**

SYS045 A1.05 - Main Turbine Generator (MT/G) System

Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the MT/G system controls including: (CFR: 41.5 / 45.5)

Expected response of primary plant parameters (temperature and pressure) following T/G trip ....

Given the following Unit 1 conditions:

- Power escalation in progress
- Reactor power = 25% slowly increasing
- Main Condenser vacuum 27” Hg and degrading

1) The Main Turbine low vacuum trip setpoint is __(1)__ inches Hg.

2) After restoring vacuum to normal and stabilizing from the transient, Tave will be approximately __(2)__ degrees F.

Which ONE of the following completes the statements above?

A. 1. 19
2. 555

B. 1. 19
2. 579

C. 1. 21.75
2. 555

D. 1. 21.75
2. 579

General Discussion

Answer A Discussion

Incorrect. First part is plausible since that is the low vacuum trip setpoint for the Main Feedwater pumps.
Second part is plausible since it would be correct for Turbine Trips that occur with Rx Power >29.75% power.

Answer B Discussion

Incorrect. First part is plausible since that is the low vacuum trip setpoint for the Main Feedwater pumps.
Second part is correct.

Answer C Discussion

Incorrect. First part is correct.
Second part is plausible since it would be correct for Turbine Trips that occur with Rx Power >29.75% power.

Answer D Discussion

Correct. The low vacuum trip setpoint for the Main Turbine is 21.75" Hg. Since the Turb/Rx trip is not yet armed the Rx will not trip as a result of the Main Turbine trip therefore the resulting Tave would remain approximately 579 degrees once the plant stabilized.

Basis for meeting the KA

Requires the ability to predict changes in Tave following a Main Turbine trip a low in the power range.

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	NEW	

Development References

STG-MT Obj 16
CF-FWPT
IC-RPS

Student References Provided

SYS045 A1.05 - Main Turbine Generator (MT/G) System

Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the MT/G system controls including: (CFR: 41.5 / 45.5)

Expected response of primary plant parameters (temperature and pressure) following T/G trip ....

401-9 Comments:

Remarks/Status

SYS055 K1.06 - Condenser Air Removal System (CARS)

Knowledge of the physical connections and/or cause-effect relationships between the CARS and the following systems: (CFR: 41.2 to 41.9 / 45.7 to 45.8)

PRM system ....

Given the following Unit 1 conditions:

- Reactor power = 35% stable
- Air Ejector off-gas activity increasing
- Local RP survey indicates significant increase in 1B Main Steam Line activity

1) 1RIA-40 (Air Ejector Off Gas) __(1)__ be used to determine Primary to Secondary leak rate.

2) In accordance with the SGTR tab, the MAXIMUM RCS temperature allowed when isolating the 1B SG is __(2)__ degrees F.

Which ONE of the following completes the statements above?

A. 1. can
2. 525

B. 1. can
2. 532

C. 1. can NOT
2. 525

D. 1. can NOT
2. 532

General Discussion

Answer A Discussion

Incorrect.
First part is correct. 1RIA-40 can be used to determine Primary to Secondary leak rate. Second part is incorrect. Plausible since the band to isolate the SG is 525 to 532 degrees as directed by the SGTR tab.

Answer B Discussion

Correct.
First part is correct. 1RIA-40 can be used to determine Primary to Secondary leak rate. Second part is correct. The SGTR tab directs cooling the RCS to a band of 525 to 532 degrees prior to isolating the SG.

Answer C Discussion

Incorrect. First part is incorrect. Plausible since it would be correct if asking about RIA-59/60. Per the SGTR tab, RIA-59/60 cannot be used to determine leak rate with Reactor power is < 40%.
Second part is incorrect. Plausible since the band to isolate the SG is 525 to 532 degrees as directed by the SGTR tab.

Answer D Discussion

Incorrect. First part is incorrect. Plausible since it would be correct if asking about RIA-59/60. Per the SGTR tab, RIA-59/60 cannot be used to determine leak rate with Reactor power is < 40%. Second part is correct.

Basis for meeting the KA

This question requires knowledge of the cause-effect relationship between increasing activity in the air ejector off gas system and Process Radiation Monitor system use by the operators.

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Memory	MODIFIED	2009B Q9

Development References

EAP-AP31 Obj R1, R9
EAP-SGTR Obj 28,29,30
2009B Q9

Student References Provided

SYS055 K1.06 - Condenser Air Removal System (CARS)

Knowledge of the physical connections and/or cause-effect relationships between the CARS and the following systems: (CFR: 41.2 to 41.9 / 45.7 to 45.8)

PRM system ....

401-9 Comments:

Remarks/Status

SYS071 A4.10 - Waste Gas Disposal System (WGDS)
Ability to manually operate and/or monitor in the control room: (CFR: 41.7 / 45.5 to 45.8)
WGDS sampling ....

In accordance with OP/1-2/A/1104/018 (GWD System)…

1) A newly isolated GWD tank must be sampled for Hydrogen within __(1)__ hours.

2) If Hydrogen concentration in a GWD tank is 3.5%, the Hydrogen concentration must be reduced to $\leq$ 3% within __(2)__ hours.

Which ONE of the following completes the statements above?

A. 1. 24
   2. 24

B. 1. 24
   2. 48

C. 1. 48
   2. 24

D. 1. 48
   2. 48

General Discussion

Answer A Discussion

Incorrect. First part is correct. Second part is incorrect but plausible since it would be correct if hydrogen concentration were greater than 4%.

Answer B Discussion

Correct. IAW limits and precautions of 1104/18, an isolated GWD tank must be sampled for Hydrogen within 24 hours of being isolated. If H2 concentration in a tank exceeds 3% but is less than or equal to 4% volume, the concentration must be reduced to less than or equal to 3% within 48 hours.

Answer C Discussion

Incorrect. First part is plausible since 48 hours is the time allowed to reduce Hydrogen pressure to less than or equal to 3% when hydrogen is > 3% but less than or equal to 4%. Second part is incorrect but plausible since it would be correct if hydrogen concentration were greater than 4%.

Answer D Discussion

Incorrect. First part is plausible since 48 hours is the time allowed to reduce Hydrogen pressure to less than or equal to 3% when hydrogen is > 3% but less than or equal to 4%. Second part is correct.

Basis for meeting the KA

Requires the ability to monitor H2 concentration and perform actions related to operation of the GWD tanks and sampling of the tanks. Actions for tank sampling, isloations ,and additions are initiated from the Control Room.

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	NEW	

Development References

WE-GWD obj 11
1104/18

Student References Provided

SYS071 A4.10 - Waste Gas Disposal System (WGDS)

Ability to manually operate and/or monitor in the control room: (CFR: 41.7 / 45.5 to 45.8)

WGDS sampling ....

401-9 Comments:

Remarks/Status

SYS079 A2.01 - Station Air System (SAS)

Ability to (a) predict the impacts of the following malfunctions or operations on the SAS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: (CFR: 41.5 / 43.5 / 45.3 / 45.13)

Cross-connection with IAS ....

Given the following Unit 1 conditions:

- Reactor power = 100%
- Instrument Air (IA) header pressure = 90 psig decreasing

1) Unit __(1)__ AP/22 (Loss of Instrument Air) will dispatch an operator to ensure Diesel Air Compressors are operating.

2) IF IA header pressure reaches 85 psig the Service Air compressors will __(2)__ the instrument air header.

A. 1. one
   2. manually be aligned to

B. 1. two
   2. manually be aligned to

C. 1. one
   2. automatically begin to supply

D. 1. two
   2. automatically begin to supply

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D

General Discussion

Answer A Discussion

Incorrect. First part is incorrect. Plausible since there are definitely actions that need to be taken outside of the Control Room during a loss of IA on Unit 1, however it is the Unit 2 AP/22 that directs those actions. Second part is incorrect. Plausible since other system cross connects directed by AP's are performed manually (example: cross connecting LPSW systems on loss of LPSW).

Answer B Discussion

Incorrect. First part is correct. Second part is incorrect. Plausible since other system cross connects directed by AP's are performed manually (example: cross connecting LPSW systems on loss of LPSW).

Answer C Discussion

Incorrect. First part is incorrect. Plausible since there are definitely actions that need to be taken outside of the Control Room during a loss of IA on Unit 1, however it is the Unit 2 AP/22 that directs those actions.
Second part is correct.

Answer D Discussion

Correct. The Unit 2 AP/22 directs actions outside the control room on a loss of IA. The setpoint for SA-141 is 85 psig. When that pressure is reached, SA-141 begins to regulate IA pressure using the Service Air System.

Basis for meeting the KA

Requires the ability to predict the impact of decreasing IA pressure on SA system more specifically the impact of reaching the cross connect setpoint. It also requires using procedures to mitigate the consequences of decreasing IA pressure when operation of SA-141 will occur. Some of these actions are specifically associated with the fact that the IA and SAS have cross connected (ex. Ensuring DAC is operating and start if necessary).

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Memory	MODIFIED	ILT46 Q65

Development References

ILT46 Q65
EAP-APG R9
AP/22

Student References Provided

SYS079 A2.01 - Station Air System (SAS)

Ability to (a) predict the impacts of the following malfunctions or operations on the SAS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: (CFR: 41.5 / 43.5 / 45.3 / 45.13)

Cross-connection with IAS ....

401-9 Comments:

Remarks/Status

SYS086 K5.03 - Fire Protection System (FPS)

Knowledge of the operational implication of the following concepts as they apply to the Fire Protection System: (CFR: 41.5 / 45.7)

Effect of water spray on electrical components ....

Given the following Unit 1 conditions:

- Reactor power = 100%
- An Active fire has been reported in 1TA switchgear

1) De-energizing 1TA switchgear will result in a loss of the 1A1 and the __(1)__ Reactor Coolant Pumps.

2) In accordance with the "Fire Plan", a water fog __(2)__ be used on the switchgear to fight the fire.

Which ONE of the following completes the statements above?

A. 1. 1A2
2. can

B. 1. 1A2
2. can NOT

C. 1. 1B1
2. can

D. 1. 1B1
2. can NOT

General Discussion

Answer A Discussion

Incorrect. First part is plausible since it would be logical to assume that the two "A" loop RCP's were powered from 1TA switchgear. Second part is correct.

Answer B Discussion

Incorrect. First part is plausible since it would be logical to assume that the two "A" loop RCP's were powered from 1TA switchgear. Second part is plausible since water conducts electricity and therefore there would be a concern of electrical shock. Also since water on metal promotes oxidation it would also be plausible to believe it is prohibited in order to not cause further damage to the switchgear. And lastly it is plausible because a water stream cannot be used.

Answer C Discussion

Correct. The 1A1 and 1B1 RCP's are powered from the 1TA switchgear. A water fog is allowed to be used on electrical switchgear fires.

Answer D Discussion

Incorrect. First part is correct. Second part is plausible since water conducts electricity and therefore there would be a concern of electrical shock. Also since water on metal promotes oxidation it would also be plausible to believe it is prohibited in order to not cause further damage to the switchgear. And lastly it is plausible because a water stream cannot be used.

Basis for meeting the KA

Per CE, OK to ask about use of fog pattern with water on electrical equip. This question requires knowledge of the use of water fog on electrical equipment and the effect of de-energizing switchgear when using a water fog to extinguish a fire.

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Memory	MODIFIED	ILT42 Q99

Development References

ILT42 Q99
RCP pwr supply
Fire Plan
TA-OE Obj R2

Student References Provided

SYS086 K5.03 - Fire Protection System (FPS)

Knowledge of the operational implication of the following concepts as they apply to the Fire Protection System: (CFR: 41.5 / 45.7)

Effect of water spray on electrical components ....

401-9 Comments:

Remarks/Status

GEN2.1 2.1.13 - GENERIC - Conduct of Operations
Conduct of Operations
Knowledge of facility requirements for controlling vital/controlled access. (CFR: 41.10 / 43.5 / 45.9 / 45.10)

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1) The MAXIMUM number of visitors you can escort into a Vital Area is __(1)__.

2) If a Site Assembly were to occur while you were in a Vital Area with visitors you should report to your assembly location __(2)__.

Which ONE of the following completes the statements above?

A. 1. 5
   2. once you have returned the visitors to Security at the PAP

B. 1. 5
   2. immediately taking the visitors with you

C. 1. 10
   2. once you have returned the visitors to Security at the PAP

D. 1. 10
   2. immediately taking the visitors with you

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B

General Discussion

Answer A Discussion

First part is correct. Second part is plausible since that is where visitors are returned to once they have finished with being inside the protected area.

Answer B Discussion

Correct. You can only escort 5 visitors into Oconee Vital areas and if a site assembly were to occur while you were escorting visitors you would take the visitors to your assembly location with you.

Answer C Discussion

Incorrect. First part is plausible since it is correct for other areas inside the Protected Area. Second part is plausible since that is where visitors are returned to once they have finished with being inside the protected area.

Answer D Discussion

Incorrect. First part is plausible since it is correct for other areas inside the Protected Area. Second part is correct.

Basis for meeting the KA

CE allowed asking "initial training" information since there are not items specific to license duties related to this KA. Question requires knowledge of facility requirements for limits on personnel you can escort into a vital area.

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Memory	NEW	

Development References

EOP-SEP R10,11,12
Annual Update
RP/1000/009

Student References Provided

GEN2.1 2.1.13 - GENERIC - Conduct of Operations
Conduct of Operations
Knowledge of facility requirements for controlling vital/controlled access. (CFR: 41.10 / 43.5 / 45.9 / 45.10)

401-9 Comments:

Remarks/Status

GEN2.1 2.1.41 - GENERIC - Conduct of Operations
Conduct of Operations
Knowledge of the refueling process. (CFR: 41.2 / 41.10 / 43.6 / 45.13)

Given the following Unit 3 conditions:

- Reactor in MODE 6
- Refueling in progress

Which ONE of the following describes the source range NI requirements while refueling the reactor in accordance with OP/3/A/1502/007 (Operations Defueling/Refueling Responsibilities)?

A. Reactor Operator can use any one source range NI

B. Reactor Operator can use any two source range NI's

C. Reactor Engineering will specify the one required source range NI

D. Reactor Engineering will specify the two required source range NI's

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D

General Discussion

Answer A Discussion

Incorrect: Plausible since it would be correct if fuel handling was not in progress. Only 1 SR NI is required to be operable while shutdown when fuel handling is not in progress.

Answer B Discussion

Incorrect: Plausible since the limits and precautions section of 1502/007 (Operations Defueling/Refueling Responsibilities) states "Any combination of two Source Range NI's may be used for defueling." However the two must be selected by Reactor Engineering per the body of the procedure (Encl 4.1 Step 4.3). So it is reasonable to conclude the RO can select any two Nis for refueling.

Answer C Discussion

Incorrect: Plausible since only 1 SR NI is required to be operable while shutdown when fuel handling is not in progress. It would be reasonable to conclude that one is required any time while shutdown.

Answer D Discussion

CORRECT. Two Source Range Nis are required and they are selected by Reactor Engineering in accordance with OP/3/A/1502/007.

Basis for meeting the KA

Requires knowledge of the refueling process procedures.

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Memory	BANK	ILT39 Q66

Development References

ILT39 Q66
FH-FHS Obj. 17
OP/3/A/1502/007

Student References Provided

GEN2.1 2.1.41 - GENERIC - Conduct of Operations
Conduct of Operations
Knowledge of the refueling process. (CFR: 41.2 / 41.10 / 43.6 / 45.13)

401-9 Comments:

Remarks/Status

GEN2.2 2.2.22 - GENERIC - Equipment Control
Equipment Control
Knowledge of limiting conditions for operations and safety limits. (CFR: 41.5 / 43.2 / 45.2)

Given the following Unit 1 condition:

- Reactor in MODE 1

Which ONE of the following is the MINIMUM Pressurizer level (inches) that would require declaring Tech Spec 3.4.9 (Pressurizer) LCO NOT met in accordance with PT/1/A/0600/001 (Periodic Instrument Surveillance)?

A. 240

B. 260

C. 285

D. 340

General Discussion

Answer A Discussion

Incorrect. Plausible since this value is below the TS required value of 285 therefore it is plausible to believe it to be an instrument corrected value. Also, 240 inches is the hi level alarm setpoint for the OAC alarm. Additional plausibility from the fact that this is a fairly common level value however it is the SG level required for natural circ when on EFDW.

Answer B Discussion

Correct. PT.600/01 corrects the TS required 285" for allowable instrument error and uses 260" as the threshold value.

Answer C Discussion

Incorrect. Plausible since this is the analytical value provided in Tech Spec 3.4.9 for maximum level.

Answer D Discussion

Incorrect. Plausible since this is a value associated with the pressurizer however this is the maximum Pzr level allowed for RCP restart with abnormal containment conditions.

Basis for meeting the KA

Requires knowledge of the conditions that would require the LCO requirments of TS 3.4.9 NOT met.

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Memory	BANK	ILT44 Q59

Development References

Adm-ITS Obj R8
TS 3.4.9
PT/600/01

Student References Provided

GEN2.2 2.2.22 - GENERIC - Equipment Control

Equipment Control

Knowledge of limiting conditions for operations and safety limits. (CFR: 41.5 / 43.2 / 45.2)

401-9 Comments:

Remarks/Status

ILT48 ONS SRO NRC Examination QUESTION 69 69 **C**

GEN2.2 2.2.39 - GENERIC - Equipment Control
Equipment Control
Knowledge of less than or equal to one hour Technical Specification action statements for systems. (CFR: 41.7 / 41.10 / 43.2 / 45.13)

Given the following Unit 1 conditions:
Initial conditions:

- Reactor power = 100%

Current conditions:

- Keowee Emergency Start channels 1 and 2 inoperable

In accordance with Tech Spec 3.3.21 (EPSL Keowee Emergency Start Function) …

1) The MAXIMUM time allowed to declare both KHU's inoperable is __(1)__.

2) The Required Action associated with this inoperability is to energize __(2)__ Standby Bus(es) from a Lee Combustion Turbine via an isolated power path.

Which ONE of the following completes the statements above?

A. 1. immediately
2. at least ONE

B. 1. 1 hour
2. at least ONE

C. 1. immediately
2. BOTH

D. 1. 1 hour
2. BOTH

General Discussion

Answer A Discussion

Incorrect, First part is correct. Second part is incorrect. Plausible since it would be correct if only the KHU Underground powerpath were inoperable per TS 3.8.1 Condition D.

Answer B Discussion

Incorrect, First part is incorrect but plausible since 1 hour is a common completion time for significant inoperabilities. Additionally, allowing 1 hr to declare components inoperable is allowed in other TS's (Ex. 3.3.7) which adds to plausibility of the 1 hour completion time for declaring KHU's not operable. Also, when one KHU is declared inoperable, 1 hr is allowed to operability test the other KHU to determine if it is operable.Second part is incorrect. Plausible since it would be correct if only the KHU Underground powerpath were inoperable per TS 3.8.1 Condition D.

Answer C Discussion

Correct. Both Keowee units are required to be declared inoperable immediately per TS 3.3.21 Condition C. TS 3.8.1 Condition I requires energizing BOTH standby buses within 1 hr with both KHU's inoperable.

Answer D Discussion

Incorrect, First part is incorrect but plausible since 1 hour is a common completion time for significant inoperabilities. Additionally, allowing 1 hr to declare components inoperable is allowed in other TS's (Ex. 3.3.7) which adds to plausibility of the 1 hour completion time for declaring KHU's not operable. Also, when one KHU is declared inoperable, 1 hr is allowed to operability test the other KHU to determine if it is operable. Second part is correct.

Basis for meeting the KA

Requires knowledge of 1 hr or less actions required by TS 3.3.21 and 3.8.1.

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Memory	BANK	2009B NRC Exam Q70

Development References

2009B NRC Exam Q70
ADM-TSS Obj. R4
TS 3.3.21
TS 3.8.1

Student References Provided

GEN2.2 2.2.39 - GENERIC - Equipment Control

Equipment Control

Knowledge of less than or equal to one hour Technical Specification action statements for systems. (CFR: 41.7 / 41.10 / 43.2 / 45.13)

401-9 Comments:

Remarks/Status

GEN2.3 2.3.11 - GENERIC - Radiation Control
Radiation Control
Ability to control radiation releases. (CFR: 41.11 / 43.4 / 45.10)

Given the following Unit 3 conditions:

- 3A GWD gas tank release in progress
- Release is at 2/3 Station Limit

1) 3RIA-45 High and Alert setpoints will be set at __(1)__ the normal 1/3 Station Limit setpoint in accordance with PT/0/A/0230/001 (Radiation Monitor Check).

2) If 3RIA-45 High alarm setpoint is reached, the 3A GWD gas tank release __(2)__ automatically terminate.

Which ONE of the following completes the statements above?

A. 1. double
2. will

B. 1. double
2. will NOT

C. 1. half
2. will

D. 1. half
2. will NOT

General Discussion

Answer A Discussion

Incorrect.
First part is correct. Per PT/0/A/230/001, when performing a 2/3 station limit release, the releasing unit's RIA-45 setpoint is double the normal setpoint for 1/3 Station Limit.
Second part is incorrect. Plausible since RIA-45 high alarm will automatically terminate a RB Purge release on the respective unit.

Answer B Discussion

Correct.
First part is correct Per PT/0/A/230/001, the releasing unit's RIA-45 setpoint is double the normal setpoint for 1/3 Station Limit when performing a 2/3 station limit release.
Second part is correct. RIA-45 will not terminate the release. RIA-37/38 are the process monitors that are interlocked to terminate the release.

Answer C Discussion

Incorrect.
First part is incorrect. Plausible since PT/0/A/230/001 (Radiation Monitor Check) directs the setpoint for RIA-45 on the non-releasing unit to be set at half the 1/3 Station Limit value when release is at 2/3 station limit.
Second part is incorrect. Plausible since RIA-45 high alarm will automatically terminate a RB Purge release on the respective unit.

Answer D Discussion

Incorrect.
First part is incorrect. Plausible since PT/0/A/230/001 (Radiation Monitor Check) directs the setpoint for RIA-45 on the non-releasing unit to be set at half the 1/3 Station Limit value when release is at 2/3 station limit..
Second part is correct. RIA-45 will not terminate the release. RIA-37/38 are the process monitors that are interlocked to terminate the release.

Basis for meeting the KA

Question requires knowledge of the process for releasing at 2/3 the station limit.

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	MODIFIED	ILT39 Q70

Development References

ILT39 Q70
WE-GWD Obj. 07
OP/3/A/1104/018
PT/0/A/0230/001

Student References Provided

GEN2.3 2.3.11 - GENERIC - Radiation Control
Radiation Control
Ability to control radiation releases. (CFR: 41.11 / 43.4 / 45.10)

401-9 Comments:

Remarks/Status

GEN2.3 2.3.14 - GENERIC - Radiation Control

Radiation Control

Knowledge of radiation or contamination hazards that may arise during normal, abnormal, or emergency conditions or activities. (CFR: 41.12 / 43.4 / 45.10)

Given the following Unit 1 conditions:

- 36 gpm primary to secondary leak in 1A SG
- RCS cooldown in progress
- RCS temperature = 395°F decreasing
- The SRO has determined that current method of maintaining SCM is inadequate

1) The reason that the SGTR tab makes every effort to prevent a Reactor trip during shutdown is to minimize the chance of __(1)__ .

2) If an operator is dispatched to align Auxiliary Pressurizer Spray during the subsequent RCS cooldown and receives a dose alarm while performing this task he will __(2)__.

Which ONE of the following completes the statements above?

A. 1. lifting the MSRVs and causing a radiation release to the environment
2. complete the task while monitoring his dose

B. 1. lifting the MSRVs and causing a radiation release to the environment
2. immediately stop and leave the area

C. 1. RCS pressure transients and causing the Primary to Secondary leak rate to increase
2. complete the task while monitoring his dose

D. 1. RCS pressure transients and causing the Primary to Secondary leak rate to increase
2. immediately stop and leave the area

General Discussion

Answer A Discussion

Correct. The SGTR tab directs shutting down the plant as long as all available HPI can maintain Pzr level in order to prevent lifting the MSRV's would release to environment. Since emergency dose limits (EDLs) are in effect, the AO is expected to complete the task while monitoring his dose.

Answer B Discussion

Incorrect, First part is correct. The SGTR tab directs maintaining SCM low in order to reduce the dp between RCS and SG pressure, which in turn reduces the leak rate and contamination of the secondary plant. Second part is incorrect but plausible since it would be correct if EDLs were not in affect.

Answer C Discussion

Incorrect: First part is incorrect. Plausible since an RCS pressure transient could cause an increase in Primary to Secondary leakage however this is not the reason for guidance in the EOP for a controlled shutdown.
Second part is correct.

Answer D Discussion

Incorrect: First part is incorrect. Plausible since an RCS pressure transient could cause an increase in Primary to Secondary leakage however this is not the reason for guidance in the EOP for a controlled shutdown.
Second part is incorrect but plausible since it would be correct if EDLs were not in affect.

Basis for meeting the KA

Question requires knowledge of radiation hazards due to a SGTR in that it requires an understanding of the impact of lifting the MSRV's during a SGTR..

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	MODIFIED	ILT42 Q70

Development References

ILT42 Q70
EAP-TCA Obj. R6
SGTR Tab Obj R1
EAP-SGTR

Student References Provided

GEN2.3 2.3.14 - GENERIC - Radiation Control

Radiation Control

Knowledge of radiation or contamination hazards that may arise during normal, abnormal, or emergency conditions or activities. (CFR: 41.12 / 43.4 / 45.10)

401-9 Comments:

Remarks/Status

ILT48 ONS SRO NRC Examination QUESTION 72 72 **A**

GEN2.3 2.3.4 - GENERIC - Radiation Control
Radiation Control
Knowledge of radiation exposure limits under normal or emergency conditions. (CFR: 41.12 / 43.4 / 45.10)

In accordance with PD-RP-ALL-0001 (Radiation Worker Responsibilities), which ONE of the following states…

1) the MAXIMUM annual Dose Limit (REM) allowed by the NRC?

2) the MAXIMUM lifetime Planned Special Exposure limit (REM) allowed by the NRC?

A. 1. 5
2. 25

B. 1. 5
2. 50

C. 1. 2
2. 25

D. 1. 2
2. 50

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A

General Discussion

Answer A Discussion

Correct. The maximum annual dose limit allowed by the NRC is 5 REM. The maximum lifetime planned special exposure limit allowed by the NRC is 5 times the annual limit (25 REM).

Answer B Discussion

Incorrect. First part is correct. Second part is plausible since 50 REM is the annual limit allowed by the NRC for SDE to skin and extremities and CDE to any tissue or organ except lens of the eye.

Answer C Discussion

Incorrect. First part is plausible since 2 REM is the annual dose limit allowed by Duke Energy. Second part is correct.

Answer D Discussion

Incorrect. First part is plausible since 2 REM is the annual dose limit allowed by Duke Energy. Second part is plausible since 50 REM is the annual limit allowed by the NRC for SDE to skin and extremities and CDE to any tissue or organ except lens of the eye.

Basis for meeting the KA

Requires knowledge of emergency worker radiation exposure limits and when they apply.

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Memory	NEW	

Development References

2009B NRC Exam Q73
EAP-TCA Obj. R6
OMP 1-18
PD-RP-ALL-0001

Student References Provided

GEN2.3 2.3.4 - GENERIC - Radiation Control

Radiation Control

Knowledge of radiation exposure limits under normal or emergency conditions. (CFR: 41.12 / 43.4 / 45.10)

401-9 Comments:

Remarks/Status

GEN2.4 2.4.16 - GENERIC - Emergency Procedures / Plan

Emergency Procedures / Plan

Knowledge of EOP implementation hierarchy and coordination with other support procedures or guidelines such as, operating procedures, abnormal operating procedures, and severe accident management guidelines. (CFR: 41.10 / 43.5 / 45.13)

Given the following Unit 1 conditions:
Initial conditions:

- Reactor power = 90% slowly decreasing
- SG Primary to Secondary leak rate = 6 gpm stable
- AP/31 (Primary to Secondary Leakage) in progress
- Unit shutdown in progress

Current conditions

- Reactor power = 60% slowly decreasing
- SG Primary to Secondary leak rate = 28 gpm slowly increasing

Which ONE of the following describes the actions required in accordance with plant procedures?

A. Continue unit shutdown using AP/31

B. Exit AP/31 and go directly to SGTR tab

C. Exit AP/31, perform IMA’s, then go to SGTR tab

D. Perform AP/31 in parallel with performing the SGTR tab

ILT48 ONS SRO NRC Examination QUESTION 73

73

B

General Discussion

Answer A Discussion

Incorrect: Plausible since AP/31 would still be in effect if the leak rate were < 25 gpm and some AP's are self contained AP's that direct unit shutdowns and/or power decreases.

Answer B Discussion

Correct: There is an IAAT in AP/31 that directs going to the EOP if SG leak rate reaches 25 gpm. The entry conditions of the EOP with a SGTR > 25 gpm without a Reactor trip direct the operator to go directly to the SGTR tab.

Answer C Discussion

Incorrect: Plausible since exiting AP/31 and entering the EOP is correct and this would be the correct EOP path for most EOP entries however entering while on line with a SG tube rupture is a unique exception that requires going direclty to the SGTR tab.

Answer D Discussion

Incorrect: Plausible since most AP's are performed in parallel with the EOP when EOP entry is required.

Basis for meeting the KA

Requires knowledge of the hierarchy of the EOP versus AP/31.

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	BANK	ILT40 Q74

Development References

ILT40 Q74
EAP-SA Obj. R21
AP/31
EOP

Student References Provided

GEN2.4 2.4.16 - GENERIC - Emergency Procedures / Plan

Emergency Procedures / Plan

Knowledge of EOP implementation hierarchy and coordination with other support procedures or guidelines such as, operating procedures, abnormal operating procedures, and severe accident management guidelines. (CFR: 41.10 / 43.5 / 45.13)

401-9 Comments:

Remarks/Status

GEN2.4 2.4.45 - GENERIC - Emergency Procedures / Plan
Emergency Procedures / Plan
Ability to prioritize and interpret the significance of each annunciator or alarm. (CFR: 41.10 / 43.5 / 45.3 / 45.12)

Given the following Unit 1 conditions:

- Reactor tripped from 100% power
- The following Statalarms actuate:
  - 1SA-1/C-11 (ES Channel 7 Trip)
  - 1SA-1/D-11 (ES Channel 8 Trip)
  - 1SA-2/C-4 (RC Pressurizer Level Emerg High/Low)
  - 1SA-2/C-8 (AFIS Header A Initiated)
  - 1SA-2/D-5 (HP LDST Level Interlock Initiated)
  - 1SA-8/A-3 (FDWPT A Trip)
  - 1SA-8/A-6 (FDWPT B Trip)

Which ONE of the following emergency procedures has the highest priority?

A. EOP Enclosure 5.1 (ES Actuation)

B. Rule 5 (Main Steam Line Break)

C. EOP Enclosure 5.5 (Pzr and LDST Level Control)

D. Rule 3 (Loss of Main or Emergency Feedwater)

ILT48 ONS SRO NRC Examination QUESTION 74

74

B

General Discussion

Answer A Discussion

Incorrect: Plausible in that ES Actuation of all 8 Channels has most likely occurred

Answer B Discussion

CORRECT: AFIS actuation tells the operator that MSLB has occurred which is the highest priority due to the overcooling it can cause; in fact EHT has caused all the other SA conditions

Answer C Discussion

Incorrect: Plausible in that overcooling is causing the RCS inventory to contract to the point of possibly emptying the Pzr and LDST; however the overcooling would be stopped by Rule 5.

Answer D Discussion

Incorrect: Plausible in that AFIS has caused the MFWPs to trip; a loss of both MFW and EFW would be a higher priority than Rule 5 but there is no reason to assume that EFW pumps are unavailable.

Basis for meeting the KA

Requires the ability to interpret the significance of statalarms, to diagnose the event, and to prioritize EOP rules and enclosures

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	BANK	2009 NRC Exam Q74

Development References

2009 NRC Exam Q74
Admin-OMP Obj R10, R52
OMP 1-18

Student References Provided

GEN2.4 2.4.45 - GENERIC - Emergency Procedures / Plan

Emergency Procedures / Plan

Ability to prioritize and interpret the significance of each annunciator or alarm. (CFR: 41.10 / 43.5 / 45.3 / 45.12)

401-9 Comments:

Remarks/Status

GEN2.4 2.4.49 - GENERIC - Emergency Procedures / Plan

Emergency Procedures / Plan

Ability to perform without reference to procedures those actions that require immediate operation of system components and controls. (CFR: 41.10 / 43.2 / 45.6)

Given the following Unit 1 conditions:
Initial conditions:

- Reactor power = 100%
- Both Main Feedwater pumps trip

Current conditions:

- REACTOR TRIP pushbutton has been depressed
- Reactor power = 3% slowly decreasing

Which ONE of the following describes the NEXT action required in accordance with EOP Immediate Manual Actions?

A. Perform Rule 1

B. OPEN 1HP-24 and 1HP-25

C. Verify RCP seal injection available

D. Depress the Turbine TRIP pushbutton

ILT48 ONS SRO NRC Examination QUESTION 75 75 **D**

General Discussion

Answer A Discussion
Incorrect: Plausible since this would be correct if power level was > 5%.. Additional plausibility since there is a 1% power threshold for actions within Rule 2. Therefore it is plausible to believe that if power is still > 1%, going to Rule 1 is required.

Answer B Discussion
Incorrect: Plausible since this is one of the first actions taken by Rule 1 during an ATWS. It is plausible to believe these actions are part of IMA's since it is in IMA's that the ATWS is diagnosed and aligning emergency boration is critical to the successful mitigation of the ATWS.

Answer C Discussion
Incorrect: Plausible since this is an action taken in IMA's, however it is done after the main turbine is tripped.

Answer D Discussion
Correct: Since Rx power is < 5%, the next action is to depress the Turbine Trip pushbutton.

Basis for meeting the KA
Requires the ability to perform EOP Immediate Manual Actions from memory.

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Memory	BANK	ILT40 Q75

Development References
ILT40 Q75
EAP-SA R24
EOP IMAs

Student References Provided

GEN2.4 2.4.49 - GENERIC - Emergency Procedures / Plan
Emergency Procedures / Plan
Ability to perform without reference to procedures those actions that require immediate operation of system components and controls. (CFR: 41.10 / 43.2 / 45.6)

401-9 Comments:

Remarks/Status

APE022 2.4.20 - Loss of Reactor Coolant Makeup
APE022 GENERIC
Knowledge of the operational implications of EOP warnings, cautions, and notes. (CFR: 41.10 / 43.5 / 45.13)

Given the following Unit 1 conditions:

- RCS Tave = 480°F stable
- 1A HPI pump tripped
- 1B HPI pump failed to start and can NOT be started manually
- In accordance with AP/14 (Loss of Normal HPI Makeup and/or RCP Seal Injection), BOTH the SSF RC Makeup Pump and the 1C HPI Pump are aligned to supply RCP seal injection

In accordance with AP/14…

1) __(1)__ will be utilized to secure one of the sources of RCP seal injection.

2) An RCS Heatup of $\leq$ 10ºF __(2)__ allowed as part of the strategy to maintain Pressurizer level $\geq$ 100 inches

A. 1. Encl. 5.1 (SSF RC Makeup)
 2. is

B. 1. Encl. 5.1 (SSF RC Makeup)
 2. is NOT

C. 1. Encl. 5.2 (Emergency Alignment of 1C HPI Pump for Normal Makeup)
 2. is

D. 1. Encl. 5.2 (Emergency Alignment of 1C HPI Pump for Normal Makeup)
 2. is NOT

General Discussion

Answer A Discussion

Correct. Even though the preferred method of providing Seal Injection is with the C HPI pump, both paths are pursued and then the RC Makeup pump is secured when and if the C HPI pump is successfully aligned and operating. There is a NOTE in the AP that allows heating up as much as 10 degrees to help maintain Pzr level no less than 100 inches as long as the Rx is shutdown.

Answer B Discussion

Incorrect. First part is correct. Second part is plausible since it would not be allowed if the Reactor were not shut down. Also plausible to believe that heating up would not be allowed to control Pzr level since there is so much focus on controlling RCS heatup when it is occurring.

Answer C Discussion

Incorrect. First part is plausible since Encl. 5.1 (SSF RC Makeup) is initiated prior to Encl. 5.2 and only secured when the 1C HPI Pump is successfully aligned per Encl. 5.2. The operator could reason that since Encl. 5.1 is initiated first, that it is the preferred method to supply seal injection. Second part is correct.

Answer D Discussion

Incorrect.First part is plausible since Encl. 5.1 (SSF RC Makeup) is initiated prior to Encl. 5.2 and only secured when the 1C HPI Pump is successfully aligned per Encl. 5.2. The operator could reason that since Encl. 5.1 is initiated first, that it is the preferred method to supply seal injection.

Second part is plausible since it would not be allowed if the Reactor were not shut down. Also plausible to believe that heating up would not be allowed to control Pzr level since there is so much focus on controlling RCS heatup when it is occurring.

Basis for meeting the KA

Requires knowledge of the operational implication of a Note at step 29 of AP/14 allowing RCS heatup only if the Rx is shutdown.

Basis for Hi Cog

Basis for SRO only

This question requires assessing plant conditions and determining a section of a procedure to be utilized based on that assessment. Both parts of this question meet that SRO guideline criteria since both determine steps or sections to be performed in the AP which are based solely on plant conditions. 10 CFR 55.43(b)(5).

Job Level	Cognitive Level	QuestionType	Question Source
SRO	Comprehension	NEW	

Development References	Student References Provided
EAP/APG R9 AP/14	

APE022 2.4.20 - Loss of Reactor Coolant Makeup

APE022 GENERIC

Knowledge of the operational implications of EOP warnings, cautions, and notes. (CFR: 41.10 / 43.5 / 45.13)

401-9 Comments:	Remarks/Status

ILT48 ONS SRO NRC Examination QUESTION 77 77 **B**

APE027 AA2.04 - Pressurizer Pressure Control System (PZR PCS) Malfunction
Ability to determine and interpret the following as they apply to the Pressurizer Pressure Control Malfunctions: (CFR: 43.5 / 45.13)
Tech-Spec limits for RCS pressure ....

Given the following Unit 1 conditions:

- Reactor in MODE 5
- ALL LTOP requirements established in accordance with Tech Spec 3.4.12 (Low Temperature Overpressure Protection (LTOP) System)

In accordance with Tech Spec 3.4.12…

1) The 1RC-66 setpoint is __(1)__ psig.

2) A dedicated LTOP operator __(2)__ allowed as a substitute for an inoperable PORV to prevent exceeding RCS brittle fracture pressure limits.

Which ONE of the following completes the statements above?

A. 1) 535
2) is

B. 1) 535
2) is NOT

C. 1) 550
2) is

D. 1) 550
2) is NOT

General Discussion

Answer A Discussion

Incorrect: First part is correct. Second part is incorrect. Plausible since there are 2 trains of LTOP. The trains are the PORV and Administrative Controls that limit the rate of RCS pressure increase. A dedicated LTOP operator is allowed as a substitute for one of the trains (Admin. Controls), but not the other (PORV).

Answer B Discussion

Correct: The 1RC-66 setpoint per TS 3.4.12 is 535 psig. A dedicated LTOP operator is not allowed as a substitute for an inoperable PORV.

Answer C Discussion

Incorrect: First part is incorrect. Plausible since 550 psig is the setpoint for LPI actuation from ES 3/4 and is also the main steam setpoint for Automatic Feedwater Isolation (AFIS).
Second part is incorrect. Plausible since there are 2 trains of LTOP. The trains are the PORV and Administrative Controls that limit the rate of RCS pressure increase. A dedicated LTOP operator is allowed as a substitute for one of the trains (Admin. Controls), but not the other (PORV).

Answer D Discussion

Incorrect: First part is incorrect. Plausible since 550 psig is the setpoint for LPI actuation from ES 3/4 and is also the main steam setpoint for Automatic Feedwater Isolation (AFIS). Second part is correct.

Basis for meeting the KA

Requires knowledge of the LTOP LCO as it relates to the PORV,
which is part of the Pressurizer pressure control system. The malfunction portion of
the KA is satisfied by the failure of the PORV to open. With the failure having occurred the operator is being asked to interpret the failure as it relates to exceeding the Tech Spec RCS pressure limits that would result in RCS brittle fracture.

Basis for Hi Cog

Basis for SRO only

In accordance with Clarification Guidance for SRO-only Questions:
This question requires knowledge from the basis of TS 3.4.12 and the Safety Limits that
is not systems knowledge. 10CFR 55.43(b)(2).
It cannot be answered by knowing 1 hr or less TS/TRM Action
It cannot be answered solely with "above the line" information.
It cannot be answered solely by knowing Safety Limits

Job Level	Cognitive Level	QuestionType	Question Source
SRO	Comprehension	NEW	

Development References

ADMIN-TSS obj R5
TS 3.4.12 and basis

Student References Provided

APE027 AA2.04 - Pressurizer Pressure Control System (PZR PCS) Malfunction
Ability to determine and interpret the following as they apply to the Pressurizer Pressure Control Malfunctions: (CFR: 43.5 / 45.13)
Tech-Spec limits for RCS pressure ....

401-9 Comments:

Remarks/Status

Preview

EPE038 EA2.01 - Steam Generator Tube Rupture (SGTR)
Ability to determine or interpret the following as they apply to a SGTR : (CFR 43.5 / 45.13)
When to isolate one or more S/Gs ....

Given the following Unit 1 conditions:
Time = 1000:

- MSLB on 1B SG outside containment and can NOT be steamed
- 1A S/G developed a SGTR
- EHT tab is complete
- EOP SGTR Tab in progress
- 1A S/G level = 288" XSUR slowly increasing
- SCM = 10°F stable

Time = 1040:

- 1A S/G has reached the level where water can enter the main steam lines
- Rule 4 has been initiated and the PORV has been opened
- Core SCM = 0°F

1) At Time = 1000, the SGTR tab __(1)__ direct performance of Encl. 5.22 (SG Blowdown)

2) At Time = 1040, the SGTR tab will direct initiation of the __(2)__ tab.

Which ONE of the following completes the statements above?

A. 1. does
2. HPI CD

B. 1. does
2. LOCA CD

C. 1. does NOT
2. HPI CD

D. 1. does NOT
2. LOCA CD

ILT48 ONS SRO NRC Examination QUESTION 78

78

A

General Discussion

Answer A Discussion

1st part is correct because per the STGR tab (step 227) Encl 5.22 is performed if any SG with a tube rupture rises > 285".

2nd part is correct. Per step 232 and 233 in the SGTR tab, stop steaming the affected SG and if the remaining SG is not available for steam (RNO) Perform Rule 4 and GO TO the HPI CD tab.

Answer B Discussion

1st part is correct.

2nd part is incorrect because the SGTR tab directs you to the HPI CD tab. It is plausible because if HPI FC was not in progress, it would be correct. LOSCM is the higher priority tab (normally).

Answer C Discussion

1st part is incorrect. The STGR tab (step 227): Encl 5.22 is performed if any SG with a tube rupture rises > 285". Plausible since 285" is a rather arbitrary number and there are actions in the EOP that occure at 290 psi RCS pressure therefore confusing the numbers would be plausible.

2nd part is correct. Per step 232 and 233 in the SGTR tab, stop steaming the affected SG and if the remaining SG is not available for steam (RNO) Perform Rule 4 and GO TO the HPI CD tab.

Answer D Discussion

1st part is incorrect. The STGR tab (step 227): Encl 5.22 is performed if any SG with a tube rupture rises > 285". Plausible since 285" is a rather arbitrary number and there are actions in the EOP that occure at 290 psi RCS pressure therefore confusing the numbers would be plausible.

2nd part is incorrect because the SGTR tab directs you to the HPI CD tab. It is plausible because if HPI FC was not in progress, it would be correct. LOSCM is the higher priority tab (normally).

Basis for meeting the KA

The question requires knowledge of the isolation requirements of a SG since knowing when steaming of an isolated SG is required demonstrates the ability to determin if the SG should be isolated or not.

Basis for Hi Cog

Basis for SRO only

This question is SRO ONLY because it meets. 10 CFR 55.43(b)(5)

It requires assessing plant conditions and determining when a section of the EOP should be performed.

Job Level	Cognitive Level	QuestionType	Question Source
SRO	Memory	MODIFIED	ILT43 Q78

Development References

ILT43 Q78
SGTR Tab
EAP SGTR Obj R 16, R26

Student References Provided

EPE038 EA2.01 - Steam Generator Tube Rupture (SGTR)
Ability to determine or interpret the following as they apply to a SGTR : (CFR 43.5 / 45.13)
When to isolate one or more S/Gs ....

401-9 Comments:

Remarks/Status

ILT48 ONS SRO NRC Examination QUESTION 79 79 **C**

APE057 2.4.11 - Loss of Vital AC Electrical Instrument Bus
APE057 GENERIC
Knowledge of abnormal condition procedures. (CFR: 41.10 / 43.5 / 45.13)

Given the following Unit 1 conditions:

- Reactor power = 50% stable
- 1KI and 1KU panelboards are de-energized

Which ONE of the following states the correct procedure to use to maintain Steam Generator pressure and RCS temperature?

A. AP/23 (Loss of ICS Power)

B. AP/25 (Standby Shutdown Facility)

C. EOP Enclosure 5.24 (Operation of the ADVs)

D. EOP Enclosure 5.42 (Alignment of EFM Pump to Feed SGs)

ILT48 ONS SRO NRC Examination QUESTION 79

79

C

General Discussion

Answer A Discussion

Incorrect. Plausible since the failures will meet the entry conditions for AP/23 and if the other essential inverter (KX) were lost instead of one of these two it would be a correct answer if it occurred in MODE 3 or 4.

Answer B Discussion

Incorrect. Plausible since this is a method used by the EOP to maintain stable SG pressure and RCS temperature under other circumstances and with both KI and KU being lost with the unit at power a Rx trip would have occurred therefore the entry condtions to the EOP would be met.

Answer C Discussion

Correct. With both KI and KU lost the TBV's are unavailable and section 4A of AP/23 will direct using EOP Encl 5.24.

Answer D Discussion

Incorrect. Plausible since Enclosure 5.42 is utilized to feed the SGs under certain loss of power scenarios.

Basis for meeting the KA

CE allowed use of Essential Inverters since Oconee does not have AP's realted to loss of vital inverters. This question requires knowledge of Abnormal Procedures realted to a loss of essential inverters.

Basis for Hi Cog

Basis for SRO only

Question requires selection of procedure and cannot be answered based solely on entry conditions. 10 CFR 55.43(b)(5).

Job Level	Cognitive Level	QuestionType	Question Source
SRO	Comprehension	NEW	

Development References

EAP-APG obj R9
EOP IMA's and SA's
AP/23

Student References Provided

APE057 2.4.11 - Loss of Vital AC Electrical Instrument Bus
APE057 GENERIC
Knowledge of abnormal condition procedures. (CFR: 41.10 / 43.5 / 45.13)

401-9 Comments:

Remarks/Status

Preview

APE065 2.4.41 - Loss of Instrument Air

APE065 GENERIC

Knowledge of the emergency action level thresholds and classifications. (CFR: 41.10 / 43.5 / 45.11)

Given the following Unit 1 conditions:

Time = 1200:

- Reactor trip from 100%
- AP/22 (Loss of Instrument Air) in progress
- Instrument Air (IA) and Auxiliary Instrument Air (AIA) pressure lost to the 1A Turbine Bypass Valves
- 1A SG pressure 935 psig stable
- Maintaining 1A SG pressure with Atmospheric Dump Valves (ADVs) in accordance with EOP Subsequent Actions

Time = 1210:

- 1A SG Tube Leak = 15 gpm stable

Time = 1230:

- 1A SG Tube Rupture = 180 gpm stable
- EOP SGTR in progress

1) At time = 1210, the emergency classification is __(1)__.

2) At time = 1230, the emergency classification is __(2)__.

Which ONE of the following completes the statements above?

REFERENCE PROVIDED

A. 1. NONE
   2. ALERT

B. 1. NONE
   2. SITE AREA EMERGENCY

C. 1. UNUSUAL EVENT
   2. ALERT

D. 1. UNUSUAL EVENT
   2. SITE AREA EMERGENCY

ILT48 ONS SRO NRC Examination QUESTION 80

80

D

General Discussion

Answer A Discussion

Incorrect: First part is incorrect. Plausible since it would be correct if the ADVs were not being used to steam 1A SG. Second part is incorrect. Plausible since it would be correct if the ADVs were not being used to steam 1A SG.

Answer B Discussion

Incorrect: First part is incorrect. Plausible since it would be correct if the ADVs were not being used due to the loss of IA and AIA to 1A TBV. Second part is correct.

Answer C Discussion

Incorrect. First part is correct. Second part is incorrect. Plausible since it would be correct if the ADVs were not being used to steam 1A SG.

Answer D Discussion

CORRECT. The classification at 1210 is Unusual Event. This is based on receiving 3 points under Containment Barriers (Loss) on the Fission Product Barrier Matrix for "Failure of secondary side of SG results in a direct opening to the environment with SG Tube Leak >/= 10 gpm in the same SG". Unusual Event is 1 to 3 points.
The classification at 1230 is Site Area Emergency. This is based on the 3 points described above plus 4 points received under RCS Barriers (Potential Loss) for "SGTR >/= 160 gpm" for a total of 7 points. SAE is 7 to 10 points.

Basis for meeting the KA

Question requires the candidate to evaluate plant conditions associated with loss of Instrument Air and SGTR and make emergency classifications based on their evaluation.

Basis for Hi Cog

Basis for SRO only

Question requires the applicant to evaluate plant conditions and make emergency classifications based on their evaluation.

Job Level	Cognitive Level	QuestionType	Question Source
SRO	Comprehension	NEW	

Development References
EAP-SEP Obj. R12 RP/0/A/1000/001 E-Plan Basis Doc.

Student References Provided
RP/0/A/1000/001

APE065 2.4.41 - Loss of Instrument Air

APE065 GENERIC

Knowledge of the emergency action level thresholds and classifications. (CFR: 41.10 / 43.5 / 45.11)

401-9 Comments:

Remarks/Status

APE077 AA2.07 - Generator Voltage and Electric Grid Disturbances
Ability to determine and interpret the following as they apply to Generator Voltage and Electric Grid Disturbances: (CFR: 41.5 and 43.5 / 45.5, 45.7, and 45.8)
Operational status of engineered safety features...........................

Given the following Unit 1 conditions:
Time = 1200

- Reactor power = 100% stable
- AFIS bypassed for maintenance
- SA-16/C-1 (230 KV Swyd Isolate ES Permit) actuated
- 230 KV Yellow Bus voltage = 224.2 KV increasing

Time = 1201

- AP/34 (Degraded Grid) in progress
- Main Turbine trips due to low grid frequency
- 230 KV Yellow Bus voltage = 226.8 KV increasing
- RCS pressure = 1245 psig rapidly decreasing
- RB pressure = 11.4 psig rapidly increasing

Engineered Safeguards systems...

1) will be energized from __(1)__.

2) __(2)__ sufficient to maintain Reactor Building pressure within design limits.

Which ONE of the following completes the statements above?

A. 1. CT-1
2. are

B. 1. CT-1
2. are NOT

C. 1. CT-4
2. are

D. 1. CT-4
2. are NOT

General Discussion

Answer A Discussion

Incorrect. First part is plausible since it would be correct if there had not been a switchyard isolation. Second part is correct.

Answer B Discussion

Incorrect. First part is plausible since it would be correct if there had not been a switchyard isolation.
Second part is plausible since it would be correct if this were a MSLB since AFIS is bypassed. The basis of TS 3.3.11 (AFIS) explains that for a Main Steam Line break (which is what is occuring in this question)

Answer C Discussion

Correct.
Grid voltage is low and if it stays less than 227,468 for greater than 9 seconds then an ES 1 or 2 actuation on any unit will cause a swyd isolation to occur. In the current conditions swyd voltage is still low along with low RCS pressure which causes a swyd isolation to occur due to ES 1 and 2 actuation. A swyd isolation concurrent with an ES actuation will result in power to the MFBs coming from a Keowee unit via the underground and CT-4.
The basis of TS 3.6.5 (Reactor Building Spray and Reactor Building Cooling) explains that for a LOCA (which is what is occuring in this question) the highest peak containment pressure is 57.75 psig

Answer D Discussion

Incorrect.
First part is correct.
Second part is plausible since it would be correct if this were a MSLB since AFIS is bypassed. The basis of TS 3.3.11 (AFIS) explains that for a Main Steam Line break (which is what is occuring in this question)

Basis for meeting the KA

Requires knowledge of the operational status of ES components following a grid distrubance. Since without the grid distrubance, the supply to ES components would be CT-1 this question meets the KA. It is met at the SRO level since the LOCA is initiated by a turbine trip that is initiated by the grid distrubance.

Basis for Hi Cog

Basis for SRO only

This question is SRO only in that it requires knowledge of design basis of plant that is not systems knowledge. This information is incorporated into the basis of Tech Spec 3.6.5 and 3.3.11and is therefore basis knowledge and as allowed by SRO clarification guidance it becomes an SRO level question. 10 CFR 55.43(b)(2)

Job Level	Cognitive Level	QuestionType	Question Source
SRO	Comprehension	MODIFIED	ILT39 Q16

Development References

ILT39 Q16
TS 3.3.11` basis
TS 3.6.5 basis
EL-PSL Obj 11

Student References Provided

APE077 AA2.07 - Generator Voltage and Electric Grid Disturbances

Ability to determine and interpret the following as they apply to Generator Voltage and Electric Grid Disturbances: (CFR: 41.5 and 43.5 / 45.5, 45.7, and 45.8)

Operational status of engineered safety features...........................

401-9 Comments:

Remarks/Status

APE003 AA2.02 - Dropped Control Rod

Ability to determine and interpret the following as they apply to the Dropped Control Rod: (CFR: 43.5 / 45.13)

Signal inputs to rod control system ....

Given the following Unit 1 conditions:

Initial conditions:

- Reactor power = 100%
- Control Rod 3 in Group 7 indicates 0% withdrawn
- AP/01 (Unit Runback) initiated

Current conditions:

- Reactor power 70% decreasing

1) With ICS in AUTO, the Regulating Rods will NOT respond to an "out" command until Reactor power is less than a MAXIMUM of __(1)__ percent.

2) The basis for the above limit on Reactor power is to maintain __(2)__ within design limits.

Which ONE of the following completes the statements above?

A. 1. 55
 2. Linear Heat Rate

B. 1. 55
 2. Shutdown Margin

C. 1. 60
 2. Linear Heat Rate

D. 1. 60
 2. Shutdown Margin

General Discussion

Answer A Discussion

Incorrect. First part is incorrect. Plausible since it is the value for the Asymmetric Rod Runback. Second part is correct.

Answer B Discussion

Incorrect. First part is incorrect. Plausible since it is the value for the Asymmetric Rod Runback. Second part is incorrect. Plausible since SDM at power is verified using curves in the COLR which utilize reactor power and control rod position. Additionally, the operator utilizes a different curve when operating with a dropped rod.

Answer C Discussion

CORRECT. With an Asymmetric/dropped rod, a Regulating Rod "out inhibit" is established if in manual OR if in AUTO with NI power > 60%. The basis for the limit on reactor power is to ensure that local Linear Heat Rate increases, due to the misaligned rod, will not cause the core design criteria to be exceeded.

Answer D Discussion

Incorrect. First part is correct. Second part is incorrect. Plausible since SDM at power is verified using curves in the COLR which utilize reactor power and control rod position. Additionally, the operator utilizes a different curve when operating with a dropped rod.

Basis for meeting the KA

Question requires the ability to determine the power level, above which, the rod control system will not respond to an "out" command and the basis for the limit.

Basis for Hi Cog

Basis for SRO only

The question cannot be answered solely by knowing 1 hour or less actions, "above the line" information, or TS Safety Limits. It requires knowledge of TS Bases. 10 CFR 55.43(b)(2)

Job Level	Cognitive Level	QuestionType	Question Source
SRO	Memory	NEW	

Development References

IC-CRI Obj. 11
ADM-TSS Obj. R5
TS 3.1.4 Bases

Student References Provided

APE003 AA2.02 - Dropped Control Rod

Ability to determine and interpret the following as they apply to the Dropped Control Rod: (CFR: 43.5 / 45.13)

Signal inputs to rod control system ....

401-9 Comments:

Remarks/Status

APE024 AA2.06 - Emergency Boration
Ability to determine and interpret the following as they apply to the Emergency Boration: (CFR: 43.5 / 45.13)
When boron dilution is taking place ....

Given the following Unit 1 conditions:

- Reactor power = 75% stable
- Group 7 rod position = 72% withdrawn stable
- Makeup to LDST initiated

1) If the LDST makeup were diluting boron concentration, Group 7 rods would be __(1)__.

2) If the boron dilution results in NOT meeting the Regulating rod position limits of Tech Spec 3.2.1 (Regulating Rod Position Limits), Tech Spec requires that the makeup source for boration be either the __(2)__ or the Concentrated Boric Acid Storage Tank.

A. 1. withdrawing
2. BWST

B. 1. withdrawing
2. “A” BHUT

C. 1. inserting
2. BWST

D. 1. inserting
2. “A” BHUT

General Discussion

Answer A Discussion

Incorrect. First part is plausible as it is a common error to confuse rod motion direction with boron changes vs temperature changes. Second part is correct.

Answer B Discussion

Incorrect. First part is plausible as it is a common error to confuse rod motion direction with boron changes vs temperature changes.
Second part is plausible since Tech Specs requires that a minimum BWST level of 46 feet be maintained as part of ECCS support therefore it is plausible to believe that TS would not direct using BWST if there were other options in order to preserve its design function availability. Since A BHUT is maintained at a higher boron concentration than RCS it is a plausible alternative to the BWST since it would result in restoring SDM. Additional plausibility is derived from the basis requirements of TS 3.1.8 which allow boration from the "best source available for unit conditions" when SDM requirements are not met therefore this would be a correct answer if the SDM requirements were not met during Physics Testing.

Answer C Discussion

Correct. If boron concentration were decreasing then control rods would be inserting to offset the decrease in boron. The basis of TS 3.2.1 requires that the boration be done in the manner described in the basis of TS 3.1.1 and that states that the boration should be from a highly borated source such as CBAST or the BWST.

Answer D Discussion

Incorrect. First part is correct.
Second part is plausible since Tech Specs requires that a minimum BWST level of 46 feet be maintained as part of ECCS support therefore it is plausible to believe that TS would not direct using BWST if there were other options in order to preserve its design function availability. Since A BHUT is maintained at a higher boron concentration than RCS it is a plausible alternative to the BWST since it would result in restoring SDM. Additional plausibility is derived from the basis requirements of TS 3.1.8 which allow boration from the "best source available for unit conditions" when SDM requirements are not met therefore this would be a correct answer if the SDM requirements were not met during Physics Testing.

Basis for meeting the KA

This question meets the KA in that it requires being able to determine when a boron dilution is taking place by observing the resulting control rod motion. Additionally, at the SRO level the ability to "interpret" the boron dilution would include the ability to mitigate the event and to answer that part of this question requires TS basis knowledge.

Basis for Hi Cog

Basis for SRO only

In accordance with Clarification Guidance for SRO-only Questions:
This question requires knowledge from the basis of TS 3.2.1 and 3.1.1 and
is not systems knowledge. 10 CFR 55.43(b)(2)
It cannot be answered by knowing 1 hr or less TS/TRM Action
It cannot be answered solely with "above the line" information.
It cannot be answered solely by knowing Safety Limits

Job Level	Cognitive Level	QuestionType	Question Source
SRO	Comprehension	MODIFIED	ILT46 Q96

Development References

ILT46 Q96
TS 3.2.1 basisTS
TS 3.1.1 basis
TS 3.1.8 basis

Student References Provided

APE024 AA2.06 - Emergency Boration
Ability to determine and interpret the following as they apply to the Emergency Boration: (CFR: 43.5 / 45.13)
When boron dilution is taking place ....

401-9 Comments:

Remarks/Status

BWA05 2.2.44 - Emergency Diesel Actuation

BWA05 GENERIC

Ability to interpret control room indications to verify the status and operation of a system, and understand how operator actions and directives affect plant and system conditions. (CFR: 41.5 / 43.5 / 45.12)

Given the following Unit 1 conditions:
Initial conditions:

- Reactor power = 100%
- ACB-3 closed

Current conditions:

- 2SA-17/A-1 (GEN #1 EMERG. LOCKOUT) actuated
- 1TC, 1TD, and 1TE 4160V switchgear are <u>Locked</u> <u>Out</u>
- Blackout tab in progress
- EOP Enclosure 5.38 (Restoration of Power) has been initiated

1) Main Feeder Buses will be energized by __(1)__.

2) In accordance with the Blackout tab, once the Main Feeder Buses are energized the CRS will be directed to __(2)__.

Which ONE of the following completes the statements above?

A. 1. CT-5
2. continue in the Blackout Tab

B. 1. CT-5
2. transfer back to Subsequent Actions Tab

C. 1. KHU-2
2. continue in the Blackout Tab

D. 1. KHU-2
2. transfer back to Subsequent Actions Tab

General Discussion

Answer A Discussion

Incorrect. First part is plausible since it would be correct if neither of the KHU's were available. Second part is correct.

Answer B Discussion

Incorrect. First part is plausible since it would be correct if neither of the KHU's were available. Second part is plausible since it would be correct if any one of the three 4160v buses were energized by the MFB.

Answer C Discussion

Correct. Guidance in Encl. 5.38 directs closing the underground feeder (ACB-4) for the operating KHU to see if that will get the MFBs energized before going to CT-5. The transfer back to Subsequent Actions requires at least one of the 4160v switchgear buses to be energized even after the MFB's are energized.

Answer D Discussion

Incorrect. First part is correct, Second part is plausible since it would be correct if any one of the three 4160v buses were energized by the MFB.

Basis for meeting the KA

Requires the ability to interpret control room indications to determine the status of available power sources to understand which power source will be aligned to energize the Main Feeder Buses (MFBs). Also requires an understanding of operator actions to restore power such that even though power is restored to the MFBs, realize that the 4160V Switchgear is still de-energized and based on these system conditions, select the appropriate EOP section which is to continue in the Blackout Tab.

Basis for Hi Cog

Basis for SRO only

Requires assessing operator actions and plant conditions to determine a procedure or section of a procedure with which to proceed. 10 CFR 55.43(b)(5).

Job Level	Cognitive Level	QuestionType	Question Source
SRO	Comprehension	BANK	ILT45 Q85

Development References

ILT45 Q85
EAP-BO Obj. R1 & R6
EOP Encl. 5.38
Blackout Tab

Student References Provided

BWA05 2.2.44 - Emergency Diesel Actuation

BWA05 GENERIC

Ability to interpret control room indications to verify the status and operation of a system, and understand how operator actions and directives affect plant and system conditions. (CFR: 41.5 / 43.5 / 45.12)

401-9 Comments:

Remarks/Status

BWA07 2.4.21 - Flooding
BWA07 GENERIC
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. (CFR: 41.7 / 43.5

Given the following Unit 1 conditions:
Time = 1200:

- Notified by Unit 2 that 2SA-18/A-11 (TURBINE BSMT WATER EMERGENCY HIGH LEVEL) in alarm
- Reactor tripped from 100%
- EOP Turbine Building Flood (TBF) tab initiated

Time = 1300:

- Core SCM = 0°F

In accordance with the EOP TBF tab...

1) At time = 1200, initiate feeding SGs with Main and Emergency Feedwater while maintaining a MINIMUM Tave of __(1)__ºF.

2) At time = 1300, performance of Rule 4 (Initiation of HPI Forced Cooling) __(2)__ required.

Which ONE of the following completes the statements above?

A. 1. 550
2. is

B. 1. 532
2. is

C. 1. 550
2. is NOT

D. 1. 532
2. is NOT

General Discussion

Answer A Discussion

First part is incorrect. Plausible since a minimum of 550 degrees Tc (550 - 555) is maintained per EOP Rule 7 during an SSF Event in Mode 1 or 2 with TDEFDWP or alternate unit providing SG Feed and the TBF tab will utilize the SSF to feed the SGs if no main or emergency FDW is available.

Second part is correct. Step 20 in the TBF tab states that IAAT RCS heats to the point of losing core SCM, THEN GO TO STEP 88 (Perform Rule 4).

Answer B Discussion

First part is correct. The EOP TBF tab initiates feeding both SGs to 95% Operating Range with Main and Emergency Feedwater. If initial Tave >/= 532 degrees, Tave is maintained >/= 532 degrees during the SG fill.

Second part is correct. If Core SCM is lost due to heat up, the TBF tab directs performance of Rule 4.

Answer C Discussion

First part is incorrect. Plausible since a minimum of 550 degrees Tc (550 - 555) is maintained per EOP Rule 7 during an SSF Event in Mode 1 or 2 with TDEFDWP or alternate unit providing SG Feed and the TBF tab will utilize the SSF to feed the SGs if no main or emergency FDW is available.

Second part is incorrect. Plausible since the EHT and SGTR tabs direct transfer to the LOSCM tab when any SCM = 0 and HPI Forced Cooling is not in progress.

Answer D Discussion

First part is correct. The EOP TBF tab initiates feeding both SGs to 95% Operating Range with Main and Emergency Feedwater. If initial Tave >/= 532 degrees, Tave is maintained >/= 532 degrees during the SG fill.

Second part is incorrect. Plausible since the EHT and SGTR tabs direct transfer to the LOSCM tab when any SCM = 0 and HPI Forced Cooling is not in progress.

Basis for meeting the KA

Question requires knowledge of a parameter (Core SCM) and logic (Core SCM lost due to heat up) during a Turbine Building Flood to assess the status of core cooling and heat removal and transfer to a different section of the EOP TBF tab to perform Rule 4 (Initiation of HPI Forced Cooling).

Basis for Hi Cog

Basis for SRO only

Per ES-401 Attachment 2 Clarification Guidance for SRO Only Questions, the candidate must assess plant conditions and then select a procedure or section of a procedure with which to proceed. 10 CFR 55.43(b)(5).

Job Level	Cognitive Level	QuestionType	Question Source
SRO	Comprehension	NEW	

Development References
EAP-TBF Obj. R4 / R5 EOP TBF

Student References Provided

BWA07 2.4.21 - Flooding

BWA07 GENERIC

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. (CFR: 41.7 / 43.5

ILT48 ONS SRO NRC Examination **QUESTION 85** 85 **B**

401-9 Comments:	Remarks/Status
	Preview

SYS005 2.2.25 - Residual Heat Removal System (RHRS)
SYS005 GENERIC
Knowledge of the bases in Technical Specifications for limiting conditions for operations and safety limits. (CFR: 41.5 / 41.7 / 43.2)

Given the following Unit 1 conditions:
Time = 1215

- Unit shutdown in progress
- 1A1 RCP in operation
- Tcold = 220°F slowly decreasing
- RCS Pressure 325 psig slowly decreasing
- LPI Cooler outlet temperature = 110°F stable

Time = 1230

- Tcold = 200°F slowly decreasing
- RCS Pressure 275 psig stable
- LPI Cooler outlet temperature = 110°F stable
- 1A LPI Pump is started

Time = 1240

- Tcold = 197°F stable
- 1A1 RCP secured

Time = 1245

- LPI Cooler outlet temperature = 180°F stable

1) The RCS cooldown rate __(1)__ violate the maximum cooldown rate allowed per Tech Specs?

2) When the 1A LPI pump is started at Time = 1230, the temperature transient that results from the difference in LPI Cooler Outlet temperature and Tcold __(2)__ outside the bounds of the Reactor Vessel stress analysis?

Which ONE of the following completes the statements above?

A. 1. does
2. is

B. 1. does
2. is NOT

C. 1. does NOT
2. is

D. 1. does NOT
2. is NOT

General Discussion

Answer A Discussion

Incorrect. First part is correct. Second part is plausible since TS specifies LPI cooler Outlet temperature as RCS temperature when on LPI (with NO RCP's operating). Since the delta temp between cooler outlet and Tcold is in excess of the allowed cooldown rate for this RCS temperature it would be plausible to believe that the cooldown limits would be exceeded.

Answer B Discussion

Correct. RCS temperature at 1215 is 220 degrees since there is an RCP in operation. At 1245 RCS temp is 180 degrees since there is only an LPI pump in operation. The cooldown would be 40 degrees. The TS limit is 25 degrees in any 1/2 hour at this RCS temperature therefore the TS limit has been exceeded. The TS basis for Cooldown Rates (TS 3.4.3) specifically addresses the RV issue as follows:
An analysis examined the effects of initiating flow through a previously idle LPI train (i.e. either placing a train of LPI in operation or swapping from one train to the other) when none of the RC pumps are operating. This analysis has determined that the brief temperature excursion caused by the fluid initially in the idle LPI train can be accommodated if, at the time the LPI header is put in service, the RCS pressure is less than 295 psig.

Answer C Discussion

Incorrect. First part is plausible since it would be correct if RCS temperature were > 250 degrees where cooldown rate is less restrictive. Second part is plausible since TS specifies LPI cooler Outlet temperature as RCS temperature when on LPI (with NO RCP's operating). Since the delta temp between cooler outlet and Tcold is in excess of the allowed cooldown rate for this RCS temperature it would be plausible to believe that the RV stress analysis limits would be exceeded since that analysis is in part driven by limiting heatup and cooldown rates. It is plausible to believe that even if cooldown rates are not violated that during the "brief period of stabilization" you could be outside the bounds of the RV stress analysis because that philosophy of allowing brief periods outside of a TS limit is consistent with other situations. As an example, the RCS is allowed to violate the RCS pressure Safety Limit for 5 minutes. That brief allowance would make it plausible to believe you would be allowed to briefly violate RV stress analysis.

Answer D Discussion

Incorrect. First part is plausible since it would be correct if RCS temperature were > 250 degrees where cooldown rate is less restrictive. Second part is correct

Basis for meeting the KA

This question is specific to the RHR system at ONS and requires information from the basis of the RCS P/T limit LCO to determine that the LPI cooler outlet temperature during the period of stabilization does not need to be considered when an LPI train is placed in service.

Basis for Hi Cog

Basis for SRO only

This question requires both application of Tech Specs and knowledge of information contained in TS basis. 10 CFR 55.43(b)(2)
It cannot be answered solely by1hr or less memory items.
It cannot be answered solely by above the line knowledge
It cannot be answered solely by knowing TS Safety Limits
It does require knowledge of TS basis that is not systems knowledge in that knowledge of how LPI cooler outlet temperatures are applied to cooldown rates
It also required application of TS's by requiring an analysis of various temperature indications and knowledge of how to apply those indication to cooldown limits provided by TS 3.4.3.

Job Level	Cognitive Level	QuestionType	Question Source
SRO	Comprehension	BANK	ILT44 Q87

Development References

ILT44 Q87
ADM-TSS obj R5
TS 3.4.3 basis

Student References Provided

SYS005 2.2.25 - Residual Heat Removal System (RHRS)
SYS005 GENERIC
Knowledge of the bases in Technical Specifications for limiting conditions for operations and safety limits. (CFR: 41.5 / 41.7 / 43.2)

401-9 Comments:	Remarks/Status
	No miss on ILT44 exam

SYS012 A2.05 - Reactor Protection System (RPS)

Ability to (a) predict the impacts of the following malfunctions or operations on the RPS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: (CFR: 41.5 / 43.5 / 45.3 / 45.5)

Faulty or erratic operation of detectors and function generators ....

Given the following Unit 1 conditions:
Initial conditions:

- Reactor power = 100%
- I&E performing Reactor Protective System (RPS) calibration procedure

Current conditions:

- The RCS High Pressure trip setpoint is determined to be 6 psig non-conservative in 1A and 1B RPS Channels..

1) The actual RPS trip setpoint for RCS High Pressure is __(1)__ psig.

2) In accordance with the bases of Tech Spec 3.3.1 (Reactor Protective System (RPS) Instrumentation), the 1A and 1B RCS High Pressure Trip Functions are __(2)__.

Which ONE of the following completes the statements above?

A. 1. 2345
   2. operable

B. 1. 2345
   2. inoperable

C. 1. 2355
   2. operable

D. 1. 2355
   2. inoperable

General Discussion

Answer A Discussion

Correct. The actual RPS trip setpoint for RCS High Pressure is 2345 psig. The allowable value per TS 3.3.1 is 2355 psig. According to TS Bases, when the trip setpoint is found to be incorrect, the trip functions are operable if the trip setpoint is within the allowable value.

Answer B Discussion

Incorrect. First part is correct. Second part is incorrect but plausible to believe the trip function is inoperable when the setpoint is found to be incorrect in the non-conservative direction and if the setpoint was 10 psig non-conservative, it would be correct.

Answer C Discussion

Incorrect. First part is incorrect. Plausible since 2355 psig is the allowable Tech Spec value. Second part is correct.

Answer D Discussion

Incorrect. First part is incorrect. Plausible since 2355 psig is the allowable Tech Spec value. Second part is incorrect but plausible to believe the trip function is inoperable when the setpoint is found to be incorrect in the non-conservative direction and if the setpoint was 10 psig non-conservative, it would be correct.

Basis for meeting the KA

Requires the ability to predict the impact of several malfunctions on RPS and to use Tech Specs to mitigate the consequences of the failures.

Basis for Hi Cog

Basis for SRO only

This question requires application of Tech Specs.
It cannot be answered solely by 1hr or less memory items.
It cannot be answered solely by above the line knowledge
It cannot be answered solely by knowing TS Safety Limits
It does require application of generic LCO requirements. 10 CFR 55.43(b)(2)

Job Level	Cognitive Level	QuestionType	Question Source
SRO	Comprehension	MODIFIED	ILT46 Q87

Development References

ILT46 Q87
IC-RPS Obj. R30, 31, 32
TS 3.3.1
TS 3.3.1 Bases

Student References Provided

SYS012 A2.05 - Reactor Protection System (RPS)

Ability to (a) predict the impacts of the following malfunctions or operations on the RPS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: (CFR: 41.5 / 43.5 / 45.3 / 45.5)

Faulty or erratic operation of detectors and function generators ....

401-9 Comments:

Remarks/Status

SYS013 A2.06 - Engineered Safety Features Actuation System (ESFAS)
Ability to (a) predict the impacts of the following malfunctions or operations on the ESFAS; and (b) based Ability on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations; (CFR: 41.5 / 43.5 / 45.3 / 45.13)
Inadvertent ESFAS actuation ....

Given the following Unit 1 conditions:

- Reactor power = 100%
- RCS pressure 2155 psig stable
- RB pressure 0.1 psig stable
- ES Channel 2 actuation

1) AP/42 Enclosure 5.3 (SSF Restoration) __(1)__ required to be performed.

2) In accordance with AD-LS-ALL-0006 (Notification/Reportability Evaluation), a 4 hour ENS notification __(2)__ required.

Which ONE of the following completes the statements above?

REFERENCE PROVIDED

A. 1. is
   2. is

B. 1. is NOT
   2. is

C. 1. is
   2. is NOT

D. 1. is NOT
   2. is NOT

General Discussion

Answer A Discussion

Incorrect. First part is incorrect. Plausible since it would be correct for an ES Channel 1 actuation. Second part is incorrect. Plausible since it would be correct for a valid ES actuation.

Answer B Discussion

Incorrect. First part is correct. Second part is incorrect. Plausible since it would be correct for a valid ES actuation.

Answer C Discussion

Incorrect. First part is incorrect. Plausible since it would be correct for an ES Channel 1 actuation. Second part is correct.

Answer D Discussion

CORRECT. AP/42 Encl. 5.3 is NOT required to be performed for an ES Channel 2 actuation. It is performed following actuation of ES Channel 1. A 4 hour ENS notification is NOT required in this case, but would be required if the actuation were valid.

Basis for meeting the KA

Question requires the candidate to be able to determine, following an inadvertent ES Channel 2 actuation, if the SSF Restoration enclosure of AP/42 is required to be performed. Also requires knowledge of the Notification/Reportability Evaluation procedure and whether or not the ES Channel 2 actuation is reportable.

Basis for Hi Cog

Basis for SRO only

Per ES-401 Attachment 2 (Clarification Guidance for SRO-only Questions), requires knowledge of the NRC reporting requirements under Conditions and limitations in the facility license (10CFR55.43(b)(1).

Job Level	Cognitive Level	QuestionType	Question Source
SRO	Memory	NEW	

Development References

EAP-APG Obj. R9
ADM-SD Obj. R22
AP/42
AD-LS-ALL-0006

Student References Provided

AD-LS-ALL-0006

SYS013 A2.06 - Engineered Safety Features Actuation System (ESFAS)

Ability to (a) predict the impacts of the following malfunctions or operations on the ESFAS; and (b) based Ability on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations; (CFR: 41.5 / 43.5 / 45.3 / 45.13)

Inadvertent ESFAS actuation ....

401-9 Comments:

Remarks/Status

SYS039 A2.03 - Main and Reheat Steam System (MRSS)

Ability to (a) predict the impacts of the following malfunctions or operations on the MRSS; and (b) based on predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: (CFR: 41.5 / 43.5 / 45.3 / 45.13)

Indications and alarms for main steam and area radiation monitors (during SGTR) ....

Given the following Unit 1 conditions:

Time = 0800:

- Reactor power = 100%
- 1RIA-59 reading 10 gpm slowly increasing
- AP/31 (Primary to Secondary Leakage) is initiated

Time = 0810:

- AP/29 (Rapid Unit Shutdown) is in progress
- Reactor power = 60% decreasing
- 1RIA-59 reading 28 gpm

Time = 0845:

- Reactor is tripped
- 1A1 RCP restarted per Encl. 5.6 (RCP Restart)
- SCM = 0ºF

Time = 0847

- SCM = 0ºF

In accordance with the SGTR Tab…

1) The MINIMUM allowed power level to utilize 1RIA-59 for leakage calculation is __(1)__ percent.

2) The EARLIEST time that a transfer to the LOSCM tab is <u>required</u> is __(2)__.

Which ONE of the following completes the statements above?

A. 1. > 40
2. 0845

B. 1. > 40
2. 0847

C. 1. > 25
2. 0845

D. 1. > 25
2. 0847

General Discussion

Answer A Discussion

Incorrect. 1st part is correct. If Reactor power is </= 40%, the EOP will not use RIA-59/60 for leakage calculation.
2nd part is incorrect. If SCM = 0 for 2 minutes after RCP start, transition to the LOSCM tab is required. If SCM = 0 for < 2 minutes, the transition to LOSCM is not required and the CRS will remain in the SGTR tab.

Answer B Discussion

CORRECT.
1st part is correct. If Reactor power is </= 40%, the EOP will not use RIA-59/60 for leakage calculation.
2nd part is correct. If SCM = 0 for 2 minutes after RCP start, transition to the LOSCM tab is required.

Answer C Discussion

Incorrect. 1st part is incorrect. Plausible because 25 is the leakage amount (in gpm) that requires entry into the EOP SGTR tab.
2nd part is incorrect. The SGTR tab will not direct transition to the LOSCM tab unless SCM = 0 for 2 minutes.

Answer D Discussion

Incorrect. 1st part is incorrect. Plausible because 25 is the leakage amount (in gpm) that requires entry into the EOP SGTR tab.
2nd part is correct. If SCM = 0 for 2 minutes after RCP start, transition to the LOSCM tab is required.

Basis for meeting the KA

Requires knowledge of how Main Steam Radiation Monitors affect procedure application during a SGTR.

Basis for Hi Cog

Basis for SRO only

ES-401, II.E
Assessment of facility conditions and selection of appropriate procedures during
normal, abnormal, and emergency situations. 10 CFR 55.43(b)(5)
Received permission from A. Goldau to use the note information to determine procedure selection on when to transfer to LOSCM tab.

Job Level	Cognitive Level	QuestionType	Question Source
SRO	Comprehension	NEW	

Development References

SGTR Tab
AP/31
EAP SGTR Obj R11

Student References Provided

SYS039 A2.03 - Main and Reheat Steam System (MRSS)

Ability to (a) predict the impacts of the following malfunctions or operations on the MRSS; and (b) based on predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: (CFR: 41.5 / 43.5 / 45.3 / 45.13)

Indications and alarms for main steam and area radiation monitors (during SGTR) ....

401-9 Comments:

Remarks/Status

Preview

SYS062 2.2.4 - AC Electrical Distribution System
SYS062 GENERIC
(multi-unit license) Ability to explain the variations in control board/control room layouts, systems, instrumentation, and procedural actions between units at a facility. (CFR: 41.6 / 41.7 / 41.10 / 45.1 / 45.13)

Given the following plant conditions:
Initial conditions:

- Unit 1 and 2 in MODE 5
- Unit 3 is at 100%

Current conditions:

- ALL units EOP Blackout tab in progress

1) Actuating Unit 1 & 2 Keowee Emergency Start Channel B switch in the Unit 2 Control Room will start __(1)__ KHU(s).

2) The switch in part 1 above __(2)__ be used to satisfy the Unit 2 Manual Keowee Emergency Start requirements of Tech Spec 3.3.22 (EPSL Manual Keowee Emergency Start Function).

Which ONE of the following completes the statements above?

A. 1. ONLY one
   2. can

B. 1. BOTH
   2. can

C. 1. ONLY one
   2. can NOT

D. 1. BOTH
   2. can NOT

General Discussion

Answer A Discussion

Incorrect. First part is incorrect. Plausible since all other switches associated with starting Keowee units in auto or manual are unit specific. Second part is plausible since it is a switch that is located in the Unit 2 Control Room and Unit 1 also has a switch on its control board

Answer B Discussion

Incorrect. First part is correct. . Second part is plausible since it is a switch that is located in the Unit 2 Control Room and Unit 1 also has a switch on its control board

Answer C Discussion

Incorrect. First part is incorrect. Plausible since all other switches associated with starting Keowee units in auto or manual are unit specific. Second part is correct.

Answer D Discussion

Correct. Any of the KHU Emergency Start switches starts both KHU's. The switch in the Unit 1 CR and the switch in the Unit 2 CR both use Unit 1's Emergency start circuits therefore the switch located in the Unit 2 Control Room can only be used to satisfy the Unit 1 TS requirements.

Basis for meeting the KA

Question requires the candidate to be able to explain the variations in control board/control room layouts pertaining to the KHU Emergency Start circuits.

Basis for Hi Cog

Basis for SRO only

Question requires knowledge of the basis of TS 3.3.22 which states that the Unit 2 switch cannot be used to satisfy the Unit 2 TS requirements.

Job Level	Cognitive Level	QuestionType	Question Source
SRO	Comprehension	NEW	

Development References

EAP-BO Obj. R6
Unit 2 Encl. 5.38
Unit 3 Encl. 5.38
TS 3.3.22 basis

Student References Provided

SYS062 2.2.4 - AC Electrical Distribution System
SYS062 GENERIC
(multi-unit license) Ability to explain the variations in control board/control room layouts, systems, instrumentation, and procedural actions between units at a facility. (CFR: 41.6 / 41.7 / 41.10 / 45.1 / 45.13)

401-9 Comments:

Remarks/Status

SYS002 2.2.22 - Reactor Coolant System (RCS)
SYS002 GENERIC
Knowledge of limiting conditions for operations and safety limits. (CFR: 41.5 / 43.2 / 45.2)

Given the following Unit 3 plant conditions:
Time = 1200

- Reactor in MODE 1
- RBNS level 20 inches increasing
- LPSW leak into RB
- Begin pumping RBNS using 3A and 3B RBNS Pumps

Time = 1205

- RBNS level as indicated below

Time = 1230

- RBNS level indication unchanged from Time = 1205

1) Condition A of Tech Spec 3.4.15 __(1)__ required to be entered.

2) __(2)__ can be used to satisfy the RIA requirements of TS 3.4.15 LCO.

Which ONE of the following completes the statements above?

REFERENCE PROVIDED

A. 1. is
2. 3RIA-47

B. 1. is
2. 3RIA-49

C. 1. is NOT
2. 3RIA-47

D. 1. is NOT

ILT48 ONS SRO NRC Examination QUESTION 91 91 A

General Discussion

Answer A Discussion

Correct. TS 3.4.15 basis requires that:
Leakage detection systems must have the capability to detect significant reactor coolant pressure boundary (RCPB) degradation as soon after occurrence as practical to minimize the potential for propagation to a gross failure. Thus, an early indication or warning signal is necessary to permit proper evaluation of all unidentified LEAKAGE. With the RBNS level off scale and no way to bring it back on scale (due to the LPSW leak size) the candidate must determine that the RBNS level indication cannot perform its safety function as is therefore inoperable in the context of TS 3.4.15.
Since the LCO specifies that a particulate monitor must be used, 3RIA-47 is required. TS Bases also states RIA-47.

Answer B Discussion

Incorrect: First part is correct. Second part is plausible since it is one of the RB RIA's, however it is not a particulate monitor.

Answer C Discussion

Incorrect. First part is plausible since there is no malfunction or out of service equipment associated with the RBNS, however it cannot perform its safety function. Second part is correct.

Answer D Discussion

Incorrect. First part is plausible since there is no malfunction or out of service equipment associated with the RBNS, however it cannot perform its safety function. Second part is plausible since it is one of the RB RIA's, however it is not a particulate monitor.

Basis for meeting the KA

Requires applying Tech Spec 3.4.15 in that the SRO must assess plant conditions and apply them to the LCO requirments and the required safety function of the equipment required by the LCO to determine if the LCO is met.

Basis for Hi Cog

Basis for SRO only

Requires knowledge from the TS Bases of TS 3.4.15 to determine that the RBNS level indication cannot perform the safety function associated with identifying RCS leakage inside containment.
It cannot be answered solely by1hr or less memory items.
It cannot be answered solely by above the line knowledge
It cannot be answered solely by knowing TS Safety Limits
It does require knowledge of TS basis that is not systems knowledge

Job Level	Cognitive Level	QuestionType	Question Source
SRO	Comprehension	BANK	ILT44 Q91

Development References

ILT44 Q91
Admin-TSS obj R5
TS 3.4.15 basis

Student References Provided

TS 3.4.15

SYS002 2.2.22 - Reactor Coolant System (RCS)
SYS002 GENERIC
Knowledge of limiting conditions for operations and safety limits. (CFR: 41.5 / 43.2 / 45.2)

401-9 Comments:

Remarks/Status

Preview - Q changed out since preview. 10/01/15.

Nobody missed on ILT44.

SYS014 A2.02 - Rod Position Indication System (RPIS)
Ability to (a) predict the impacts of the following malfunctions or operations on the RPIS; and (b) based on those on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations : (CFR: 41.5 / 43.5 / 45.3 / 45.13)
Loss of power to the RPIS ....

Given the following Unit 1 conditions:

- Reactor power = 100%
- Electrical malfunction results in loss of ALL Control Rod position indications.

1) In accordance with Tech Spec 3.1.7 (Position Indicator Channels) , the MAXIMUM time allowed to declare all Control Rods inoperable is __(1)__.

2) Assuming indications are NOT restored, Tech Spec 3.1.4 (Control Rod Group alignment limits), __(2)__ require reducing Reactor Power to a MAXIMUM of 60% RTP within 2 hours of declaring all Control Rods inoperable.

Which ONE of the following completes the statements above?

REFERENCE PROVIDED

A. 1. immediately
2. does

B. 1. immediately
2. does NOT

C. 1. one hour
2. does

D. 1. one hour
2. does NOT

ILT48 ONS SRO NRC Examination QUESTION 92 92 A

General Discussion

Answer A Discussion

Correct. TS 3.1.7 required declaring all rods that have no position indication operable inoperable immediately. This puts you in TS 3.1.4 where both Condition A and Condition C apply. While Condition C requires Mode 3 within 12 hours, the Condition A requirement to be below 60% RTP within 2 hours would also still be applicable.

Answer B Discussion

Incorrect. First part is correct.
Second part is plausible since that requirement stems from Condition A. Condition A applies with one Control Rod inoperable. It is a common misconception when applying Tech specs that you are only in the specific CONDITION that matches plant status. i.e. I would not be in Condition A since it is for one inoperable rod because I have more than one inoperable rod. That misconception would lead the candidate to believe that only the requirements of Condition C apply. Further plausibility comes from the fact that Oconee does have an outlier SLC (16.8.3) that does work as the above "misconception" states. There is a condition for "a single battery" being inoperable and the condition only applies when there is one and ONLY one battery inoperable.

Answer C Discussion

Incorrect. First part is plausible since there are many Tech Specs that allow 1 hr as a competition time and the 1 hr CT would mean that this would still be a required memory item. Second part is correct.

Answer D Discussion

incorrect. First part is plausible since there are many Tech Specs that allow 1 hr as a competition time and the 1 hr CT would mean that this would still be a required memory item.
Second part is plausible since that requirement stems from Condition A. Condition A applies with one Control Rod inoperable. It is a common misconception when applying Tech specs that you are only in the specific CONDITION that matches plant status. i.e. I would not be in Condition A since it is for one inoperable rod because I have more than one inoperable rod. That misconception would lead the candidate to believe that only the requirements of Condition C apply. Further plausibility comes from the fact that Oconee does have an outlier SLC (16.8.3) that does work as the above "misconception" states. There is a condition for "a single battery" being inoperable and the condition only applies when there is one and ONLY one battery inoperable.

Basis for meeting the KA

Requires knowledge of procedures to mitigate consequences of loss of power to RPIS. Predicting the impact is understanding that all Control Rods must be delcared inoperable and procedure use is met by applying the requirments of TS 3.1.4.

Basis for Hi Cog

Basis for SRO only

This question requires application of Tech Specs.
It cannot be answered solely by1hr or less memory items.
It cannot be answered solely by above the line knowledge
It cannot be answered solely by knowing TS Safety Limits
It does require application of generic LCO requirements. 10 CFR 55.43(b)(2)

Job Level	Cognitive Level	QuestionType	Question Source
SRO	Comprehension	NEW	

Development References

Admin-ITS OBJ r3
TS 3.1.4
TS 3.1.7

Student References Provided

TS 3.1.4

SYS014 A2.02 - Rod Position Indication System (RPIS)
Ability to (a) predict the impacts of the following malfunctions or operations on the RPIS; and (b) based on those on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations : (CFR: 41.5 / 43.5 / 45.3 / 45.13)
Loss of power to the RPIS ....

401-9 Comments:

Remarks/Status

SYS033 2.4.9 - Spent Fuel Pool Cooling System (SFPCS)
SYS033 GENERIC
Knowledge of low power/shutdown implications in accident (e.g., loss of coolant accident or loss of residual heat removal) mitigation strategies.
(CFR: 41.10 / 43.5 / 45.13)

Given the following Unit 1 conditions:
Time = 1000

- Mode 6
- LPI aligned in Normal Decay Heat Removal mode
- 1A and 1B SGs in wet layup
- Fuel Transfer Canal flooded
- 1B LPI pump OOS

Time = 1030

- ALL available LPI pumps tripped and can NOT be restarted

1) At 1000, in accordance with OP/1/A/1104/004 (Low Pressure Injection System), the __(1)__ LPI pump should be operating.

2) In accordance with AP/26 (Loss of Decay Heat Removal), Enclosure __(2)__ will be initiated for heat removal.

Which ONE of the following completes the statements above?

A. 1. 1A
2. 5.18 (SSF Operation for Loss of DHR Events)

B. 1. 1C
2. 5.7 (DHR Using SF Cooling)

C. 1. 1C
2. 5.18 (SSF Operation for Loss of DHR Events)

D. 1. 1A
2. 5.7 (DHR Using SF Cooling)

General Discussion

Answer A Discussion

Incorrect. The first part is correct. The A or B LPI Pump is operated in Decay Heat Removal (DHR), if possible, per the LPI procedure since these pumps automatically restart when power is restored following a loss of power. Second part is incorrect. Plausible since this enclosure would be utilized if the Fuel Transfer Canal were not full.

Answer B Discussion

Incorrect. First part is incorrect. Plausible since it would be correct if the 1A LPI Pump were unavailable. Second part is correct. With all LPI Pumps unavailable and the Transfer Canal flooded, AP/26 will initiate Encl. 5.7 (DHR Using SF Cooling).

Answer C Discussion

Incorrect. First part is incorrect. Plausible since it would be correct if the 1A LPI Pump were unavailable. Second part is incorrect. Plausible since this enclosure would be utilized if the Fuel Transfer Canal were not full..

Answer D Discussion

Correct. With the 1B LPI Pump OOS, the A LPI Pump is operated in Decay Heat Removal (DHR), if possible, per the LPI procedure since it would automatically restart when power was restored following a loss of power. With all LPI Pumps unavailable and the Transfer Canal flooded, AP/26 will initiate Encl. 5.7 (DHR Using SF Cooling).

Basis for meeting the KA

Requires knowledge of low power/shutdown loss of Decay Heat Removal mitigation strategies as related to Spent Fuel Pool Cooling.

Basis for Hi Cog

Basis for SRO only

This question is SRO only per ES-401 Attachment 2 Clarification Guidance for SRO-only Questions due to the following:
It cannot be answered solely by using systems knowledge.
It cannot be answered solely by knowing immediate operator actions.
It cannot be answered solely by knowing entry conditions for Aps or direct entry to the EOP.
It cannot be answered solely by knowing the purpose or overall mitigation strategy of a procedure.
The question requires assessing plant conditions and then selecting the proper section of the procedure with which to proceed. 10 CFR 55.43(b)(5)

Job Level	Cognitive Level	QuestionType	Question Source
SRO	Comprehension	NEW	

Development References

EAP-APG Obj. R9
OP/1/A/1104/004 LPI
AP/26

Student References Provided

SYS033 2.4.9 - Spent Fuel Pool Cooling System (SFPCS)
SYS033 GENERIC
Knowledge of low power/shutdown implications in accident (e.g., loss of coolant accident or loss of residual heat removal) mitigation strategies. (CFR: 41.10 / 43.5 / 45.13)

401-9 Comments:

Remarks/Status

GEN2.1 2.1.39 - GENERIC - Conduct of Operations
Conduct of Operations
Knowledge of conservative decision making practices. (CFR: 41.10 / 43.5 / 45.12)

Given the following Unit 1 conditions:

- 1A SG isolated due to a steam line break
- 1B SG has a tube rupture

1) Without additional station management approval, the section of the EOP that would be used to cooldown to LPI would be the section using the __(1)__SG.

2) Once RCS temperature and pressure allow alignment of LPI, the __(2)__ mode will be the INITIAL LPI alignment utilized.

Which ONE of the following completes the statements above?

A. 1. 1A
2. normal DHR

B. 1. 1A
2. High Pressure

C. 1. 1B
2. normal DHR

D. 1. 1B
2. High Pressure

General Discussion

Answer A Discussion

First part is incorrect because the SGTR tab will direct you to use the SG with the tube rupture (1B) unless you have station management approval (step 61) to use the SG with the steam leak. It is plausible since it is the SG that does not have a tube leak which on the surface would logically be the SG that should cause less off site dose.

Second part is incorrect because High Pressure mode is the desired lineup unless Station management deems otherwise (Note before Step 237 SGTR tab). It is plausible because if it were Unit 3, it would be correct.

Answer B Discussion

First part is incorrect because the SGTR tab will direct you to use the SG with the tube rupture (1B) unless you have station management approval (step 61) to use the SG with the steam leak. It is plausible since it is the SG that does not have a tube leak which on the surface would logically be the SG that should cause less off site dose.

Second part is correct. Per the SGTR tab, "The credited LPI alignment for SGTR design basis event is High Pressure mode and is desired unless Station management or equipment issues deem otherwise".

Answer C Discussion

First part is correct. The SGTR tab directs using the SG with the tube leak unless station management directs using the Faulted SG.

Second part is incorrect because High Pressure mode is the desired lineup unless Station management deems otherwise (Note before Step 237 SGTR tab). It is plausible because if it were Unit 3, it would be correct.

Answer D Discussion

First part is correct. The SGTR tab directs using the SG with the tube leak unless station management directs using the Faulted SG.

Second part is correct. Per the SGTR tab, "The credited LPI alignment for SGTR design basis event is High Pressure mode and is desired unless Station management or equipment issues deem otherwise".

Basis for meeting the KA

Requires knowledge of conservative decision making as it relates to ensuring off site dose is minimized during a cooldown with both a steam leak and a SGTR in opposing SG's.

Basis for Hi Cog

Basis for SRO only

Required knowledge of approval levels required for Radiation hazards that arise during abnormal situations. This is SRO only criteria since it would re Process for release approvals. 10 CFR 55.43(b)(4)

Job Level	Cognitive Level	QuestionType	Question Source
SRO	Comprehension	NEW	

Development References	Student References Provided
EAP-SGTR Obj R27 SGTR Tab	

GEN2.1 2.1.39 - GENERIC - Conduct of Operations
Conduct of Operations
Knowledge of conservative decision making practices. (CFR: 41.10 / 43.5 / 45.12)

401-9 Comments:	Remarks/Status

GEN2.1 2.1.5 - GENERIC - Conduct of Operations
Conduct of Operations
Ability to use procedures related to shift staffing, such as minimum crew complement, overtime limitations, etc. (CFR: 41.10 / 43.5 / 45.12)

In accordance with the bases of SLC 16.13.1 (Minimum Station Staffing Requirements)...

1) the NRC Communicator __(1)__ required to be a licensed or previously licensed SRO.

2) the NRC Communicator __(2)__ also be the Off-site Communicator.

Which ONE of the following completes the statements above?

A. 1. is
2. can

B. 1. is
2. can NOT

C. 1. is NOT
2. can

D. 1. is NOT
2. can NOT

ILT48 ONS SRO NRC Examination QUESTION 95 95 **A**

General Discussion

Answer A Discussion

Correct.
Per the bases of SLC 16.13.1, an SRO serves as the offsite communicator and the NRC communicator. This is permissible since the offsite communicator role is completed prior to the NRC communicator role starting. The initial offsite communication is required within 15 minutes of the declaration and the NRC communication is required within 60 minutes.

Answer B Discussion

Incorrect.
First part is correct. Second part is incorrect. Plausible since both positions are required to be staffed and have separate duties and procedures to perform during an event.

Answer C Discussion

Incorrect.
First part is incorrect. Plausible since some ERO positions are allowed to be staffed by a licensed or previously licensed RO (TSC Operations Superintendent Assistant, Assistant to the OSC Operations Liason, and the OSM Liason).
Second part is correct.

Answer D Discussion

Incorrect.
First part is incorrect. Plausible since some ERO positions are allowed to be staffed by a licensed or previously licensed RO (TSC Operations Superintendent Assistant, Assistant to the OSC Operations Liason, and the OSM Liason).
Second part is incorrect. Plausible since both positions are required to be staffed and have separate duties and procedures to perform during an event.

Basis for meeting the KA

Requires ability to ensure the NRC Communicator and Off-site Communicator positions are properly staffed per SLC 16.31.1 (Minimum Station Staffing Requirements) as described in the bases.

Basis for Hi Cog

Basis for SRO only

In accordance with Rev. 1 of "Clarification Guidance for SRO-only Questions":
This question requires knowledge of the facility operating limitations in the TS (SLC) and their bases to determine required shift staffing. 10 CFR 55.43(b)(2)

Job Level	Cognitive Level	QuestionType	Question Source
SRO	Comprehension	NEW	

Development References

ADMIN-OMP Obj R5
OMP 2-1
OMP 1-07
ADM-TSS R5
SLC 16.13.1

Student References Provided

GEN2.1 2.1.5 - GENERIC - Conduct of Operations
Conduct of Operations
Ability to use procedures related to shift staffing, such as minimum crew complement, overtime limitations, etc. (CFR: 41.10 / 43.5 / 45.12)

401-9 Comments:

Remarks/Status

ILT48 ONS SRO NRC Examination QUESTION 96 96 **B**

GEN2.2 2.2.43 - GENERIC - Equipment Control
Equipment Control
Knowledge of the process used to track inoperable alarms. (CFR: 41.10 / 43.5 / 45.13)

In accordance with OP/0/A/1108/001 (Curves and General Information) Encl. 4.17 (Evaluation for Removal of Statalarms/Control Room Indications), which ONE of the following is the MINIMUM level of approval required to remove a Statalarm from service located on 1VB1?

A. Reactor Operator

B. Control Room Supervisor

C. Work Control Center SRO

D. Shift Manager

General Discussion

Answer A Discussion

Incorrect. Plausible since it would be correct if asking about preparing the removal vs approving the removal. Also, specifying 1VB1 as the panel adds plausibility since it would not be one of the "front board" alarms and is therefore perceived as less critical.

Answer B Discussion

Correct. The Control Room Supervisor must approve removing a statalarm from service on any Control Room panel.

Answer C Discussion

Incorrect. Plausible since the WCC SRO, when filled by a licensed SRO, approves equipment tagouts on the unit.

Answer D Discussion

Incorrect. Plausible since there are other things in the day to day operation that require a minimum of the Shift Mangers approval.

Basis for meeting the KA

Requires generic knowledge of the process required to remove a statalarm from service.

Basis for Hi Cog

Basis for SRO only

This question meets SRO requirements since it requires knowledge of administrative processes for disabling annunciators per ES-401 Attachment 2, 10 CFR 55.43(b)(3).

Job Level	Cognitive Level	QuestionType	Question Source
SRO	Memory	NEW	

Development References
Admin-OMP Obj R5 1108/01

Student References Provided

GEN2.2 2.2.43 - GENERIC - Equipment Control

Equipment Control

Knowledge of the process used to track inoperable alarms. (CFR: 41.10 / 43.5 / 45.13)

401-9 Comments:

Remarks/Status
Preview

GEN2.3 2.3.15 - GENERIC - Radiation Control
Radiation Control
Knowledge of radiation monitoring systems, such as fixed radiation monitors and alarms, portable survey instruments, personnel monitoring equipment, etc. (CFR: 41.12 / 43.4 / 45.9)

Given the following Unit 1 conditions:
Initial conditions:

- Reactor in MODE 6
- Fuel offload in progress
- Penetration openings exist due to containment penetration work in progress

Current conditions:

- Control Room notified that a Fuel Assembly has been dropped
- 1SA-8 B-9 (PROCESS MONITOR RADIATION HIGH) actuates
- 1RIA-3 (Fuel Transfer Canal Area Monitor) HIGH alarm actuates
- 1RIA-49 (RB Gas) HIGH alarm actuates

Which ONE of the following states the:

1) MAXIMUM time (minutes) allowed to isolate all containment penetrations in accordance OP/1/A/1502/009 (Containment Closure Control)?

2) Abnormal Procedure that contains the actions that are required to mitigate the initiating event?

A. 1. 30
2. AP/1/A/1700/009 (Spent Fuel Damage)

B. 1. 30
2. AP/1/A/1700/018 (Abnormal Release of Radioactivity)

C. 1. 35
2. AP/1/A/1700/009 (Spent Fuel Damage)

D. 1. 35
2. AP/1/A/1700/018 (Abnormal Release of Radioactivity)

General Discussion

Answer A Discussion

Correct.
AP/9 has direction to notify Containment Closure Coordinator to ensure any open penetrations are isolated in accordance with the Containment Closure Control procedure. These penetration must be isolated within 30 minutes therefore AP/9 would be the AP needing immediate attention.

Answer B Discussion

Incorrect:
First part is correct.
Second part is incorrect. Plausible since the entry conditions for the AP are met.

Answer C Discussion

Incorrect:
First part is incorrect. Plausible since there are other time critical actions that have to be performed in this time such as open ADVs on both Main Steam Lines within 35 minutes of a tornado.
Second part is correct.

Answer D Discussion

Incorrect:
First part is incorrect. Plausible since there are other time critical actions that have to be performed in this time such as open ADVs on both Main Steam Lines within 35 minutes of a tornado.
Second part is incorrect. Plausible since the entry conditions for the AP are met.

Basis for meeting the KA

Question requires the knowledge of Radiation alarms and automatic actions performed by each. Meets KA at SRO level since it requires the ability to prioritize radiation alarms to determine what procedure must be used.

Basis for Hi Cog

Basis for SRO only

In accordance with Clarification Guidance for SRO-only Questions, this question
requires assessing plant conditions and selecting a procedure with which to proceed to
mitigate the event. Since the entry conditions for both of the AP choices provided are met, the SRO must use knowledge of the content of the AP's to prioritize which AP should be performed first. 10 CFR 55.43(b)(5)

Job Level	Cognitive Level	QuestionType	Question Source
SRO	Comprehension	MODIFIED	ILT40 Q90

Development References

ILT40 Q90
EAP-APG obj R9
AP/9 & AP/18
OP/1502/09

Student References Provided

GEN2.3 2.3.15 - GENERIC - Radiation Control

Radiation Control

Knowledge of radiation monitoring systems, such as fixed radiation monitors and alarms, portable survey instruments, personnel monitoring equipment, etc. (CFR: 41.12 / 43.4 / 45.9)

401-9 Comments:

Remarks/Status

GEN2.3 2.3.11 - GENERIC - Radiation Control
Radiation Control
Ability to control radiation releases. (CFR: 41.11 / 43.4 / 45.10)

Given the following plant conditions:
Time = 0400

- Reactor power = 100%
- 1A GWD tank release in progress at 1/3 Station Limit

Time = 0415

- 3B GWD tank release initiated at 1/3 Station Limit

Time = 0430

- Loss of power to RM-80 skid of 1RIA-37 (Waste Gas Effluent Monitor)

1) In accordance with OP/3/A/1104/018 (GWD System) the release at 0415 is required to be approved by the __(1)__.

2) At 0430 and in accordance with the ARGs, an RO will __(2)__.

Which ONE of the following completes the statements above?

A. 1. Unit 3 CRS
2. manually close GWD-4

B. 1. Unit 3 CRS
2. verify GWD-4 has automatically closed

C. 1. SM only
2. manually close GWD-4

D. 1. SM only
2. verify GWD-4 has automatically closed

ILT48 ONS SRO NRC Examination QUESTION 98

98

D

General Discussion

Answer A Discussion

Incorrect. First part is incorrect. Plausible because it would be correct if the release was at 1/3 limit and only one release was in progress. Second part is incorrect. Plausible since it would be correct for loss of power to the 1RIA-45 RM-80 skid.

Answer B Discussion

Incorrect. First part is incorrect. Plausible because it would be correct if the release was at 1/3 limit and only one release was in progress. Second part is correct.

Answer C Discussion

Incorrect:. First part is correct. 2 Gaseous Waste Releases (GWRs) at 1/3 Station Limit requires Shift Manager (SM) approval. Second part is incorrect. Plausible since it would be correct for loss of power to the 1RIA-45 RM-80 skid.

Answer D Discussion

Correct:
2 Gaseous Waste Releases (GWRs) at 1/3 Station Limit requires Shift Manager (SM) approval.
Loss of power to the RIA (RM-80) skid causes any associated high alarm interlocks to actuate. In this case a loss of power to the RM-80 skid for 1RIA-37 causes GWD-4 to close to isolate the release.

Basis for meeting the KA

Question requires knowledge of the process for releasing a GWD gas tank including who has to approve the release.Understanding the process is paramount in the ability to control the release.

Basis for Hi Cog

Basis for SRO only

Per Clarification Guidance for SRO-only Questions:

Radiation hazards that may arise during normal and abnormal situations, including maintenance activities and various contamination conditions.

Process for gaseous/liquid release approvals, i.e., release permits. 10 CFR 55.43(b)(4)

Additionally this question is supported as SRO by an SRO ONLY objective in the WE-GWD lesson plan.

Job Level	Cognitive Level	QuestionType	Question Source
SRO	Comprehension	MODIFIED	ILT42 Q97

Development References

ILT42 Q97
OP/3/A/1104/18
ARG
WE-GWD Obj 07
RAD-RIA

Student References Provided

GEN2.3 2.3.11 - GENERIC - Radiation Control
Radiation Control
Ability to control radiation releases. (CFR: 41.11 / 43.4 / 45.10)

401-9 Comments:

Remarks/Status

New K/A

ILT48 ONS SRO NRC Examination QUESTION 99 99 **A**

GEN2.4 2.4.18 - GENERIC - Emergency Procedures / Plan
Emergency Procedures / Plan
Knowledge of the specific bases for EOPs. (CFR: 41.10 / 43.1 / 45.13)

Given the following Unit 1 conditions:
Time = 0000

- Reactor power = 75%
- All three seals on the1B1 RCP fail

Time = 0015

- SCM = 0ºF stable

Time = 0019

- 1A1 RCP remains operating
- LOSCM tab in progress
- Rapid depressurization of BOTH steam generators is in progress

1) The reason the 1A1 RCP is NOT secured at Time = 0019 is to __(1)__.

2) The MINIMUM condition(s) that will allow the section of the LOSCM tab to be performed that reinstates the requirement to adhere to Tech Spec cooldown rate limits is once __(2)__ is/are greater than 0 degrees F.

Which ONE of the following completes the statements above?

A. 1. prevent core uncovery that could result from phase separation if the RCP were secured
2. ALL subcooling margins

B. 1. provide forced circulation which enhances heat removal even with a two phase mixture
2. ALL subcooling margins

C. 1. prevent core uncovery that could result from phase separation if the RCP were secured
2. ANY subcooling margin

D. 1. provide forced circulation which enhances heat removal even with a two phase mixture
2. ANY subcooling margin

General Discussion

Answer A Discussion

Correct. If a RCP remains operating greater than 2 minutes after LOSCM occurs, then it is left on. Void fraction could be greater than 70% and if the pump is subsequently stopped,
phase separation will occur and the core could be uncovered. LOSCM tab will require holding at a WHEN step (39) until all SCM's are >0 before continuing.

Answer B Discussion

Incorrect. First part is incorrect. Plasuible because it would be correct if SCM was lost for < 2 minutes. Second part is correct

Answer C Discussion

Incorrect. First part is correct. Second part is plausible since there are various conditions in the EOP which take actions basesd soley on Core SCM (Ex. Transfer to ICC tab) and actions are taken based on any subcooling margin such as securing RCPs if any SCM is 0.

Answer D Discussion

Incorrect. First part is incorrect. Plasuible because it would be correct if SCM was lost for < 2 minutes.Second part is plausible since there are various conditions in the EOP which take actions basesd soley on Core SCM (Ex. Transfer to ICC tab) and actions are taken based on any subcooling margin such as securing RCPs if any SCM is 0.

Basis for meeting the KA

This question requires knowing the basis for specfic steps in the EOP.

Basis for Hi Cog

Basis for SRO only

This question requires assessing plant conditions using that assessment to determine if or when a section of the LOSCM tab can be performed.

Job Level	Cognitive Level	QuestionType	Question Source
SRO	Comprehension	BANK	ILT45 Q77

Development References

ILT45 Q77
EAP-LOSCM Obj. 15
EOP Rule 2

Student References Provided

GEN2.4 2.4.18 - GENERIC - Emergency Procedures / Plan
Emergency Procedures / Plan
Knowledge of the specific bases for EOPs. (CFR: 41.10 / 43.1 / 45.13)

401-9 Comments:

Remarks/Status

ILT48 ONS SRO NRC Examination **QUESTION 100** 100 **A**

GEN2.4 2.4.29 - GENERIC - Emergency Procedures / Plan
Emergency Procedures / Plan
Knowledge of the emergency plan. (CFR: 41.10 / 43.5 / 45.11)

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1) In accordance with RP/0/A/1000/002 (Control Room Emergency Coordinator Procedure) implementation of the OSAG __(1)__ require the use of 10CFR50.54(x) and(y) provisions.

2) If implemented, 10CFR50.54(x) will require the MINIMUM level of approval to be __(2)__ .

Which ONE of the following completes the statements above?

A. 1. does
2. a licensed SRO

B. 1. does
2. the Emergency Coordinator

C. 1. does NOT
2. a licensed SRO

D. 1. does NOT
2. the Emergency Coordinator

ILT48 ONS SRO NRC Examination QUESTION 100

100

A

General Discussion

Answer A Discussion

Correct. The first part of the question is correct in that any implementation of the OSAG requires a 10CFR50.54(x) declaration.
The second part of the question is correct in that the MINIMUM level of approval for a 10CFR50.54(x) situation, per 10CFR50.54(y) is a licensed SRO.

Answer B Discussion

Incorrect distractor. First part of distractor 'B' is correct, second part of distractor 'B' is incorrect. Second part of distractor 'B' is plausible because the Emergency Coordinator is the highest level authority on site during an emergency, is granted the authority to make a 50.54(x) declaration, and probably would be the decision-maker in this situation. However, technically speaking the second part of this distractor is incorrect because the Emergency Coordinator is not the MINIMUM required level of approval; instead, 10CFR50.54(y) specifies that the minimum level of authorization is a licensed SRO.

Answer C Discussion

Incorrect distractor. First part of distractor 'C' is incorrect, second part of distractor 'C' is correct. First part of distractor 'C' is plausible because no other directed procedural transition requires a 50.54(x) declaration. A SRO applicant may incorrectly believe that use of approved procedures (OSAG) is not a departure from the license basis condition, and therefore may choose this incorrect distractor.

Answer D Discussion

Incorrect distractor. Both parts of this distractor are incorrect. For plausibility descriptions, see above discussions of distractor 'B' and 'C.'

Basis for meeting the KA

This question matches the K/A in that, given an extreme emergency situation (similar to Fukushima Dai-ichi), the question requires the SRO applicant to demonstrate knowledge of the requirements associated with OSAG entry and implementation of 10CFR50.54(x) and (y). These decisions are associated with the Emergency Coordinator function in the Emergency Plan implementation procedures.

Basis for Hi Cog

Basis for SRO only

This question is linked to 10CFR55.43(b)(1), Conditions and limitations in the facility license, in that SRO-level authorization, at a minimum, is required to transition to the OSAG and declare a 10CFR50.54(x) condition. Licensed ROs are not allowed to make that determination.

Job Level	Cognitive Level	QuestionType	Question Source
SRO	Memory	BANK	ILT43 Q100

Development References

ILT43 Q100
EAP-SEP Obj. R10
RP/0/A/1000/002

Student References Provided

GEN2.4 2.4.29 - GENERIC - Emergency Procedures / Plan
Emergency Procedures / Plan
Knowledge of the emergency plan. (CFR: 41.10 / 43.5 / 45.11)

401-9 Comments:

Remarks/Status

Facility: **Oconee** Scenario No.: **1** Op-Test No.: 1

Examiners: ________________________ Operators: ________________________**SRO**

________________________ ________________________**OATC**

________________________ ________________________**BOP**

Initial Conditions:
- Reactor Power = 100%

Turnover:
- Feedwater valve DP selected to 1A1 and 1B2 for maintenance
- ICS Diamond and FDW Masters are in HAND for Control Rod Movement PT
- AMSAC/DSS bypassed

Event No.	Malfunction No.	Event Type*	Event Description
0a	Override		Standby (1B) HPI pump auto start
0b	Override		Standby EHC pump fails to Auto start
1		N: OATC, SRO	Control Rod Movement PT (GP 1 Only)
2	MPS120 Override	C: BOP, SRO **(TS)**	1A HPIP Sheared Shaft, 1B HPIP fails to start in AUTO
3	MCS008	I: OATC, SRO	Loop B Tc Fails low
4	Override	C: OATC, SRO **(TS)**	Group 1 Rod 6 Control Rod drops, manual power reduction
5	MPS190	C: BOP, SRO	Spray valve fails open
6	Override	C: BOP, SRO	Lowering EHC pressure, Standby EHC pump fails to start
7	MSS010 MSS020 MSS260 MSS270	M: ALL	LOHT • CBPs trip requiring HPI FC • 1C HPIP fails to start requiring RCS vents to be opened

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

Scenario 1

Event Summary

Event 1: The OATC will perform PT/1/A/0600/015, Encl. 13.2 (Control Rod Movement at Power). This will be performed for group 1 rods only.

Event 2: The 1A HPIP will experience a sheared shaft. Pump amps will decrease to approximately 10-15 amps, discharge pressure and flow will drop to ≈ 0. The 1B HPIP will not start in automatic requiring operator action. The crew will enter AP/14 (Loss of Normal HPI Makeup and/or RCP Seal Injection), close 1HP-5, 1HP-120 and 1HP-31 and start the 1B HPIP. The crew should then restore the system to normal and enter TS for loss of the 1A HPIP.

Event 3: Loop B Tc will fail low causing control rods to withdraw and feedwater demand to decrease. The crew should perform Plant Transient Response (PTR) and place the ICS Diamond and FDW Loop Masters in MANUAL. The crew will perform AP/28 (ICS Instrument Failures). ICS will remain in MANUAL for the rest of the scenario.

Event 4: Control Rod Group 1 Rod 6 will drop into the core. Because ICS is in MANUAL, the OATC will have reduce power in MANUAL to ≤ 55%.

Event 5: After the power reduction, 1RC-1 (Pzr Spray Valve) fails open and will reduce RCS pressure. This will require the operator to close the block valve (1RC-3) to stabilize RCS pressure.

Event 6: EHC pressure will start lowering. The standby EHC pump will fail to start at 1350 psig and the low pressure alarm will actuate at 1300 psig. The operators must start the standby EHC pump prior to a turbine trip on low EHC pressure.

Event 7: Condensate Booster Pumps trip, MFWPs subsequently trip, MD EFDW pumps will fail to start and the TD EFDW pump will overspeed and trip. The crew will not be able to feed the SGs before the criteria to perform Rule 4 (HPI Forced Cooling) is satisfied. The 1C HPIP will fail to start (degraded HPI) which will require the crew to open RCS vents and transfer to the HPI CD tab of the EOP.

Op-Test No.: **ILT48** Scenario No.: **1**	Event No.: **1**	Page 1 of 5
Event Description: **Control Rod Movement PT (N, OATC, SRO)**		

Time	Position	Applicant's Actions or Behavior
		PT/1/A/0600/015
	SRO	**Crew response:** SRO directs the OATC to perform PT/1/A/0600/015, Encl. 13.2 (Control Rod Movement at Power).
	OATC	**PT/1/A/0600/015, Encl. 13.2** Rev 26 3.1 **WHILE** enclosure is in progress, monitor the following indications: {8} • CRD position • Appropriate ranged NIs • RCS temperature • Neutron error 3.2 Ensure Rx Diamond and FDW Masters in Hand per Enclosure for Placing Rx Diamond/FDW Masters To Hand of OP/1/A/1102/004 A (ICS Operation).**(already in HAND)** 3.3 **IF AT ANY TIME** contingency actions directed by CRS, perform Section 4 (Contingency Actions) {4} **NOTE:** When operating switches on Diamond, maintain switch depressed until light indication changes state. 3.4 Perform the following: (R.M.) • Ensure SEQ OR is ON. • Ensure SAFETY RODS OUT BYPASS is ON. • Ensure RUN is ON. • Ensure SINGLE SELECT SWITCH selected to ALL. **NOTE:** CRD Groups 1-6 are required to be ≥ 95% withdrawn for Shutdown Margin Calculation at Power enclosure of PT/1/A/1103/015 (Reactivity Balance Procedure) to be valid. 3.5 **IF AT ANY TIME** any CRD Group 1-6 reaches 95% during insertion, stop inserting associated group. (R.M.)

This event is complete when the Control Rod Movement PT is complete and ICS is in Auto or when directed by the lead examiner.

Op-Test No.: **ILT48** Scenario No.: **1**	Event No.: **1**	Page 2 of 5
Event Description: **Control Rod Movement PT (N, OATC, SRO)**		

Time	Position	Applicant's Actions or Behavior
	OATC	***PT/1/A/0600/015*** **<u>Crew response</u>:** 3.6 Perform the following to test CRD Group 1: (R.M.) ___ 3.6.1 Ensure GROUP SELECT SWITCH to 1. ___ 3.6.2 Ensure Group 1 CONTROL ON lights are ON. (PI panel) {5} **NOTE:** • 1SA-2/C-10 "CRD Safety Rods Not At Upper Limit" will alarm when Safety Groups are inserted. • Control rods should **NOT** be left inserted. Rod withdrawal should commence immediately after insertion is complete. ___ 3.6.3 Perform the following: {3} A. Insert CRD Group 1. B. **WHEN** all 100% lights OFF, stop insertion. C. Begin Group 1 withdraw to 100%. **NOTE:** In RUN speed, all rod motion is inhibited 12 seconds after first rod reaches OUT LIMIT. D. **WHEN** OUT LIMIT is ON, maintain WITHDRAW until CRD TRAVEL “Out” light OFF. ___ 3.6.4 Verify all 100% lights are ON for Group 1. (PI Panel) ___ 3.6.5 Verify unit is stable. ***Examiner Note: Steps 3.7 – 3.13 test Control Rod Groups 2-8. When completing the PT on GP 1 Control Rods, they should proceed to step 3.14 to return ICS to AUTOMATIC.*** **NOTE:** When operating switches on Diamond, maintain switch depressed until light indication changes state. 3.14 Perform the following: (R.M.) • Ensure SEQ is ON. • Ensure GROUP SELECT SWITCH to OFF. • Ensure SAFETY RODS OUT BYPASS is OFF. 3.15 Return Rx Diamond and FDW Masters To Automatic per OP/1/A/1102/004 A (ICS Operation). **(Page 5)**

This event is complete when the Control Rod Movement PT is complete and ICS is in Auto or when directed by the lead examiner.

Op-Test No.: **ILT48**	Scenario No.: **1**	Event No.: **1**	Page 3 of 5
Event Description:	**Control Rod Movement PT (N, OATC, SRO)**		

Time	Position	Applicant's Actions or Behavior
	OATC	*OP/1/A/1102/004A Encl 4.1 (in progress)* **Crew Response:** **OP/1/A/1102/004A Encl 4.1** Rev10 2.9 **WHEN** required, place ICS back in auto as follows: 2.9.1 Ensure "RATE SET" thumbwheels at 0.0. 2.9.2 **IF** TURBINE MASTER is in manual ***[NA]*** 2.9.3 **IF** Rx Master is in "HAND" ***[NA]*** 2.9.4 **IF** DIAMOND is in manual, perform the following: A. Verify REACTOR MASTER in "AUTO". B. **IF** both SGs are off of Level Control, perform the following: 1. **IF** selected Tave (O1E2086) is different from Tave setpoint (O1E2087) by more than ± 0.15°F, perform the following: a. Simultaneously perform the following: • Ensure 1A FDW MASTER in "HAND" • Ensure 1B FDW MASTER in "HAND" **NOTE:** Cycling the setpoint selector may result in a Star Module failure. This is expected for this condition and entry into AP/1/A/1700/028 (ICS Instrument Failures) is **NOT** required. The Star Module failure shall be cleared before the ICS is returned to Auto. b. On REACTOR MASTER, cycle Tave setpoint selector between 565°F and 585°F five times. c. **IF** Star Module failed, perform the following: 1) Initiate Work Request to repair Star Module. 2) **WHEN** Star Module repaired, continue procedure. d. On REACTOR MASTER adjust Tave setpoint (O1E2087) toward selected Tave (O1E2086). 2. Verify selected Tave is within ± 0.15°F of Tave setpoint.

This event is complete when the Control Rod Movement PT is complete and ICS is in Auto or when directed by the lead examiner.

Op-Test No.: **ILT48**	Scenario No.: **1**	Event No.: **1**	Page 4 of 5
Event Description:	**Control Rod Movement PT (N, OATC, SRO)**		

Time	Position	Applicant's Actions or Behavior
		OP/1/A/1102/004A Encl 4.1
		<u>Crew Response</u>:
	OATC	C. **IF** either SG is on Level Control, adjust Tave setpoint (O1E2087) to 579°F.
		D. Place DIAMOND in "AUTO".
		2.9.5 Ensure STM GENERATOR MASTER in "AUTO".
		2.9.6 **IF** 1A **OR** 1B FDW Master is in "HAND", perform the following:
		A. Perform the following: • Select 1A FDW MASTER to "MEAS VAR" • Select 1B FDW MASTER to "MEAS VAR"
		B. **IF** 1A **OR** 1B FDW Master Measured Variable is **NOT** on the caret, perform the following: 1. Initiate Work Request to repair. 2. **WHEN** repairs are complete, continue procedure.
		C. Verify the following: • 1A FDW MASTER Measured Variable on the caret • 1B FDW MASTER Measured Variable on the caret
		D. Perform the following: • Select 1A FDW MASTER to "POS" • Select 1B FDW MASTER to "POS"
		E. Simultaneously perform the following: • Select 1A FDW MASTER to "AUTO" • Select 1B FDW MASTER to "AUTO"

This event is complete when the Control Rod Movement PT is complete and ICS is in Auto or when directed by the lead examiner.

Op-Test No.: **ILT48**	Scenario No.: **1**	Event No.: **1**	Page 5 of 5
Event Description:	**Control Rod Movement PT (N, OATC, SRO)**		

Time	Position	Applicant's Actions or Behavior
	OATC	***OP/1/A/1102/004A Encl 4.1*** **<u>Crew Response</u>:** **CAUTION:** Adjusting THP, Tave or Delta Tc setpoint too fast can cause plant instability. 2.10 **IF NOT** being controlled by another procedure, perform the following: 2.10.1 **IF** THP (O1E2088) is **NOT** ≈ 885 psig, slowly adjust THP Setpoint (O1E2089) to ≈ 885 psig. (R.M.) 2.10.2 **IF** Tave Setpoint (O1E2087) is **NOT** at ≈ 579°F, slowly adjust Tave setpoint to ≈ 579°F. (R.M.) 2.10.3 **IF** Delta Tc is **NOT** ≈ 0.0, adjust Delta Tc Setpoint (O1E2091) to ≈ 0.0°F. (R.M.) 2.11 **IF** desired adjust CTP as follows: (R.M.) 2.11.1 Review current mechanical maneuvering rates per PT/0/A/1103/020 (Power Maneuvering Predictions). 2.11.2 **IF** desired to increase power, perform the following: A. **WHEN** ICS has been in full Auto (Integrated Mode) for > 10 minutes, continue at Step 2.11.3. {6} 2.11.3 Ensure selected "HOLD". 2.11.4 Ensure desired setting selected ("%/MIN" or "%/HR") on "RATE" pushbuttons. 2.11.5 Ensure desired rate selected on "RATE SET" thumbwheels. 2.11.6 Insert desired CTPD SET using "INCREASE/DECREASE" pushbuttons. 2.11.7 Ensure "HOLD" is **NOT** selected. 2.11.8 **WHEN** desired CTP is achieved, return "RATE SET" thumbwheels to 0.0.

This event is complete when the Control Rod Movement PT is complete and ICS is in Auto or when directed by the lead examiner.

Op-Test No.: **ILT48**	Scenario No.: **1**	Event No.: **2**	Page 1 of 3
Event Description:	**A HPIP Sheared Shaft, B HPIP fails to start in AUTO (C: BOP, SRO)(TS)**		

Time	Position	Applicant's Actions or Behavior
	SRO/BOP	***AP/1/A/1700/014*** **<u>Plant Response</u>:** • 1SA-2/B-2 (HP RCP Seal Injection Flow High/Low) • 1SA-2/C-2 (HP Injection Pump Disch. Header Pressure High/Low) • RC Makeup Flow = ~0 gpm • RCP SI flow = ~0 gpm • 1A HPI Pump amps low = ~10 amps • PZR level will begin to decrease and LDST level will begin to increase • 1HP-120 throttles open due to PZR level decrease **<u>Crew Response</u>:** BOP may refer to ARGs (Both ARGs direct referral to AP/14) SRO will refer to AP/1/A/1700/014 **<u>AP/1/A/1700/014</u>** Rev 18 **<u>Immediate Manual Actions</u>** 3.1 **IAAT** RCP seal injection flow is lost, **AND** Component Cooling is lost, **THEN** perform the following: A. __ Trip the Rx. B. __ Stop all RCPs. C. __ Initiate AP/25 (SSF EOP). 3.2 **IAAT** loss of suction to operating HPI pumps is indicated: • Motor amps low or cycling • Discharge pressure low or cycling • Abnormal LDST level trend **THEN GO TO** Step 3.3. **RNO: GO TO** Step 4.7 ***Examiner Note: Crew should diagnose a sheared shaft and proceed to step 4.7.*** **<u>Supplemental Actions</u>** 4.7 Announce AP entry using PA System.

This event is complete when 1HP-31 is placed in AUTO or when directed by the Lead Examiner.

Op-Test No.: **ILT48**	Scenario No.: **1**	Event No.: **2**	Page 2 of 3
Event Description:	**A HPIP Sheared Shaft, B HPIP fails to start in AUTO (C: BOP, SRO)(TS)**		

Time	Position	Applicant's Actions or Behavior
	BOP	***AP/1/A/1700/014*** **<u>Crew Response</u>:** 4.8 Verify any HPI pump operating. **[With a sheared shaft on the A HPIP, this step should be interpreted as no HPIPs operating]** **RNO:** 1. __ Close 1HP-5. 2. __ Place 1HP-120 in HAND and close. 3. __ Place 1HP-31 in HAND and close. 4. __ Attempt to start the standby HPI pump. 5. __ **IF** standby HPI pump started, **THEN GO TO** Step 4.111. 6. __ **GO TO** Step 4.14. 4.111 Place 1HP-31 in HAND. 4.112 Slowly open 1HP-31 in small increments until ~ 8 gpm/RCP is achieved. 4.113 Re-establish normal makeup through 1HP-120. 4.114 Ensure proper operation of the Component Cooling System. 4.115 Reduce 1HP-7 demand to 0%. 4.116 Close 1HP-6. 4.117 Open the following: __ 1HP-1 __ 1HP-2 __ 1HP-3 __ 1HP-4 4.118 Open 1HP-5. 4.119 Throttle open 1HP-7 for ≈ 20 gpm letdown flow. 4.120 Open 1HP-6. 4.121 Adjust 1HP-7 for desired letdown flow.

This event is complete when 1HP-31 is placed in AUTO or when directed by the Lead Examiner.

Op-Test No.: **ILT48**	Scenario No.: **1**	Event No.: **2**	Page 3 of 3
Event Description:	**A HPIP Sheared Shaft, B HPIP fails to start in AUTO (C: BOP, SRO)(TS)**		

Time	Position	Applicant's Actions or Behavior
	BOP	***AP/1/A/1700/014*** **Crew Response:** 4.122 Open the following: __ 1HP-228 __ 1HP-226 __ 1HP-232 __ 1HP-230 4.123 Open 1HP-21. 4.124 **IAAT** SEAL INLET HDR FLOW ~ 32 gpm, **THEN** place 1HP-31 in AUTO. 4.125 Monitor RCP seal parameters. 4.126 Maintain RCP seal injection flows as required. 4.127 Log thermal cycle of 1A HPI header. 4.128 **WHEN** conditions permit, **THEN EXIT** this procedure. **TS 3.5.2 HIGH PRESSURE INJECTIN (HPI)** Condition A.1 (72 hours) Restore HPI pump to OPERABLE status.

This event is complete when 1HP-31 is placed in AUTO or when directed by the Lead Examiner.

Op-Test No.: **ILT48** Scenario No.: **1** Event No.: **3** Page 1 of 3

Event Description: **Loop B Tc Fails low (I: OATC, SRO)**

Time	Position	Applicant's Actions or Behavior
	SRO/OATC	***AP/1/A/1700/028*** **Plant Response**: • Loop "1B" Tc Dixson meter low (520°F) • Loop "1B" ΔT Dixson meter reads 70°F • ΔTc meter reads low (+10°F; "A" loop Hot) • Controlling NR Tave digital display reads ≈ 570°F • Controlling Tave Chessell display reads ≈ 570°F • 1SA-2/B4 (RC Average Temperature High/Low) • 1SA-2/B-5, RC COLD LEG DIFF TEMP HIGH • 1SA-2/A-12, ICS Tracking **Crew Response**: • When the Statalarms are received, the candidates should utilize the "Plant Transient Response" process to stabilize the plant. • Verbalize to the CRS reactor power level and direction of movement. • Place the Diamond and both FDW Masters in manual and position as necessary to stabilize the plant. ***Note: The OATC will have to re-ratio FDW to maintain ΔTc 0°F ± 2 °F.*** • The CRS should: ➢ Refer to AP/28, ICS Instrument Failures ➢ Ensure SPOC is contacted to repair the failed instrument. . **AP/1/A/1700/028, ICS Instrument Failures** Rev 20 4.1 Provide control bands as required. **(OMP 1-18 Att. I)** ***OMP 1-18 Attachment I:*** ***1. Plant Conditions Stable or TPB ≤ Pre-transient Conditions*** • ***NI Power ± 1% not to exceed the pre-transient or allowable power. If at the pre-transient or allowable level, band is NI Power – 1%.*** • ***Current Tave ± 2 °F.*** • ***Current SG Outlet Pressure ± 10 PSIG (N/A)*** • ***Delta Tc 0 °F ± 2 °F.***

This event is complete when the CRS reaches step 6 (WHEN) in AP/28 Section 4A, or as directed by the Lead Examiner.

Op-Test No.: **ILT48** Scenario No.: **1** Event No.: **3** Page 2 of 3

Event Description: **Loop B Tc Fails low (I: OATC, SRO)**

Time	Position	Applicant's Actions or Behavior
		AP/1/A/1700/028
		Crew Response:
	SRO/OATC	4.2 Initiate notification of the following: OSM to reference the following: • OMP 1-14 (Notifications) • Emergency Plan STA
		4.3 Verify a power transient ≥ 5% has occurred. **RNO: GO TO** Step 4.5.
		4.4 Notify Rx Engineering and discuss the need for a maneuvering plan.
		4.5 Use the following, as necessary, to determine the applicable section from table in Step 4.6: • OAC alarm video • OAC display points • Control Board indications • SPOC assistance, as needed
		4.6 **GO TO** the applicable section per the following table:

	Section	Failure
	4A	RCS Temperature

AP/1/A/1700/028, Section 4A, RCS Temperature Failure

NOTE

- If Tave instrument circuit failed high, the following may have occurred depending on initial ICS station status:
  - Unit to TRACK due to Rx Cross Limits
  - Control Rod insertion
  - Feedwater flow increase
- If Tave instrument circuit failed low, the following may have occurred depending on initial ICS station status:
  - Unit to TRACK due to Rx Cross Limits
  - Control Rod withdrawal
  - Feedwater flow decrease
  - Feedwater re-ratio

This event is complete when the CRS reaches step 6 (WHEN) in AP/28 Section 4A, or as directed by the Lead Examiner.

Op-Test No.: **ILT48**	Scenario No.: **1**	Event No.: **3**	Page 3 of 3
Event Description: **Loop B Tc Fails low (I: OATC, SRO)**			

Time	Position	Applicant's Actions or Behavior
	SRO/OATC	***AP/1/A/1700/028*** **Crew Response**: 1. Ensure the following in HAND: __ 1A FDW MASTER __ 1B FDW MASTER 2. Ensure DIAMOND in MANUAL. 3. Notify SPOC to perform the following: __ Select a valid RCS Tave and Delta Tc input to ICS per AM/1/A/0326/020 (Control of Unit 1 Star Module Signal Selection Function). __ Investigate and repair the failed RCS temperature instrumentation. 4. **PERFORM** an instrumentation surveillance using applicable table in Encl 5.2 (ICS Instrument Surveillances) for the failed instrument. 5. Verify instrumentation surveillance in Encl 5.2 (ICS Instrument Surveillances) was performed satisfactorily as written. **RNO:** Initiate a Surveillance Evaluation in accordance with PT/1/A/0600/001 (Periodic Instrument Surveillance) and OP/1/A/1105/014 (Control Room Instrumentation Operation And Information). 6. **WHEN** notified by SPOC that a valid RCS Tave and Delta Tc input have been restored to ICS, **THEN GO TO** OP/1/A/1102/004 A Encl (Placing ICS Stations To Auto).

This event is complete when the CRS reaches step 6 (WHEN) in AP/28 Section 4A, or as directed by the Lead Examiner.

Op-Test No.: **ILT48** Scenario No.**: 1** Event No.**: 4** Page 1 of 7

Event Description**: Group 1 Rod 6 Control Rod drops requiring Manual power reduction (C: OATC, SRO) (TS)**

Time	Position	Applicant's Actions or Behavior
	SRO/OATC	***AP/1/A/1700/001*** **Plant Response**: • Group 1 Rod 6 drops into the core • Statalarm 1SA-2/A-10 (CRD GLOBAL SYSTEM FAULT) • Statalarm 1SA-2/B-10 (CRD ASYMMETRIC ROD POSITION ERROR) • Statalarm 1SA-2/D-9 (CRD OUT INHIBIT) • Statalarm 1SA-4/C-1 (QUADRANT POWER TILT) (**in at ≈ 2 minutes**) • Statalarm 1SA-5/A-5 (1A RPS TROUBLE) • Statalarm 1SA-5/D-5 (1D RPS TROUBLE) **Crew Response**: Crew should perform Plant Transient Response (PTR) and determine that no manual FDW adjustments are required and that a runback condition exists but due to ICS being in manual it is not occurring. • OATC reports to the SRO reactor power level and direction of movement. • The BOP reports expected AUTO Runback did not occur, and monitors RCS pressure and inventory and inserts Control Rods as needed. • The OATC will adjust FDW and/or control rods as necessary to restore reactor power to the desired control band. SRO should enter AP/1/A/1700/001 (Unit Runback) **AP/1/A/1700/001** Rev 15 4.1 **GO TO** the most limiting section per the following table: (table below) **Section 4H** 1. **IAAT** a more limiting runback occurs, **THEN GO TO** Subsequent Actions Step 4.1. 2. **IAAT** more than one control rod is dropped or misaligned ≥ 6.5% (9″) from the group average, **THEN** trip the Rx.

√	Section	Runback
	4H	Asymmetric Control Rod (1%/min to 55%power)

This event is complete when Rx Power has decreased to < 55%, or as directed by the lead examiner.

Op-Test No.: **ILT48** Scenario No.: **1** Event No.: **4** Page 2 of 7

Event Description: **Group 1 Rod 6 Control Rod drops requiring Manual power reduction (C: OATC, SRO) (TS)**

Time	Position	Applicant's Actions or Behavior
	SRO/OATC	***AP/1/A/1700/001*** **NOTE** NIs should **NOT** be calibrated per guidelines contained in OP/1/A/1102/004 (Operation at Power) due to actual power re-distribution within the core as a result of a dropped/misaligned rod. 3. Verify Rx is critical. 4. Verify power > 55% when the rod was dropped or misaligned. 5. Verify Rx runback to 55% core thermal power in progress. • CTPD set at 55% • ASYMETRIC RODS Runback Light lit • CTP Demand decreasing • Reactor power will decrease when the runback catches up with the initial power decrease from the dropped rod. **RNO:** 1. Initiate power reduction to ≤ 55% core thermal power at ≥ 1%/min. 2. **IF** control rods will not insert manually, **THEN** perform the following: A. Trip reactor. B. **GO TO** Unit 1 EOP. 6. Initiate Encl 5.1 (Control of Plant Equipment During Shutdown). (**Page 19**) **NOTE:** The following actions should be performed as quickly as possible due to the complexity of resetting RPS trip setpoints and Tech Spec time limits. 7. Notify SPOC to perform the following: __ Investigate cause of dropped or misaligned control rod. __ Prepare to reduce the following trip setpoints: • RPS Flux/Flow-Imbalance • RPS High Flux

This event is complete when Rx Power has decreased to < 55%, or as directed by the lead examiner.

Op-Test No.: **ILT48** Scenario No.: **1** Event No.: **4** Page 3 of 7

Event Description: **Group 1 Rod 6 Control Rod drops requiring Manual power reduction (C: OATC, SRO) (TS)**

Time	Position	Applicant's Actions or Behavior
	SRO/OATC	*AP/1/A/1700/001* **Crew Response:** 8. Notify the OSM to ensure the requirements of the following Tech Specs are met: __ TS 3.1.4 (Control Rod Group Alignment Limits) __ TS 3.1.5 (Safety Rod Position Limits) __ TS 3.2.3 (Quadrant Power Tilt) ***Booth Cue*: When SM is contacted, inform the team that the SM is occupied on Unit 3 and cannot verify TS requirements at this time.** 9. __ Notify OSM to make notifications as required per OMP 1-14 (Notifications). 10. __ Verify > 1% SDM with allowance for the inoperable control rod per PT/1/A/1103/015 (Reactivity Balance Calculation) within one hour. ***Examiner Note: Shutdown Margin will be adequate*** 11. Reduce core thermal power ≤ the following limits, based on the number of RCPs operating, within two hours: RCPs — Allowable Thermal Power (% FP) 3 — 45 **4 — 60** **NOTE** The following ensures adequate margin in preparation for resetting RPS trip setpoints. 12. __ **IAAT** the power decrease is complete, **AND** any NI is > the following: RCPs — Maximum NI Power (% FP) 3 — 40 **4 — 55** **THEN** reduce power until all NIs are ≤ the Maximum NI Power limit for the operating RCP combination per Encl 5.4 (Power Reduction).

This event is complete when Rx Power has decreased to < 55%, or as directed by the lead examiner.

Op-Test No.: **ILT48** Scenario No.: **1** Event No.: **4** Page 4 of 7

Event Description: **Group 1 Rod 6 Control Rod drops requiring Manual power reduction (C: OATC, SRO) (TS)**

Time	Position	Applicant's Actions or Behavior
	SRO/OATC	***AP/1/A/1700/001*** **Crew Response:** 13. **WHEN** all NIs are ≤ the Maximum NI Power limit for the operating RCP combination, **THEN** notify SPOC to reduce RPS trip setpoints per AM/1/A/0315/017 (TXS RPS Channel A, B, C, And D Parameter Changes For Abnormal/Normal Operating Conditions.) **NOTE** Due to the power decrease initiated in this AP, the current plant configuration must be compared to the normal plant configuration in OP/1/A/1102/004 (Operation at Power) power reduction enclosure. Equivalent steps performed by this AP should be signed off as intent met. Any steps **NOT** performed by this AP must be evaluated in preparation for power increase or continued shutdown. 14. Initiate OP/1/A/1102/004 (Operation at Power) power reduction enclosure. **NOTE** The following will prevent a potential MODE change from MODE 2 to MODE 1 if unit power stabilizes ≤ 5%. 15. **IAAT** reactor power is ≤ 5%, **THEN GO TO** the following as necessary to shutdown the reactor prior to rod recovery. • OP/1/A/1102/10 (Controlling Procedure for Unit Shutdown) • OP/1/A/1102/004 (Operation at Power) 16. **IAAT** another runback has or should have occurred, **THEN GO TO** Subsequent Actions. 17. **WHEN** the control rod is repaired, **THEN** perform the following: A. __ Notify Duty Reactor Engineer for any necessary maneuvering limits. B. __ **GO TO** OP/1/A/1105/019 (Control Rod Drive System) to recover the control rod.

This event is complete when Rx Power has decreased to < 55%, or as directed by the lead examiner.

Op-Test No.: **ILT48**	Scenario No.: **1**	Event No.: **4**	Page 5 of 7

Event Description: **Group 1 Rod 6 Control Rod drops requiring Manual power reduction (C: OATC, SRO) (TS)**

Time	Position	Applicant's Actions or Behavior
		AP/1/A/1700/001
		Crew Response:
	SRO	**TS 3.1.4 CONTROL ROD GROUP ALIGNMENT LIMITS** Condition A (1hour) Restore control rod alignment or verify SDM (2 hours) Reduce Thermal Power to $\leq$ 60% of allowable Thermal Power. (10 hours) RPS trip setpoints must be reduced based on flux and flux/flow imbalance to $\leq$ 65.5% of the allowable thermal power. **TS 3.1.5 SAFETY ROD POSITION LIMITS** Condition A (1 hour) Verify SDM and declare associated control rod INOPERABLE. **TS 3.2.3 QUADRAND POWER TILT** Condition A if QPT exceeds +3.5 (10 hours) RPS trip setpoints must be reduced $\geq$ 2% RTP for each 1% of QPT greater than the steady state limit (24 hours) QPT restored to less than or equal to the steady state limit **TS 3.10.1 STANDBY SHUTDOWN FACILITY (SSF)** Conditions A-E (7 days) Restore to operable status
		Once Reactor Power is reduced to below 85% the SSF must be declared inoperable and therefore Tech Spec 3.10.1 applies. Conditions A-E should be entered.

This event is complete when Rx Power has decreased to < 55%, or as directed by the lead examiner.

Op-Test No.: **ILT48**	Scenario No.: **1**	Event No.: **4**	Page 6 of 7

Event Description: **Group 1 Rod 6 Control Rod drops requiring Manual power reduction (C: OATC, SRO) (TS)**

Time	Position	Applicant's Actions or Behavior
		AP/1/A/1700/001
	SRO/OATC BOP	**AP/1/A/1700/001 Enclosure 5.1** 1. **IAAT** SRO determines all appropriate actions have been taken, **AND** the runback is complete, **THEN EXIT** this Enclosure. 2. Notify the WCC SRO to initiate Enclosure 5.2 (WCC SRO Support During Unit Runback). 3. Start the following pumps: __ 1A FDWP SEAL INJECTION PUMP __ 1A FDWP AUXILIARY OIL PUMP __ 1B FDWP AUXILIARY OIL PUMP __ 1B FDWP SEAL INJECTION PUMP 4. **WHEN** CTP $\leq$ 80%, **THEN** stop the following pumps: {3} {4} __ 1E1 HTR DRN PUMP __ 1E2 HTR DRN PUMP 5. **WHEN** CTP ≤ 65%, **THEN** continue this Enclosure. 6. Place the following in MANUAL and close: __ 1FDW-53 __ 1FDW-65
		NOTE: 1B FDWP is the preferred pump to shut down first.
		7. Verify both Main FDWPs operating. 8. Verify 1B FDWP to be shut down first. 9. Adjust the FWP bias counter-clockwise to lower 1B FWP suction flow ≈1 x 10^6 lb/hr < 1A FWP suction flow. 10. **GO TO** Step 12.

This event is complete when Rx Power has decreased to < 55%, or as directed by the lead examiner.

Op-Test No.: **ILT48** Scenario No.: **1** Event No.: **4** Page 7 of 7

Event Description: **Group 1 Rod 6 Control Rod drops requiring Manual power reduction (C: OATC, SRO) (TS)**

Time	Position	Applicant's Actions or Behavior
	SRO/OATC BOP	*AP/1/A/1700/001* **Crew Response:** 12. **IAAT** both Main FDW pumps running, **AND** both of the following exist: __ 1B Main FDW pump is first pump to be shut down __ Any of the following alarms occur: • 1SA-16/A-3 (FWP B FLOW MINIMUM) • 1SA-16/A-4 (FWP B FLOW BELOW MIN), **THEN** trip 1B Main FDW Pump. 13. **IAAT** both Main FDW pumps running, **AND** both of the following exist: __ 1A Main FDW pump is first pump to be shut down __ Any of the following alarms occur: • 1SA-16/A-1 (FWP A FLOW MINIMUM) • 1SA-16/A-2 (FWP A FLOW BELOW MIN), **THEN** trip 1A Main FDW Pump. 14. **IAAT** the operating FDWP suction flow < 1.5 x 106 lb/hr, **THEN** slowly throttle the associated recirc control valve to establish 2300 - 6000 gpm total Condensate flow: • 1FDW-53 • 1FDW-65 15. Maintain Pzr level between 220” - 250″. 16. **IAAT** load is ≤ 550 MWe, **THEN** perform Steps 17 - 18. 17. Stop the following: {3} __ 1A MSRH DRN PUMP __ 1B MSRH DRN PUMP 18. Place the following in DUMP: {3} __ 1HD-37 __ 1HD-52

This event is complete when Rx Power has decreased to < 55%, or as directed by the lead examiner.

Op-Test No.: **ILT48**	Scenario No.: **1**	Event No.: **5**	Page 1 of 2
Event Description:	**Spray valve fails open (C: BOP, SRO)**		

Time	Position	Applicant's Actions or Behavior
		AP/1/A/1700/044
		Plant Response: • RCS pressure decreasing below 2155 psig • 1RC-1 Indicates OPEN • 1SA-2/D-3, RC PRESS HIGH/LOW
	SRO/BOP	**Crew Response**: • BOP should recognize that 1RC-1 is open and push the CLOSE pushbutton (This is an IMA in AP/44) • SRO should direct entry into AP/1/A/1700/044 Abnormal Pressurizer Pressure Control
		AP/1/A/1700/044 Abnormal Pressurizer Pressure Control Rev 4
		IMAs
		3.1 **IAAT** PORV is open, **AND** RC pressure is < setpoint (2400 psig (HIGH) or 480 psig (LOW)), **THEN** close 1RC-4.
	CT-1	3.2 **IAAT** RC pressure < 2155 psig, **AND** 1RC-1 indicates open, **THEN** select 1RC-1 to CLOSE. **[1RC-1 Will NOT close]**
		3.3 **IAAT** all the following conditions exist: __ RC pressure < 2155 psig __ RC pressure decreasing without a corresponding decrease in PZR Level **THEN** close 1RC-3.
		Subsequent Actions
		4.1 Announce AP entry using the PA system.
		4.2 **GO TO** the applicable step per the following table:

	Failure Caused RCS Pressure	Step
	Decrease	4.3
	Increase	4.18

Examiner Note: TS 3.4.1 may apply depending on crew response to the failure.

TS 3.4.1, REACTOR COOLANT SYSTEM
Condition A (2 hours) Restore RCS DNB parameter(s) to within limit.
COLR DNB Limit = 2125 psig

This event is complete when the BOP closes 1RC-3 and stabilizes RCS pressure, or as directed by the Lead Examiner.

Op-Test No.: **ILT48** Scenario No.: **1** Event No.: **5** Page 2 of 2
Event Description: **Spray valve fails open (C: BOP, SRO)**

Time	Position	Applicant's Actions or Behavior
	SRO/BOP	*AP/1/A/1700/044* **Crew Response:** 4.3 Verify 1RC-4 is closed. **RNO**: **IF** PORV is open, **AND** 1RC-4 has failed to close, **THEN** perform the following: A. __ Dispatch an operator to open 1DIB Panelboard breaker #24. B. __ Manually trip the reactor. C. __ Initiate AP/02 (Excessive RCS Leakage). 4.4 Verify 1RC-3 is closed. **RNO**: 1. __ **IF** RC pressure is uncontrollable, **THEN GO TO** Step 4.7. 2. __ **IF** 1RC-1 is selected to CLOSE, **THEN** maintain RC pressure within desired band with 1RC-1 in manual control. 3. __ **GO TO** Step 4.13. 4.13 Verify PZR heaters maintaining RCS pressure within desired band. 4.14 Notify SPOC to repair malfunctioning component. 4.15 Ensure requirements of following are met: __ TS 3.4.1 (RCS Pressure, Temperature, and Flow Departure from Nucleate Boiling Limits) __ TS 3.4.9 (Pressurizer) __ TS 3.4.12 (Low Temperature Overpressure Protection System) __ SLC 16.5.1 (Reactor Coolant System Vents) 4.16 **WHEN** repairs complete, **THEN** place following components in desired position for current plant conditions as determined by CR SRO: __ 1RC-1 __ 1RC-3 __ 1RC-4 __ PZR heater bank #1 __ PZR heater bank #2 __ PZR heater bank #3 __ PZR heater bank #4 4.17 __ **WHEN** directed by CR SRO, **THEN EXIT** this procedure.

This event is complete when the BOP closes 1RC-3 and stabilizes RCS pressure, or as directed by the Lead Examiner.

Op-Test No.: **ILT48** Scenario No.: **1** Event No.: **6** Page 1 of 1

Event Description: **Lowering EHC pressure, Standby EHC pump fails to start (C: BOP,SRO)**

Time	Position	Applicant's Actions or Behavior
	SRO/BOP	***1SA-3/E-2*** **Plant Response**: • 1SA-3/E-2 EHC Hydraulic Header Pressure Low **Crew Response**: • SRO will direct the BOP to refer to the ARG: **1SA-3/E-2** **NOTE:** Standby pump starts at 1350 psig decreasing. 3.1 Verify standby pump is running. ***Examiner Note: Per AD-OP-ALL-1000, Conduct of Operations, Section 5.17.2 Expectations: Written procedures are not necessary for situations where: (3) Conditions exist which may require timely actions due to failure of automatic control systems.*** ***In this situation, the standby EHC pump should be started in order to prevent an automatic Turbine/Reactor trip due to low EHC pressure.***

This event is complete when the STBY EHC pump is started, or when directed by the lead examiner.

Op-Test No.: **ILT48** Scenario No.: **1** Event No.: **7** Page 1 of 11

Event Description: **LOHT (M: All)**

Time	Position	Applicant's Actions or Behavior
	SRO	**Plant Response**: • Both MFWPs trip • Reactor Trips • MD EFDWPs do NOT start • TD EFDWP overspeeds and trips **Crew Response**: • SRO directs the OATC to perform IMAs and the BOP to perform a Symptom Check • If the RCS saturates, the crew will perform Rule 2 (Loss of SCM) (**Page 27**)
	OATC	***IMAs*** ***EOP Immediate Actions*** Rev 40 3.1 Depress REACTOR TRIP pushbutton. 3.2 Verify reactor power < 5% FP and decreasing. 3.3 Depress the turbine TRIP pushbutton 3.4 Verify all turbine stop valves closed. 3.5 Verify RCP seal injection available.
	BOP	***SYMPTOM CHECK*** The BOP will verify the following:

Power Range NIs **NOT** < 5% Power Range NIs **NOT** decreasing	Rule 1, *ATWS/Unanticipated Nuclear Power Production*
Any SCM < 0°F	Rule 2, *Loss Of SCM*
Loss of Main and Emergency FDW (including unsuccessful manual initiation of EFDW)	Rule 3, *Loss of Main or Emerg FDW* Rule 4, *Initiation of HPI Forced Cooling* (Inability to feed SGs and > 2300 psig, NDT limit reached, or PZR level > 375")
Uncontrolled Main steam line(s) pressure decrease	Rule 5, *Main Steam Line Break*
CSAE Offgas alarms Process monitor alarms (RIA-40, 59,60), Area monitor alarms (RIA-16/17)	None (SGTR Tab is entered when identified SG Tube Leakage > 25 gpm)

BOP will perform Rule 3 due to a loss of ALL feedwater: (**Page 26**)

SRO will review IMAs and transfer to the Subsequent Actions Tab.

This event is complete as directed by the Lead Examiner.

Op-Test No.: **ILT48**	Scenario No.: **1**	Event No.: **7**	Page 2 of 11
Event Description: **LOHT (M: All)**			

Time	Position	Applicant's Actions or Behavior
	SRO/OATC	***SUBSEQUENT ACTIONS TAB*** **Crew Response**: • The SRO will transfer to the Subsequent Actions tab of the EOP and review the Parallel Action (Yellow) page.(**Page 44**) • The SRO will transfer to the Loss of Heat Transfer (LOHT) tab due to the loss of Main and Emergency feedwater. ***LOHT TAB*** 1. Ensure Rule 3 (Loss of Main or Emergency FDW) is in progress or complete. **NOTE** Transfer to LOSCM tab is **NOT** required if RCS heats to the point where core SCM = 0°F. 2. **IAAT** the RCS heats to the point where core SCM = 0°F, **THEN GO TO** Step 4. 3. **IAAT NO** SGs can be fed with FDW (Main/CBP/Emergency/PSW), **AND** any of the following exists: __ RCS pressure reaches 2300 psig **OR** NDT limit __ Pzr level reaches 375″ [340″ acc] **THEN GO TO** Step 4. **RNO**: **NOTE** 1A1 RCP provides the best Pzr spray. 1. Reduce operating RCPs to one pump/loop. 2. **WHEN** any exists: __ EFDW or PSW SG feed flow has been re-established by existing Rules/Enclosures __ EFDW aligned from another unit __ Operator performing Rule 3 (Loss of Main or Emergency FDW) or Encl 5.27 (Alternate Methods for Controlling EFDW Flow) reports EFDW available **THEN GO TO** Step 50. ***Examiner Note: The SRO will remain at this point of the procedure until RCS pressure = 2300 at which time IAAT step 3 will apply which will direct the SRO to GO TO step 4 (Page 29).***
This event is complete when the SRO has transferred to the HPI CD tab, or as directed by the Lead Examiner.		

Op-Test No.: **ILT48** Scenario No.: **1** Event No.: **7** Page 3 of 11

Event Description: **LOHT (M: All)**

Time	Position	Applicant's Actions or Behavior
	BOP	***Rule 3*** **Crew Response** 1. Verify loss of MFDW and/or EFDW was due to any of the following: __ Turbine Building Flooding __ Actions taken to increase SG level due to Turbine Building Flooding **RNO**: **GO TO** Step 3. 3. **IAAT NO** SGs can be fed with FDW (Main/CBP/Emergency/PSW), **AND** any of the following exist: __ RCS pressure reaches 2300 psig **OR** NDT limit __ Pzr level reaches 375″ [340″ acc] **THEN PERFORM** Rule 4 (Initiation of HPI Forced Cooling). 4. Start operable EFDW pumps, as required, to feed all intact SGs. 5. Verify any EFDW pump operating. **[No EFDW pumps will be operating]** **RNO**: **GO TO** Step 7. 7. Place in MANUAL and close: __ 1FDW-315 __ 1FDW-316 8. Verify both: __ Any CBP operating **[None will be operating]** __ TBVs available on an intact SG **RNO: GO TO** Step 16 16. Verify 1 TD EFDW PUMP is operable and available for manual start. **RNO**: __ **GO TO** Step 18. 18. Verify cross-tie with Unit 2 is desired. 19. Dispatch an operator to open: __ 2FDW-313 (2A EFDW Line Disch To 2A S/G X-Conn) __ 2FDW-314 (2B EFDW Line Disch To 2B S/G X-Conn)

This event is complete when the SRO has transferred to the HPI CD tab, or as directed by the Lead Examiner.

Op-Test No.: **ILT48**	Scenario No.: **1**	Event No.: **7**	Page 4 of 11
Event Description: **LOHT (M: All)**			

Time	Position	Applicant's Actions or Behavior
		Rule 3
		Crew Response:
	BOP	20. Dispatch an operator to 1FDW-313 and have them notify the CR when in position.
		21. Notify alternate unit to: A. __ Place both EFDW control valves in manual and closed. B. __ Start their TD EFDW PUMP.
		22. **IAAT** SGs are **NOT** being fed from any source, **AND** PSW SG feed available, **THEN** establish SG feed from PSW using Encl 5.45 (PSW Feed and RCP Seals).
		23. **WHEN** either exists: __ Operator is in position at 1FDW-313 __ Unit 1 TD EFDW PUMP has been manually started **THEN** continue.
		Examiner Note: • ***EFW from another source will NOT be made available. Rule 3 progress will stop at this point.***
		Rule 2
		Crew Response:
	OATC/BOP	1. **IAAT** all exist: __ Any SCM ≤ 0°F __ Rx power ≤ 1% __ ≤ 2 minutes elapsed since loss of SCM **THEN** perform Steps 2 and 3
		2. Stop all RCPs
		3. Notify CRS of RCP status
		4. Verify Blackout exists **RNO: GO TO** Step 6

This event is complete when the SRO has transferred to the HPI CD tab, or as directed by the Lead Examiner.

Op-Test No.: **ILT48**	Scenario No.: **1**	Event No.: **7**	Page 5 of 11
Event Description: **LOHT (M: All)**			

Time	Position	Applicant's Actions or Behavior
		Rule 2
		Crew Response:
	OATC/BOP	6. Open 1HP-24 and 1HP-25
		7. Start all available HPI pumps
		8. **GO TO** Step 13
		13. Open 1HP-26 and 1HP-27
		14. Verify at least two HPI pumps are operating using two diverse indications **RNO: GO TO** Step 27
		27. Verify at least two HPI pumps are operating **RNO:** Maximize HPI flow ≤ 475 gpm (including seal injection for A hdr only
		28. Verify RCS pressure > 550 psig
		29. **IAAT** either exists: __ LPI FLOW TRAIN A plus LPI FLOW TRAIN B ≥ 3400 gpm __ Only one LPI header in operation with header flow ≥ 2900 gpm **THEN GO TO** Step 34
		30. Dispatch two operators to perform Encl 5.24 (Operation of ADVs) (**PS**)
		31. Verify 1SA-2/C-8 (AFIS HEADER A INITIATED) lit **RNO:** Select OFF for both digital channels on AFIS HEADER A
		32. Verify 1SA-2/D-8 (AFIS HEADER B INITIATED) lit **RNO:** Select OFF for both digital channels on AFIS HEADER B
		33. Notify CRS: __ Suspend Rule 3 (Loss of Main or Emergency FDW) until directed by LOSCM tab __ Degraded HPI exists
		34. **EXIT**

This event is complete when the SRO transfers to the HPI CD tab, or as directed by the Lead Examiner.

Op-Test No.: **ILT48**	Scenario No.: **1**	Event No.: **7**	Page 6 of 11
Event Description: **LOHT (M: All)**			

Time	Position	Applicant's Actions or Behavior
		LOHT TAB
		Crew Response:
	SRO/OATC BOP	***Examiner Note: When the criteria for IAAT step 3 is met, the SRO will proceed to step 4:***
		NOTE SCM may be lost when the PORV is opened. Transition to LOSCM tab is **NOT** required.
	CT-2	4. **PERFORM** Rule 4 (Initiation of HPI Forced Cooling). (**Page 33**)
		5. Verify all: __ At least two HPI pumps operating **[ONE HPI pump operating]** __ Acceptable HPI flow exists in both HPI headers per Rule 4 (Initiation of HPI Forced Cooling) __ PORV open __ 1RC-4 open
		RNO: 1. **IF** any HPI pump is providing injection flow, **THEN GO TO** Step 7. 2. **GO TO** Step 12.
		7. Verify SSF-ASW available.
		8. Dispatch a licensed operator to perform Encl 5.34 (Aligning SSF-ASW for SG Feed).
		Examiner Note: Stop RO from leaving CR and notify them that Unit 2 will perform Encl 5.34.
		9. Verify PSW supplying power to reactor vessel head and RCS loop vents. **RNO**: Locally close (Unit 1 Cable Rm): __ 1SKJ-08 (1RC-155/1RC-156) __ 1SKK-08 (1RC-157/1RC-158) __ 1SKL-08 (1RC-159/1RC-160)
		Examiner Note: After being notified as AO to close breakers for 1RC-155 through 1RC-160, Fire Timer 15 to close the breakers.

This event is complete when the SRO transfers to the HPI CD tab, or as directed by the Lead Examiner.

Op-Test No.: **ILT48**	Scenario No.: **1**	Event No.: **7**	Page 7 of 11
Event Description: **LOHT (M: All)**			

Time	Position	Applicant's Actions or Behavior
	SRO/OATC BOP ***CT-3***	***LOHT TAB*** **Crew Response**: 10. Open: __ 1RC-155 __ 1RC-156 __ 1RC-157 __ 1RC-158 __ 1RC-159 __ 1RC-160 11. **GO TO** HPI CD tab. ***HPI CD TAB*** **HPI Cooldown Tab** 1. **IAAT** BWST level is ≤ 19', **THEN** initiate Encl 5.12 (ECCS Suction Swap to RBES). 2. **IAAT** either of the following exists: __ LPI FLOW TRAIN A plus LPI FLOW TRAIN B ≥ 3400 gpm __ Only one LPI header in operation with header flow ≥ 2900 gpm **THEN GO TO** LOCA CD tab. 3. Verify all of the following exist: __ PORV open __ 1RC-4 open __ Two HPI trains injecting __ CETCs ≤ 640°F **RNO**: 1.__ **IF** RCS vents (hot leg and vessel head) are open, **THEN GO TO** Step 4. 4. Perform the following: __ Ensure all RBCUs in low speed. __ Open 1LPSW-18. __ Open 1LPSW-21. __ Open 1LPSW-24. 5. __ Initiate Encl 5.35 (Containment Isolation).

This event is complete when the SRO transfers to the HPI CD tab, or as directed by the Lead Examiner.

Op-Test No.: **ILT48**	Scenario No.: **1**	Event No.: **7**	Page 8 of 11
Event Description: **LOHT (M: All)**			

Time	Position	Applicant's Actions or Behavior
		HPI CD TAB **Crew Response:**
	SRO/OATC BOP	6. **IAAT** all the following exist: __ Any RBS pump operating __ RB pressure < 3 psig __ < 24 hours into event __ Reactor Engineering confirms Condition Zero or Condition One per RP/0/B/1000/018 (Core Damage Assessment) **THEN** stop all RBS pumps. 7. Start: __ A Outside Air Booster Fan __ B Outside Air Booster Fan 8. Notify Unit 3 to start: __ 3A Outside Air Booster Fan __ 3B Outside Air Booster Fan 9. Verify 1SA-2/C-8 (AFIS HEADER A INITIATED) lit. **RNO**: __ Select OFF for both digital channels on AFIS HEADER A. 10. Verify 1SA-2/D-8 (AFIS HEADER B INITIATED) lit. **RNO**: __ Select OFF for both digital channels on AFIS HEADER B. 11. Verify indications of SGTR $\geq$ 25 gpm. **RNO**: **GO TO** Step 17. 17. **IAAT** any SG with a tube rupture that has **NOT** reached the level at which water enters the steam lines (per Encl 5.21 (Full Range SG Level For Water In Steam Lines)) approaches either of the following: __ 1000 psig __ Overfill: • Any SCM $\leq$ 0°F: Loss of SCM setpoint • All SCMs > 0°F: 285″ [315″ acc] XSUR **THEN** perform Steps 18 - 20. **RNO**: **GO TO** Step 21.

This event is complete when the SRO transfers to the HPI CD tab, or as directed by the Lead Examiner.

Op-Test No.: **ILT48**	Scenario No.: **1**	Event No.: **7**	Page 9 of 11
Event Description: **LOHT (M: All)**			

Time	Position	Applicant's Actions or Behavior
	SRO/OATC BOP	***HPI CD TAB*** **<u>Crew Response</u>:** 21. **IAAT** RCS pressure is > 1000 psig, **AND** any of the following exist: __ A SG with a tube rupture is at the level at which water enters the steam lines (per Encl 5.21 (Full Range SG Level For Water In Steam Lines) __ A SG with a tube rupture approaches 1000 psig **THEN** open: __ 1RC-155 __ 1RC-156 __ 1RC-157 __ 1RC-158 __ 1RC-159 __ 1RC-160 22. Secure makeup to the LDST. 23. Notify Chemistry of the following: A. __Sample RCS boron hourly, or as often as possible, until MODE 5. B. __Letdown status. 24. **IAAT** Chemistry reports that boron sample **CANNOT** be obtained, **THEN** notify TSC to provide guidance to obtain boron sample. 25. Initiate determination of minimum required boron concentration for MODE 5 using either of the following: __ Reactor Engineer __ PT/1/A/1103/015 (Reactivity Balance Procedure) 26. **IAAT** required boron concentration for MODE 5 is determined, **THEN** initiate Encl 5.11 (RCS Boration). **<u>NOTE</u>** Encl 5.12 (ECCS Suction Swap to RBES) requests an LPI discharge sample which is representative of RBES boron after ECCS suction has been swapped to RBES. 27. **IAAT** ECCS suction is swapped to RBES, **AND** RBES boron is decreasing, **THEN** notify TSC.

This event is complete when the SRO transfers to the HPI CD tab, or as directed by the Lead Examiner.

Op-Test No.: **ILT48**	Scenario No.: **1**	Event No.: **7**	Page 10 of 11

Event Description: **LOHT (M: All)**

Time	Position	Applicant's Actions or Behavior
	SRO/OATC BOP	***Rule 4*** **<u>Crew Response</u>**: **<u>Rule 4 HPI Forced Cooling</u>** 1. Verify any HPI pump powered from 1TC, 1TD, or 1TE can be operated. 2. Open: __ 1HP-24 __ 1HP-25 3. Start all available HPI pumps. **[C HPI Pump will NOT start]** 4. Open: __ 1HP-26 __ 1HP-27 5. Open 1RC-4. 6. Verify flow exists in any HPI header. 7. Perform the following: A. __ Place 1RC-66 SETPOINT SELECTOR to OPEN. B. __ Depress 1RC-66 OPEN PERMIT pushbutton. 8. Verify at least two HPI pumps operating. **RNO:** 1. __ **IF NO** HPI pumps are operating, **THEN**: A. __ Stop all RCPs. B. __ Position 1RC-66 SETPOINT SELECTOR to HIGH. C. __ **GO TO** Step 14. 2. __ **IF** 1HP-26 is closed, **AND** either of the following exists: __ 1A HPI PUMP operating __ 1B HPI PUMP operating **THEN** open 1HP-410. 3. __ **GO TO** Step 10. 10. Verify flow exists in any HPI header.

This event is complete when the SRO transfers to the HPI Cooldown tab, or as directed by the Lead Examiner.

Op-Test No.: **ILT48**	Scenario No.: **1**	Event No.: **7**	Page 11 of 11
Event Description: **LOHT (M: All)**			

Time	Position	Applicant's Actions or Behavior
	SRO/OATC BOP	***Rule 4*** **Crew Response**: 11. Perform the following: A. __ Place 1RC-66 SETPOINT SELECTOR to OPEN. B. __ Depress 1RC-66 OPEN PERMIT pushbutton. 12. Verify > one RCP operating. **NOTE** 1A1 RCP provides the best Pzr spray and is preferred to be left running in case recovery from HPI forced cooling is performed and a Pzr bubble drawn. 13. Stop all but one RCP. 14. **IAAT** the following limits are exceeded, (see table below) **THEN** throttle HPI to maximize flow ≤ flow limit. 15. De-energize all Pzr heaters. 16. Close 1HP-5. 17. Close: __ TBVs __ 1FDW-35 __ 1FDW-44 18. **IAAT** all HPI is lost, **THEN**: A. __ Stop all RCPs. B. __ Position 1RC-66 SETPOINT SELECTOR to HIGH. 19. __ **WHEN** directed by CRS, **THEN EXIT**.

Pump Operation	Limit
1 HPI pump/hdr	475 gpm (incl. seal injection for A hdr)
1A & 1B HPI pumps operating with 1HP-409 open	Total flow of 950 gpm (incl. seal injection)

This event is complete when the SRO transfers to the HPI Cooldown tab, or as directed by the Lead Examiner.

Rule 6
HPI

HPI Pump Throttling Limits

- HPI must be throttled to prevent violating the RV-P/T limit.
- HPI pump operation must be limited to two HPIPs when only one BWST suction valve (1HP-24 or 1HP-25) is open.
- HPI must be throttled ≤ 475 gpm/pump (including seal injection for A header) when only one HPI pump is operating in a header.
- Total HPI flow must be throttled ≤ 950 gpm including seal injection when 1A and 1B HPI pumps are operating with 1HP-409 open.
- Total HPI flow must be throttled < 750 gpm when all the following exist:
  - LPI suction is from the RBES
  - piggyback is aligned
  - either of the following exist:
    - only one piggyback valve is open (1LP-15 or 1LP-16)
    - only one LPI pump operating
- HPI may be throttled under the following conditions:

HPI Forced Cooling in Progress:	HPI Forced Cooling NOT in Progress:
All the following conditions must exist: • Core SCM > 0 • CETCs decreasing	All the following conditions must exist: • All WR NIs ≤ 1% • Core SCM > 0 • Pzr level increasing • SRO concurrence required if throttling following emergency boration

HPI Pump Minimum Flow Limit

- Maintain ≥ 170 gpm indicated/pump. This is an instrument error adjusted value that ensures a real value of ≥ 65 gpm/pump is maintained. HPI pump flow less than minimum is allowed for up to 4 hours.

Enclosure 5.5
Pzr and LDST Level Control

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
NOTE Maintaining Pzr level >100″ [180″ acc] will ensure Pzr heater bundles remain covered.	
1. __ Utilize the following as necessary to maintain desired Pzr level: • 1A HPI Pump • 1B HPI Pump • 1HP-26 • 1HP-7 • 1HP-120 setpoint or valve demand • 1HP-5	**IF** 1HP-26 will **NOT** open, **THEN** throttle 1HP-410 to maintain desired Pzr level.
2. **IAAT** makeup to the LDST is desired, **THEN** makeup from 1A BHUT.	
3. **IAAT** it is desired to secure makeup to LDST, **THEN** secure makeup from 1A BHUT.	
4. **IAAT** it is desired to bleed letdown flow to 1A BHUT, **THEN** perform the following: A. Open: __ 1CS-26 __ 1CS-41 B. __ Position 1HP-14 to BLEED. C. __ Notify SRO.	
5. **IAAT** letdown bleed is **NO** longer desired, **THEN** position 1HP-14 to NORMAL.	

Enclosure 5.5
Pzr and LDST Level Control

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
6. **IAAT** 1C HPI PUMP is required, **THEN** perform Steps 7 - 9.	**GO TO** Step 10.
7. __ Open: • 1HP-24 • 1HP-25	1. **IF** both BWST suction valves (1HP-24 and 1HP-25) are closed, **THEN** perform the following: A. __ Start 1A LPI PUMP. B. __ Start 1B LPI PUMP. C. Open: __ 1LP-15 __ 1LP-16 __ 1LP-9 __ 1LP-10 __ 1LP-6 __ 1LP-7 D. **IF** two LPI Pumps are running only to provide HPI pump suction, **THEN** secure one LPI pump. E. Dispatch an operator to open 1HP-363 (Letdown Line To LPI Pump Suction Block) (A-1-119, U1 LPI Hatch Rm, N end). F. __ **GO TO** Step 8. 2. **IF** only one BWST suction valve (1HP-24 or 1HP-25) is open, **THEN** perform the following: A. **IF** three HPI pumps are operating, **THEN** secure 1B HPI PUMP. B. **IF** < 2 HPI pumps are operating, **THEN** start HPI pumps to obtain two HPI pump operation, preferably in opposite headers. C. __ **GO TO** Step 9.

Enclosure 5.5
Pzr and LDST Level Control

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
8. __ Start 1C HPI PUMP.	**IF** at least two HPI pumps are operating, **THEN** throttle 1HP-409 to maintain desired Pzr level.
9. Throttle the following as required to maintain desired Pzr level: 1HP-26 __ 1HP-27	1. __ **IF** at least two HPI pumps are operating, **AND** 1HP-26 will **NOT** open, **THEN** throttle 1HP-410 to maintain desired Pzr level. 2. **IF** 1A HPI PUMP and 1B HPI PUMP are operating, **AND** 1HP-27 will **NOT** open, **THEN** throttle 1HP-409 to maintain desired Pzr level.

Enclosure 5.5
Pzr and LDST Level Control

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
10. **IAAT** LDST level **CANNOT** be maintained, **THEN** perform Step 11.	**GO TO** Step 12.
11. __ Perform the following: • Open 1HP-24. • Open 1HP-25. • Close 1HP-16.	1. **IF** both BWST suction valves (1HP-24 and 1HP-25) are closed, **THEN** perform the following: A. __ Start 1A LPI PUMP. B. __ Start 1B LPI PUMP. C. Open: __ 1LP-15 __ 1LP-16 __ 1LP-9 __ 1LP-10 __ 1LP-6 __ 1LP-7 D. **IF** two LPI Pumps are running only to provide HPI pump suction, **THEN** secure one LPI pump. E. Dispatch an operator to open 1HP-363 (Letdown Line To LPI Pump Suction Block) (A-1-119, U1 LPI Hatch Rm, N end). F. __ **GO TO** Step 13. 2. **IF** only one BWST suction valve (1HP-24 or 1HP-25) is open, **AND** three HPI pumps are operating, **THEN** secure 1B HPI PUMP.

NOTE
Maintaining Pzr level > 100” [180” acc] will ensure Pzr heater bundles remain covered.

12.__ Operate Pzr heaters as required to maintain heater bundle integrity.	

Enclosure 5.5
Pzr and LDST Level Control

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
13. **IAAT** additional makeup flow to LDST is desired, **AND** 1A BLEED TRANSFER PUMP is operating, **THEN** dispatch an operator to close 1CS-48 (1A BHUT Recirc) (A-1-107, Unit 1 RC Bleed Transfer Pump Rm.).	
14. **IAAT** two Letdown Filters are desired, **THEN** perform the following: __ Open 1HP-17. __ Open 1HP-18	
15. __ **IAAT** all of the following exist: __ Letdown isolated __ LPSW available __ Letdown restoration desired **THEN** perform Steps 16 - 34. {41}	__ **GO TO** Step 35.
16. Open: 1CC-7 1CC-8	1. Notify CR SRO that letdown **CANNOT** be restored due to inability to restart the CC system. 2. **GO TO** Step 35.
17. Ensure only one CC pump running.	
18. Place the non-running CC pump in AUTO.	
19. Verify both are open: 1HP-1 1HP-2	1. **IF** 1HP-1 is closed due to 1HP-3 failing to close, **THEN GO TO** Step 21. 2. **IF** 1HP-2 is closed due to 1HP-4 failing to close, **THEN GO TO** Step 21.
20. __ **GO TO** Step 23.	

NOTE
Verification of leakage requires visual observation of East Penetration Room.

21. __ Verify letdown line leak in East Penetration Room has occurred.	**GO TO** Step 23.
22. __ **GO TO** Step 35.	

Enclosure 5.5
Pzr and LDST Level Control

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
23. Monitor for unexpected conditions while restoring letdown.	
24. __ Verify both letdown coolers to be placed in service.	1. **IF** 1A letdown cooler is to be placed in service, **THEN** open: __ 1HP-1 __ 1HP-3 2. **IF** 1B letdown cooler is to be placed in service, **THEN** open: __ 1HP-2 __ 1HP-4 3. __ **GO TO** Step 26.
25. Open: __ 1HP-1 __ 1HP-2 __ 1HP-3 __ 1HP-4	
26. Verify at least one letdown cooler is aligned.	Perform the following: A. Notify CR SRO of problem. B. **GO TO** Step 35.
27. Close 1HP-6.	
28. Close 1HP-7.	
29. Verify letdown temperature < 125°F.	1. Open 1HP-13. 2. Close: __ 1HP-8 __ 1HP-9&11 3. **IF** any deborating IX is in service, **THEN** perform the following: A. __ Select 1HP-14 to NORMAL. B. __ Close 1HP-16. 4. Select LETDOWN HI TEMP INTLK BYP switch to BYPASS.

Enclosure 5.5
Pzr and LDST Level Control

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
30. __ Open 1HP-5.	
31. __ Adjust 1HP-7 for ≈ 20 gpm letdown.	
32. __ **WHEN** letdown temperature is < 125°F, **THEN** place LETDOWN HI TEMP INTLK BYP switch to NORMAL.	
33. __ Open 1HP-6.	
34. Adjust 1HP-7 to control desired letdown flow.	

NOTE

AP/32 (Loss of Letdown) provides direction to cool down the RCS to offset increasing pressurizer level.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
35. **IAAT** it is determined that letdown is unavailable due to equipment failures <u>or</u> letdown system leakage, **THEN** notify CR SRO to initiate AP/32 (Loss of Letdown).	
36. **IAAT** > 1 HPI pump is operating, **AND** additional HPI pumps are **NO** longer needed, **THEN** perform the following: A. Obtain SRO concurrence to reduce running HPI pumps. B. __ Secure the desired HPI pumps. C. Place secured HPI pump switch in AUTO, if desired.	
37. __ **IAAT** <u>all</u> the following conditions exist: __ Makeup from BWST **NOT** required __ LDST level > 55″ __ <u>All</u> control rods inserted __ Cooldown Plateau **NOT** being used **THEN** close: __ 1HP-24 __ 1HP-25	

Enclosure 5.5
Pzr and LDST Level Control

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
38. __ Verify 1CS-48 (1A BHUT Recirc) has been closed to provide additional makeup flow to LDST.	**GO TO** Step 40.
39. **WHEN** 1CS-48 (1A BHUT Recirc) is **NO** longer needed to provide additional makeup flow to LDST, **THEN** perform the following: A. Stop 1A BLEED TRANSFER PUMP. B. Locally position 1CS-48 (1A BHUT Recirc) <u>one</u> turn open (A-1-107, Unit 1 RC Bleed Transfer Pump Rm.). C. __ Close 1CS-46. D. Start 1A BLEED TRANSFER PUMP. E. Locally throttle 1CS-48 (1A BHUT Recirc) to obtain 90 - 110 psig discharge pressure. F. Stop 1A BLEED TRANSFER PUMP.	
40. __ Verify two Letdown Filters in service, **AND** <u>only one</u> Letdown filter is desired.	**GO TO** Step 42.
41. Perform <u>one</u> of the following: __ Place 1HP-17 switch to CLOSE. __ Place 1HP-18 switch to CLOSE.	
42. **WHEN** directed by CR SRO, **THEN EXIT** this enclosure.	

Subsequent Actions

Parallel Actions

EP/1/A/1800/001
Page 1 of 1

CONDITION	ACTIONS	
1. PR NIs ≥ 5% FP **OR** NIs **NOT** decreasing	**GO TO** UNPP tab.	**UNPP**
2. All 4160V SWGR de-energized {13}	**GO TO** Blackout tab.	**BLACKOUT**
3. Core SCM indicates superheat	**GO TO** ICC tab.	**ICC**
4. Any SCM = 0°F	**GO TO** LOSCM tab.	**LOSCM**
5. Both SGs intentionally isolated to stop excessive heat transfer	**GO TO** EHT tab.	**LOHT**
6. Loss of heat transfer (including loss of all Main and Emergency FDW)	**GO TO** LOHT tab.	
7. Heat transfer is or has been excessive	**GO TO** EHT tab.	**EHT**
8. Indications of SGTR ≥ 25 gpm	**GO TO** SGTR tab.	**SGTR**
9. Turbine Building flooding **NOT** caused by rainfall event	**GO TO** TBF tab.	**TBF**
10. Inadvertent ES actuation occurred	Initiate AP/1/A/1700/042 (Inadvertent ES Actuation).	**ES**
11. Valid ES actuation has occurred or should have occurred	Initiate Encl 5.1 (ES Actuation).	**ES**
12. Power lost to all 4160V SWGR and any 4160V SWGR re-energized	• Initiate AP/11 (Recovery from Loss of Power). • **IF** Encl 5.1 (ES Actuation) has been initiated, **THEN** reinitiate Encl 5.1.	**ROP**
13. RCS leakage > 160 gpm with letdown isolated	Notify plant staff that Emergency Dose Limits are in affect using PA system.	**EDL**
14. Individual available to make notifications	• Announce plant conditions using PA system. • Notify OSM to reference the Emergency Plan and NSD 202 (Reportability).	**NOTIFY**

CRITICAL TASKS

CT-1 Manual control of the spray valve (1RC-1) must be taken and the spray valve must be closed before tripping the reactor on low RCS pressure.

CT-2 HPI Forced Cooling must be established when the initiation criteria has been met.

CT-3 RCS Loop and Head vents must be opened to maximize HPI pump flow due to degraded HPI.

SAFETY: Take a Minute			
UNIT 0 (OSM)			
SSF Operable: Yes	KHU's Operable: U1 - OH, U2 - UG	LCTs Operable: 2	Fuel Handling: No

UNIT STATUS (CR SRO)

Unit 1 Simulator	**Other Units**	
Mode: 1	**Unit 2**	**Unit 3**
Reactor Power: 100%	Mode: 1	Mode: 1
Gross MWE: 895	100% Power	100% Power
RCS Leakage: 0.01 gpm No WCAP Action	EFDW Backup: Yes	EFDW Backup: Yes
RBNS Rate: 0.01 gpm		

Technical Specifications/SLC Items (CR SRO)

Component/Train	OOS Date/Time	Restoration Required Date/Time	TS/SLC #
AMSAC/DSS	0300	7 Days	16.7.2

Shift Turnover Items (CR SRO)

Primary

- Due to unanalyzed condition, the SSF should be considered INOP for Unit 1 if power levels are reduced below 85%. Evaluations must be performed prior to declaring the SSF operable following a return to power (after going below 85%).
- 1RIA-3 and 5 removed from RB.
- Control Rod Movement PT (PT/1/A/0600/015) is to be performed for GP 1 ONLY.

Secondary

- Feedwater valve DP selected to A1 and B2 for maintenance
- AMSAC/DSS bypassed
- ICS Diamond and FDW Masters are in HAND for performance of Control Rod Movement PT.
- 1SSH-1, 1SSH-3, 1SD-2, 1SD-5, 1SD-140, 1SD-303, 1SD-355, 1SD-356 and 1SD-358 are closed with power supply breakers open per the Startup Procedure for SSF Overcooling Event.

Reactivity Management (CR SRO)

RCS Boron 83 ppmB	Gp 7 Rod Position: 92% Withdrawn	Batch additions as required for volume control.

Human Performance Emphasis (OSM)

Procedure Use and Adherence

Facility: **Oconee** Scenario No.: 2 Op-Test No.: 1

Examiners: ____________________ Operators: ____________________**SRO**

____________________ ____________________**OATC**

____________________ ____________________**BOP**

Initial Conditions:

- Reactor Power = 100%

Turnover:

- Feedwater valve DP selected to 1A1 and 1B2 for maintenance
- AMSAC/DSS bypassed

Event No.	Malfunction No.	Event Type*	Event Description
0a	Override		EBOP Fails to Auto Start
0b			
0c			
1		N: OATC, SRO	5 Minute Delithiation Using Deborating IX
2	MPS290	C: BOP, SRO **(TS)**	1C CCW Pump trips
3	MCS004	I: OATC, SRO	Controlling NR Tave Fails HIGH (586ºF)
4	Override	C: BOP, R: OATC, SRO **(TS)**	1B Main FDW Pump Active Thrust Bearing Temperature HIGH Requiring manual power reduction and MFW Pump trip
5	Override	C: BOP, SRO	Bearing Oil Header Pressure LOW, EBOP fails to AUTO Start
6	MSS010 Override	M: ALL	Turbine Oil Header Pressure low, Manual Turbine Trip, ATWS • 1HP-25 fails closed
7			

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

Scenario 2

Event Summary

Event 1: The OATC will perform a 5 minute delithiation using the deborating IX using OP/1/A/1103/004C Deborating IXs, Encl. 4.4 Unit 1 Deborating IX For RCS De-lith (Rx At Power).

Event 2: CCW pump 1C will trip. The crew should address OAC Alarms and determine that the 1C CCW pump has tripped. The SRO should recognize Tech Spec for LPSW accumulator low level. Vacuum will start to decrease until CCW pump 1D is started.

Event 3: Controlling Tave will fail High causing ICS to insert control rods and increase feedwater flow. The crew should perform Plant Transient Response and take the ICS Diamond and Feedwater Loop Masters to MANUAL and stabilize the plant before the reactor trips.

Event 4: 1B MFWP thrust bearing temperature alarm will come in. Temperature will slowly increase requiring the crew to perform a manual power reduction to secure the 1B MFWP.

Event 5: Turbine oil header pressure will start decreasing causing an alarm. The EBOP will have to be started manually to prevent a turbine trip.

Event 6: Turbine oil header pressure will decrease again requiring a reactor/turbine trip but control rods will not insert automatically or manually from the control room. 1HP-25 will fail closed which will limit the number of operating HPIPs to two. Approximately 4 minutes after an operator is dispatched to open RPS breakers, the reactor will trip.

Op-Test No.: **ILT48** Scenario No.: **2** Event No.: **1** Page 1 of 6

Event Description: **5 Minute Delith Using Deborating IX (N: OATC, SRO)**

Time	Position	Applicant's Actions or Behavior
		OP/1/A/1103/004C
	SRO	**Crew response:** SRO directs the OATC to perform OP/1/A/1103/004C Deborating IXs, Encl. 4.4 Unit 1 Deborating IX For RCS De-lith (Rx At Power).
	OATC	**OP/1/A/1103/004C, Encl. 4.4** Rev 25
		NOTE: • This procedure affects reactivity management by placing IX and Letdown Filter in service causing possible RCS boron change. (R.M.) • Unit 1 Deborating IX can affect RCS boron because it contains ~ 1200 gal of borated water. (R.M.)
		NOTE: • If IX boron is within acceptable limits, IX may be placed in service with minimal reactivity affects (no CRD movement). (R.M.) • Cation resin is used for de-lith. Cation resin will **NOT** remove boron from RCS. (R.M.)
		2.1 **IF** RCS $\leq$ 100 ppm **AND** IX boron as listed in Demineralizer Log Sheet is more than $\pm$ 5 ppm of current RCS boron but is within $\pm$ 25 ppm of current RCS boron, perform the following: {7}: **[NA]**
		2.1.1 Determine RCS boron change resulting from placing IX in service (assume 1200 gal addition at boron listed in Demineralizer Log Sheet).
		2.1.2 Determine RCS makeup sources and volumes required to compensate for RCS boron changes per OP/1/A/1103/004 (Soluble Poison Control).
		2.1.3 Go To Step 2.4.
		Examiner Note: RCS Boron is 83 ppm.

This event is complete when the de-lith is complete or when directed by the lead examiner.

Op-Test No.: **ILT48** Scenario No.: **2** Event No.: **1** Page 2 of 6

Event Description: **5 Minute Delith Using Deborating IX (N: OATC, SRO)**

Time	Position	Applicant's Actions or Behavior
	OATC	*OP/1/A/1103/004C*

Crew response:

NOTE:

- Cation resin is used for de-lith. Cation resin will **NOT** remove boron from RCS. (R.M.)
- If IX boron is within acceptable limits, IX may be placed in service with minimal reactivity affects. (R.M.)
- Acceptable 'Demineralizer Log Sheet' boron for placing IX in service without rinsing is determined as follows: (R.M.) {4}

RCS Boron Concentration	Acceptable Demin Log Sheet Value
> 100 ppm	± 50 ppm of current RCS boron
≤ 100 ppm	±5 ppm of current RCS boron

2.2 **IF** Unit 1 Deborating IX boron status is **NOT** acceptable to place in service, perform Enclosure 4.5 (Unit 1 Deborating IX Rinse To MWHUT) until acceptable boron results are achieved. (R.M.). **[NA]**

2.3 Unit 1 Deborating IX has acceptable boron status to be placed in service. (R.M.)

NOTE: Placing an idle Letdown Filter in service can affect core reactivity by adding ~ 60 gals of water at a different boron concentration. (R.M.) {5} {6}

2.4 **IF** two Letdown Filters are available **AND NOT** already in service, perform the following:
(R.M.) {6}

2.4.1 Review Component Boron Log for out-of-service Letdown Filter boron.

2.4.2 Determine RCS boron based on placing second Letdown Filter in service.

2.4.3 RCS boron ___**83**_____ ppm

2.4.4 **IF** RCS makeup is required to achieve acceptable boron, determine RCS makeup sources and volumes per OP/1/A/1103/004 (Soluble Poison Control). **[NA]**

This event is complete when the de-lith is complete or when directed by the lead examiner.

Op-Test No.: **ILT48** Scenario No.: **2**	Event No.: **1**	Page 3 of 6
Event Description: **5 Minute Delith Using Deborating IX (N: OATC, SRO)**		

Time	Position	Applicant's Actions or Behavior
	OATC	*OP/1/A/1103/004C* **<u>Crew response</u>:** 2.5 Perform **one** of the following (for all applicable steps 2.1 through 2.4): • Verify acceptable RCS boron. • Ensure appropriate RCS makeup plans determined to ensure acceptable boron. 2.6 Perform **one** of the following: • **IF** two Letdown Filters available, perform the following: ◊ Ensure 1HP-17 (1A LETDOWN FILTER INLET) switch to "OPEN" ◊ Ensure 1HP-18 (1B LETDOWN FILTER INLET) switch to "OPEN" • **IF only one** Letdown Filter available, verify Letdown pressure < 105 psig. 2.7 **IF** RCS makeup is required to ensure acceptable boron, makeup per OP/1/A/1103/004 (Soluble Poison Control). **[NA]** **NOTE:** Anytime IX is placed in service CRD movement may result. (R.M.) 2.8 **WHILE** placing Unit 1 Deborating IX in service, monitor the following indications: (R.M.) {20} • Appropriate ranged NIs • Primary tank levels • Neutron error • CRD position • IX run-time for proper chemistry control 2.9 Align Unit 1 Deborating IX for service: 2.9.1 Verify closed 1CS-32 & 37 (SPARE DEBOR IX INLET & OUTLET). 2.9.2 Ensure closed 1CS-26 (LETDOWN TO RC BHUT). {17} 2.9.3 Open 1CS-27 (DEBOR IX INLET). 2.9.4 Verify 1HP-15 Controller in "MANUAL". 2.9.5 Ensure open 1HP-16 (LDST MAKEUP ISOLATION).

This event is complete when the de-lith is complete or when directed by the lead examiner.

Op-Test No.: **ILT48** Scenario No.: **2** Event No.: **1** Page 4 of 6

Event Description: **5 Minute Delith Using Deborating IX (N: OATC, SRO)**

Time	Position	Applicant's Actions or Behavior
		OP/1/A/1103/004C **Crew response:**
	OATC	2.10 Position 1HP-14 (LDST BYPASS) in "BLEED" to place Unit 1 Deborating IX in service.
		NOTE: • Chemistry procedures require a minimum of 15 minutes flush for Deborating IXs.(R.M.) • Steps 2.11, 2.12, 2.13 and 2.14 may be performed in any order.
		2.11 **IF** sample desired by Chemistry **AND** Unit 1 Deborating IX will be in service for > 20 minutes, notify Chemist to begin flush for sample of Unit 1 Deborating IX effluent. (R.M.) ________________________ ______ Person Notified Date
		2.12 **IF** unexpected changes are noted, perform the following: (R.M.) • Continue enclosure to remove Unit 1 Deborating IX from service. • Notify CRS for evaluation.
		2.13 **IF AT ANY TIME** RCS makeup is required for RCS volume control, perform Section 3 (RCS Makeup With Unit 1 Deborating IX In Service).
		NOTE: Opening 1CS-26 will remove Unit 1 Deborating IX from service.
		2.14 **IF AT ANY TIME** desired to reduce inventory, reduce RCS inventory (Bleed): 2.14.1 Open 1CS-26 (LETDOWN TO RC BHUT). 2.14.2 **WHEN** complete, close 1CS-26 (LETDOWN TO RC BHUT).
		2.15 **IF** sample required by Chemistry **AND** Unit 1 Deborating IX has been in service for > 20 minutes, prior to completing run time ensure Chemist has sampled Unit 1 Deborating IX effluent. (R.M.) ________________________ ______ Person Notified Date

This event is complete when the de-lith is complete or when directed by the lead examiner.

Op-Test No.: **ILT48** Scenario No.: **2** Event No.: **1** Page 5 of 6

Event Description: **5 Minute Delith Using Deborating IX (N: OATC, SRO)**

Time	Position	Applicant's Actions or Behavior
		OP/1/A/1103/004C
		Crew response:
	OATC	2.16 **WHEN** desired to remove Unit 1 Deborating IX from service, perform the following:
		2.16.1 Position 1HP-14 (LDST BYPASS) to "NORMAL".
		2.16.2 Ensure closed 1HP-16 (LDST MAKEUP ISOLATION).
		2.16.3 Perform one of the following: (R.M.) • Verify correct IX run time per Step 1.2. • Notify Chemistry for evaluation. ____________________ ______ Person Notified Date
		2.16.4 Reset 1HP-15 Controller for Normal Operation.
		2.16.5 Close 1CS-27 (DEBOR IX INLET).
		2.16.6 Open 1CS-26 (LETDOWN TO RC BHUT).
		2.17 Record IX use in Narrative Log.
		NOTE: 1B Letdown Filter is the preferred filter to leave in service for ALARA.
		2.18 **IF** desired, remove one Letdown Filter from service:
		2.18.1 Verify > 10 minutes since normal Letdown alignment. (R.M.) {5}
		2.18.2 Perform **one** of the following: • Position 1HP-17 (1A LETDOWN FILTER INLET) switch to "CLOSE". • Position 1HP-18 (1B LETDOWN FILTER INLET) switch to "CLOSE".
		2.18.3 Record RCS boron for out-of-service Letdown Filter in Component Boron Log. (R.M.) {6}

This event is complete when the de-lith is complete or when directed by the lead examiner.

Op-Test No.: **ILT48**	Scenario No.: **2**	Event No.: **1**	Page 6 of 6
Event Description:	**5 Minute Delith Using Deborating IX (N: OATC, SRO)**		

Time	Position	Applicant's Actions or Behavior
		OP/1/A/1103/004C
		Crew response:
	OATC	2.19 **IF** Unit 1 Deborating IX will **NOT** be used within the next seven days, perform the following: (R.M.)
		NOTE: IA supply valves should be closed on idle IX(s) to reduce chance of placing wrong IX in service due to human error. (R.M.) {8}
		2.19.1 Close IA-3092 (1CS-27 IA Isolation). (A-2-Rm 214)
		2.19.2 Bleed off pressure from operator using petcocks. (A-2-Rm 214)
		NOTE: Petcock should be left in the throttled position to ensure pressure does **NOT** build up over time.
		2.19.3 Ensure petcock left in the throttled position.
		2.19.4 Place a "T/O SHEET" CR tag on 1CS-27 (DEBOR IX INLET) switch.
		2.20 Record in Demineralizer Log Sheet for Unit 1 Deborating IX either of the following: (R.M.) • **IF** Unit 1 Deborating IX sample was **NOT** taken, record current RCS boron. • **IF** Unit 1 Deborating IX sample was taken, record IX effluent.

This event is complete when the de-lith is complete or when directed by the lead examiner.

Op-Test No.: **ILT48**	Scenario No.: **2**	Event No.: **2**	Page 1 of 2
Event Description:	**CCW pump trip (C, BOP, SRO)(TS)**		

Time	Position	Applicant's Actions or Behavior
	SRO/BOP	***OP/1/A/1104/012 A*** **Plant Response:** OAC Alarms: • LPSW LEAKAGE ACCUMULATOR LEVEL LO LO (< 20 inches) • 1C CCW LOCA/LS OFF • ESV Tank Vacuum HI • Condenser Vacuum will start decreasing **Crew Response:** ***Examiner Note: The OAC LPSW Leakage Accumulator LO LO condition is TS 3.7.7. Condition B entry criteria. This alarm will clear when the D CCW pump is started.*** The crew should recognize the need to start the 1D CCW pump and position the LOCA Load Shed select switch to a running CCW pump. OP/**1**/A/1104/012 A: Rev 18 2.1 Verify seal water aligned to CCW Pump to be started per OP/0/A/1104/052 (SSW System). **NOTE:** Do **NOT** operate CCW Pumps in the same header until adjacent CCW Pump discharge valves have fully repositioned to prevent CCW Pump discharge valve malfunction. {3} 2.2 **IF** this is the first CCW Pump to be started, verify closed CCW Pump discharge valves on adjacent CCW Pumps. 2.3 Verify closed discharge valve on CCW Pump to be started.
This event is complete when a CCW pump is started in the same header as the CCW pump that tripped and the Tech Spec determination has been made or when directed by the lead examiner.		

Op-Test No.: **ILT48**	Scenario No.: **2**	Event No.: **2**	Page 2 of 2
Event Description:	**CCW pump trip (C, BOP, SRO)(TS)**		

Position	Applicant's Actions or Behavior
SRO/BOP	*OP/1/A/1104/012 A* **Crew Response:** **NOTE:** • CCW Pump starts when discharge valve ≈ 20% open. • ESV Tank low vacuum alarms may occur during CCW Pump start. {1} • LPSW Leakage Accumulator level is a function of LPSW System pressure. When CCW Pump status is changed, LPSW Leakage Accumulator level may exceed the limits of SR 3.7.7.1 until LPSW system pressure stabilizes. As a result, momentary entry into TS 3.7.7 Condition 'B' may be necessary. 2.4 Start desired CCW Pump: ____________. 2.5 Verify CCW Pump discharge valve opens. 2.6 Ensure CCWP LOAD SHED DEFEAT switch is positioned to a running CCW Pump. **TS 3.7.7 LOW PRESSURE SERVICE WATER (LPSW) SYSTEM** **Condition B (7 days) Restore the LPSW WPS to OPERABLE status.**

This event is complete when a CCW pump is started in the same header as the CCW pump that tripped and the Tech Spec determination has been made or when directed by the lead examiner.

Op-Test No.: **ILT48**	Scenario No.: **2**	Event No.: **3**	Page 1 of 3
Event Description: **Controlling NR Tave Fails HIGH (586ºF) (I: OATC, SRO)**			

Time	Position	Applicant's Actions or Behavior
		AP/1/A/1700/028
		Plant Response: • Controlling NR Tave digital display reads ≈ 587.1°F • Controlling Tave Chessell display reads ≈ 587.1°F • 1SA-2/B4 (RC Average Temperature High/Low) • 1SA-2/A12 ICS Tracking • 1SA-2/C11 ICS Loss of OAC CTP Signal • Controls will insert and FDW flow will increase • RCS pressure will decrease
	SRO/OATC	**Crew Response**: • When the Statalarms are received, the candidates should utilize the “Plant Transient Response” process to stabilize the plant. • Verbalize to the CRS reactor power level and direction of movement.
	CT-1	• Place the Diamond and both FDW Masters in manual and position as necessary to stabilize the plant. (decrease FDW)
		Note: The OATC will have to reduce FDW in order to stabilize power below the pre-transient level.
		• The CRS should: ➢ Refer to AP/28, ICS Instrument Failures ➢ Ensure SPOC is contacted to repair the failed instrument.
		AP/1/A/1700/028, ICS Instrument Failures Rev 20 4.1 Provide control bands as required. **(OMP 1-18 Att. I)**
		OMP 1-18 Attachment I: ***1. Plant Conditions Stable or TPB $\leq$ Pre-transient Conditions*** • ***NI Power $\pm$ 1% not to exceed the pre-transient or allowable power. If at the pre-transient or allowable level, band is NI Power – 1%.*** • ***Current Tave $\pm$ 2 ºF.*** • ***Current SG Outlet Pressure $\pm$ 10 PSIG (N/A)*** • ***Delta Tc 0 ºF $\pm$ 2 ºF.***

This event is complete when the CRS reaches step 6 (WHEN) in AP/28 Section 4A, or as directed by the Lead Examiner.

Op-Test No.: **ILT48** Scenario No.: **2** Event No.: **3** Page 2 of 3

Event Description: **Controlling NR Tave Fails HIGH (586ºF) (I: OATC, SRO)**

Time	Position	Applicant's Actions or Behavior
		AP/1/A/1700/028
		Crew Response:
	SRO/OATC	4.2 Initiate notification of the following: __ OSM to reference the following: • OMP 1-14 (Notifications) • Emergency Plan __ STA
		4.3 Verify a power transient ≥ 5% has occurred. **RNO: GO TO** Step 4.5.
		4.4 Notify Rx Engineering and discuss the need for a maneuvering plan.
		4.5 Use the following, as necessary, to determine the applicable section from table in Step 4.6: • OAC alarm video • OAC display points • Control Board indications • SPOC assistance, as needed
		4.6 **GO TO** the applicable section per the following table: (Section / Failure: 4A / RCS Temperature)
		AP/1/A/1700/028, Section 4A, RCS Temperature Failure
		NOTE • If Tave instrument circuit failed high, the following may have occurred depending on initial ICS station status: • Unit to TRACK due to Rx Cross Limits • Control Rod insertion • Feedwater flow increase • If Tave instrument circuit failed low, the following may have occurred depending on initial ICS station status: • Unit to TRACK due to Rx Cross Limits • Control Rod withdrawal • Feedwater flow decrease • Feedwater re-ratio

	Section	Failure
	4A	RCS Temperature

This event is complete when the CRS reaches step 6 (WHEN) in AP/28 Section 4A, or as directed by the Lead Examiner.

Op-Test No.: **ILT48**	Scenario No.: **2**	Event No.: **3**	Page 3 of 3
Event Description: **Controlling NR Tave Fails HIGH (586ºF) (I: OATC, SRO)**			

Time	Position	Applicant's Actions or Behavior
	SRO/OATC	***AP/1/A/1700/028*** **Crew Response**: 1. Ensure the following in HAND: __ 1A FDW MASTER __ 1B FDW MASTER 2. Ensure DIAMOND in MANUAL. 3. Notify SPOC to perform the following: __ Select a valid RCS Tave and Delta Tc input to ICS per AM/1/A/0326/020 (Control of Unit 1 Star Module Signal Selection Function). __ Investigate and repair the failed RCS temperature instrumentation. 4. **PERFORM** an instrumentation surveillance using applicable table in Encl 5.2 (ICS Instrument Surveillances) for the failed instrument. 5. Verify instrumentation surveillance in Encl 5.2 (ICS Instrument Surveillances was performed satisfactorily as written. **RNO:** Initiate a Surveillance Evaluation in accordance with PT/1/A/0600/001 (Periodic Instrument Surveillance) and OP/1/A/1105/014 (Control Room Instrumentation Operation And Information). 6. **WHEN** notified by SPOC that a valid RCS Tave and Delta Tc input have Been restored to ICS, **THEN GO TO** OP/1/A/1102/004 A Encl (Placing ICS Stations To Auto).

This event is complete when the CRS reaches step 6 (WHEN) in AP/28 Section 4A, or as directed by the Lead Examiner.

Op-Test No.: **ILT48**	Scenario No.: **2**	Event No.: **4**	Page 1 of 4

Event Description: **1B Main FDW Pump Active Thrust Bearing Temperature HIGH Requiring manual power reduction and MFW Pump trip (C: BOP, R: OATC, SRO)(TS)**

Time	Position	Applicant's Actions or Behavior
	SRO/OATC/ BOP	***AP/1/A/1700/029*** **Plant response:** OAC Alarm O1A0928 FWPT 1B ACTIVE THRUST BEARING TEMP **Crew Response:** Refer to OAC Alarm Response for O1A0928 for HI-HI temperature > 200°F HI-HI: 1) If temperature cannot be maintained below HI-HI setpoint, refer to OP/1/A/1106/002 B (FDWPT Operation) to remove FDWP from service 2) Refer to OP/1/A/1102/004 (Operation at Power) 3) Notify Component Engineer ***Booth cue: If contacted, respond as the Component Engineer and recommend that the 1B FDWPT be removed from service as soon as possible.*** ***Booth cue: If contacted, respond as the SM and recommend reducing power using AP/1/A/1700/029 (Rapid Unit Shutdown) to remove the 1B FDWPT from service as soon as possible*** ***Booth cue: If an AO is dispatched, he should report that there is a strong scorching oil smell around the 1B FDWP and the bearing housing is hot to the touch.*** ***Examiner Note: The SRO will refer to AP/1/A/1700/029 (Rapid Unit Shutdown) to reduce power to below 65% in order to secure the 1B MFW Pump.*** ***The BOP should refer to OP/1/A/1106/002 B (FDWPT Operation)***) (**Page 16**) **AP/1/A/1700/029 (Rapid Unit Shutdown)**Rev 13 **NOTE** The CR SRO should read this procedure and it should **NOT** be used when EOP entry conditions exist. 4.1 Initiate Encl 5.1 (Support Actions During Rapid Unit Shutdown). 4.2 Announce AP entry using the PA system.

This event is complete when the BOP secures the 1B MFW Pump, or as directed by the Lead Examiner.

Op-Test No.: **ILT48**	Scenario No.: **2**	Event No.: **4**	Page 2 of4

Event Description: **1B Main FDW Pump Active Thrust Bearing Temperature HIGH Requiring manual power reduction and MFW Pump trip (C: BOP, R: OATC, SRO)(TS)**

Time	Position	Applicant's Actions or Behavior
	SRO/OATC BOP	***AP/1/A/1700/029*** **Crew Response:** 4.3 **IAAT** both of the following apply: __ It is desired to stop power decrease __ CTP > 18 % **THEN** perform Steps 4.4 - 4.7. **RNO: GO TO** Step 4.8. ***Examiner Note: Power decrease will be stopped when lowered to < 65%.*** 4.4 Verify ICS in AUTO. ***[ICS is in MANUAL]*** **RNO:** 1. __ Stop manual power reduction. 2. __ **GO TO** Step 4.6. **NOTE** Due to the power decrease initiated in this AP, the current plant configuration must be compared to the normal plant configuration in OP/1/A/1102/004 (Operation at Power) power reduction enclosure. Equivalent steps performed by this AP should be signed off as intent met. Any steps **NOT** performed by this AP must be evaluated in preparation for power increase or continued shutdown. 4.6 Initiate OP/1/A/1102/004 (Operation at Power) power reduction enclosure. 4.7 **WHEN** conditions permit, **THEN** perform one of the following: __ Depress MAXIMUM RUNBACK to resume power reduction. __ **GO TO** appropriate operating procedure for continued operation. 4.8 Verify ICS in AUTO. ***[ICS is in MANUAL]*** **RNO**: 1. __ Initiate manual power reduction to desired power level. 2. __ **GO TO** Step 4.10. 4.10 Verify both Main FDW pumps running.

This event is complete when the BOP secures the 1B MFW Pump, or as directed by the Lead Examiner.

Op-Test No.: **ILT48**	Scenario No.: **2**	Event No.: **4**	Page 3 of 4

Event Description: **1B Main FDW Pump Active Thrust Bearing Temperature HIGH Requiring manual power reduction and MFW Pump trip (C: BOP, R: OATC, SRO)(TS)**

Time	Position	Applicant's Actions or Behavior
	SRO/OATC BOP	***AP/1/A/1700/029*** **<u>Crew Response</u>:** **<u>NOTE</u>** • 1B Main FDW Pump is the preferred pump to be shutdown first. • To lower 1B Main FDW Pump suction flow, bias is adjusted counter-clockwise. • To lower 1A Main FDW Pump suction flow, bias is adjusted clockwise. 4.11 Adjust bias for first Main FDW pump desired to be shutdown until Suction flow is ≈ 1 x 106 lbm/hr less than remaining Main FDW pump suction flow. 4.12 **WHEN** core thermal power is < 65% FP, **THEN** continue. ***Examiner Note: when < 65% power, IAAT step 4.3 applies which directs the performance of step 4.4-4.7 on the previous page.*** ***OP/1/A/1106/002 B*** **<u>*OP/1/A/1106/002 B (FDWPT Operation*) Encl 4.9 Shutdown Of 1B FDWPT</u>** Rev 38 2.1 **IF** this is first FDWPT to be shutdown: ***[It is the 1st FDWPT to be shutdown]*** 2.1.1 Verify 1SA-5/E-1 (FWPT / RX TRIP ALERT) **NOT** in alarm. 2.1.2 Position the following: A. Ensure 1FDW-53 (1A FDWP RECIRC CONTROL) in "MANUAL" B. Ensure Closed 1FDW-53 (1A FDWP RECIRC CONTROL) C. Ensure 1FDW-65 (1B FDWP RECIRC CONTROL) in "MANUAL" D. Ensure Closed 1FDW-65 (1B FDWP RECIRC CONTROL) 2.2 **IF** in FDW Heatup, perform the following: ***[N/A]***

This event is complete when the BOP secures the 1B MFW Pump, or as directed by the Lead Examiner.

Op-Test No.: **ILT48**	Scenario No.: **2**	Event No.: **4**	Page 4 of 4

Event Description: **1B Main FDW Pump Active Thrust Bearing Temperature HIGH Requiring manual power reduction and MFW Pump trip (C: BOP, R: OATC, SRO)(TS)**

Time	Position	Applicant's Actions or Behavior
	SRO/OATC/ BOP	***OP/1/A/1106/002 B*** **Crew Response**: 2.3 Ensure running 1B FDWP AUXILIARY OIL PUMP. 2.4 **IF** 1A FDWP is **NOT** isolated for maintenance, start 1A FDWP AUXILIARY OIL PUMP. 2.5 Place 1B MAIN FDW PUMP (ICS) in "HAND". 2.6 Slowly run 1B MAIN FDW PUMP demand signal to minimum. 2.7 **IF** required, verify 1A FDWPT picks up load by observing FDWPT suction flow instruments. 2.8 Immediately trip 1B FDWPT from FW TURB 1B TRIP/RESET switch. • Verify closed 1B FDWPT HP stop valve • Verify closed 1B FDWPT LP stop valve **TS 3.10.1 STANDBY SHUTDOWN FACILITY (SSF)** Conditions A-E (7 days) Restore to operable status ***Once Reactor Power is reduced to below 85% the SSF must be declared inoperable and therefore Tech Spec 3.10.1 applies. Conditions A-E should be entered.***

This event is complete when the BOP secures the 1B MFW Pump, or as directed by the Lead Examiner.

Op-Test No.:**ILT48**	Scenario No.: **2**	Event No.: **5**	Page 1 of 1
Event Description: **Bearing Oil Header Pressure LOW, EBOP fails to AUTO Start (C: BOP, SRO)**			

Time	Position	Time
	SRO/ BOP	*1SA-3/E7* **Plant Response**: • 1SA-3/E7 BEARING OIL HEADER PRESSURE LOW • OAC alarm TGOP RUNNING **Crew Response**: 1SA-3/E7 BEARING OIL HEADER PRESSURE LOW Rev 59 3.1 Verify Turning Gear Oil Pump has started. 3.2 Check BEARING HEADER pressure gauge at Turbine Front Standard. **NOTE:** EBOP will also start on a loss of power to Turning Gear Oil Pump ***Examiner Note: EBOP will fail to start automatically.*** 3.3 **IF** BEARING HEADER pressure < 15 psig, verify EBOP is on. 3.3.1 **IF** EBOP has **NOT** started, start EBOP. **[BOP will start the EBOP]** 3.4 **IF** BEARING HEADER pressure is still < 15 psig: 3.4.1 TRIP THE TURBINE 3.4.2 Place Turbine Turning Gear switch in PULL TO LOCK. 3.5 Check all 12 bearings and verify oil drain flow. 3.6 Check Main Shaft Pump discharge and suction pressure. 3.7 Check Oil Cooler flow sight glass for flow indication and for cooler leakage. 3.8 Check booster pump valve and pressure switch set points. ***Examiner Note: Approximately one minute after the EBOP is started, it will trip on overload. When Bearing Header Pressure decreases to below 15 psig, the crew should trip the reactor and turbine which will start the next event.***

This event is complete when the OATC attempts to trip the reactor, or as directed by the Lead Examiner.

Op-Test No.: **ILT48** Scenario No.: **2** Event No.: **6** Page 1 of 6

Event Description: **Turbine Oil Header Pressure low, Manual Turbine Trip, ATWS (M: All)**

Time	Position	Applicant's Actions or Behavior
		EOP
		<u>Plant response</u>: • 1SA-3/E7 BEARING OIL HEADER PRESSURE LOW • Statalarm 1SA-01/A1, B1, C1, D1 (RP Channel A-D Trip)
	SRO	**<u>Crew response</u>**: • Recognize that the Reactor did NOT trip • Attempt to trip the reactor manually • SRO will direct the OATC to perform IMAs and the BOT to perform a symptom check.
		IMAs
	OATC	***<u>EOP Immediate Actions</u>*** Rev 40 3.1 Depress REACTOR TRIP pushbutton. **[*Will not trip the reactor]*** 3.2 Verify reactor power < 5% FP and decreasing. **RNO: GO TO** Rule 1 (ATWS/Unanticipated Nuclear Power Production). (**Page 20**)
		SYMPTOM CHECK
	BOP	The BOP will verify the following:

Power Range NIs **NOT** < 5% Power Range NIs **NOT** decreasing	Rule 1, *ATWS/Unanticipated Nuclear Po Production*
Any SCM < 0°F	Rule 2, *Loss Of SCM*
Loss of Main and Emergency FDW (including unsuccessful manual initiation of EFDW)	Rule 3, *Loss of Main or Emerg FDW* Rule 4, *Initiation of HPI Forced Cooling* (Inability to feed SGs and > 2300 psig, N limit reached, or PZR level > 375")
Uncontrolled Main steam line(s) pressure decrease	Rule 5, *Main Steam Line Break*
CSAE Offgas alarms Process monitor alarms (RIA-40, 59,60), Area monitor alarms (RIA-16/17)	None (SGTR Tab is entered when identif SG Tube Leakage > 25 gpm)

BOP will inform the SRO:

- No symptoms to report except that Power Range NIs are > 5%, OATC is performing Rule 1.

This event is complete when the crew transfers to Subsequent Actions, or as directed by the Lead Examiner.

Op-Test No.: **ILT48**	Scenario No.: **2**	Event No.: **6**	Page 2 of 6

Event Description: **Turbine Oil Header Pressure low, Manual Turbine Trip, ATWS (M: All)**

Time	Position	Applicant's Actions or Behavior
	OATC	***RULE 1*** **CREW RESPONSE:** **Rule 1** 1. Verify any Power Range NI ≥ 5% FP. 2. Initiate manual control rod insertion to the IN LIMIT. 3. Verify Main FDW is feeding the SGs. **RNO:** __ Trip the turbine-generator. 4. __ Notify CRS to **GO TO** UNPP tab. (**Page 21**) 5. Open: __ 1HP-24 __ 1HP-25 **[*Fails Closed*]** ***RNO:*** **IF** both are closed: __ 1HP-24 __ 1HP-25 **THEN GO TO** Step 32. 6. Ensure at least one operating: __ 1A HPI PUMP __ 1B HPI PUMP **[Crew should NOT start due to 1HP-25 being failed closed]** ***Examiner Note: Per Rule 6 HPI, HPI pump operations must be limited to two HPIPs when only one BWST suction valve (1HP-24 or 1HP-24) is open.*** 7. Start 1C HPI PUMP. 8. Open: __ 1HP-26 __ 1HP-27

This event is complete when the crew transfers to Subsequent Actions, or as directed by the Lead Examiner.

Op-Test No.: **ILT48**	Scenario No.: **2**	Event No.: **6**	Page 3 of 6

Event Description: **Turbine Oil Header Pressure low, Manual Turbine Trip, ATWS (M: All)**

Time	Position	Applicant's Actions or Behavior
		RULE 1
	OATC ***CT-2***	**Crew Response**: 9. Dispatch one operator without wearing Arc Flash PPE to open 600V CRD breakers: {33} __ 1X9-5C (U-1 CRD Norm Fdr Bkr) (U1 Equipment Rm) __ 2X1-5B (U-1 CRD Alternate Fdr Bkr) (T-3/Dd-28) ***Examiner Note: When the operator is dispatched to open CRD breakers, a 4 minute time will be initiated to open the CRD breakers.*** 10. Verify only two HPI pumps operating. 11. **EXIT**.
		UNPP Tab
	SRO/BOP	1. Ensure Rule 1 (ATWS / Unanticipated Nuclear Power Production) is in progress or complete. 2. Verify Main FDW is operating and in AUTO. 3. **IAAT** Main FDW is **NOT** operating, **THEN**: A. __ Trip the turbine-generator. B. __ Start all available EFDW pumps. C. __ Ensure Rule 3 (Loss of Main or Emergency FDW) is in progress or complete. 4. __ **IAAT** all power range NIs are < 5% FP, **THEN** perform Steps 5 - 6. **RNO: GO TO** Step 7. 5. Depress turbine TRIP pushbutton. 6. Verify all turbine stop valves closed.

This event is complete when the crew transfers to Subsequent Actions, or as directed by the Lead Examiner.

Op-Test No.: **ILT48**	Scenario No.: **2**	Event No.: **6**	Page 4 of 6

Event Description: **Turbine Oil Header Pressure low, Manual Turbine Trip, ATWS (M: All)**

Time	Position	Applicant's Actions or Behavior
	SRO/OATC BOP	***UNPP Tab*** **Crew Response:** 7. Verify any wide range NI > 1% FP. 8. Open 1RC-4. 9. Verify 1HP-5 open. 10. Maximize letdown using 1HP-7 while maintaining letdown temperature < 120°F. 11. Verify Main FDW available. 12. Adjust Main FDW flow as necessary to control RCS temperature. 13. Verify overcooling in progress. **[Over cooling is NOT in progrerss]** **RNO: GO TO** Step 16. 16. Secure makeup to LDST. {8} 17. **WHEN** all wide range NIs are ≤1% FP, **AND** decreasing, **THEN** continue. 18. Control RCS temperature as follows: __ Tave ≤ 555°F- Adjust SG pressure as necessary to stabilize RCS temperature using either: • TBVs • Dispatch two operators to perform Encl 5.24 (Operation of the ADVs). (**PS**) __ Tave > 555°F • Utilize Rule 7 (SG Feed Control) to control SG feed rate as necessary to maintain cooldown rate within Tech Spec limits during the approach to the SG Level Control Point. 19. __ Throttle HPI per Rule 6 (HPI). (**Page 25**) 20. __ **WHEN** RCS pressure < 2300 psig, **THEN** continue.

This event is complete when the crew transfers to Subsequent Actions, or as directed by the Lead Examiner.

Op-Test No.: **ILT48**	Scenario No.: **2**	Event No.: **6**	Page 5 of 6
Event Description: **Turbine Oil Header Pressure low, Manual Turbine Trip, ATWS (M: All)**			

Time	Position	Applicant's Actions or Behavior
	SRO/OATC BOP	***UNPP Tab*** **Crew Response:** 21. Verify PORV closed. 22. Adjust letdown flow as desired. 23. Verify RCP seal injection available. 24. **GO TO** Subsequent Actions. ***SUBSEQUENT ACTIONS Tab*** 4.1 Verify all control rods in Groups 1 – 7 fully inserted. 4.2 Verify Main FDW in operation. 4.3 Verify either: __ Main FDW overfeeding causing excessive temperature decrease. __ Main FDW underfeeding causing SG level decrease below setpoint. **RNO**: **GO TO** Step 4.5. 4.5 **IAAT** Main FDW is operating, **AND** level in any SG is > 96% on the Operating Range, **THEN** perform Steps 4.6 - 4.8. **RNO: GO TO** Step 4.9. 4.9 **IAAT** TBVs **CANNOT** control SG pressure at desired setpoint, **AND** TBVs **NOT** intentionally isolated, **THEN** manually control pressure in affected SGs using either: __ TBVs __ Dispatch two operators to perform Encl 5.24 (Operation of the ADVs) (**PS**) 4.10 Verify 1RIA-40 operable with CSAE OFF-GAS BLOWER operating. 4.11 **GO TO** Step 4.14. 4.14 Verify both are closed: __ 1MS-17 __ 1MS-26
This event is complete when the crew transfers to Subsequent Actions, or as directed by the Lead Examiner.		

Op-Test No.: **ILT48**	Scenario No.: **2**	Event No.: **6**	Page 6 of 6

Event Description: **Turbine Oil Header Pressure low, Manual Turbine Trip, ATWS (M: All)**

Time	Position	Applicant's Actions or Behavior
	SRO/OATC BOP	*SUBSEQUENT ACTIONS Tab* **Crew Response:** 4.15 Verify ES is required. **RNO:** 1. __ Initiate Encl 5.5 (Pzr and LDST Level Control) (**Page 26**) 2. __ **GO TO** Step 4.17. 4.17 Open: __ PCB 20 __ PCB 21 4.18 Verify Generator Field Breaker open. 4.19 Verify EXCITATION is OFF. 4.20 Verify Aux Bldg and Turbine Bldg Instrument Air pressure ≥ 90 psig. 4.21 Verify ICS/NNI power available. 4.22 Verify all 4160V switchgear (1TC, 1TD & 1TE) energized. 4.23 Verify both SGs > 550 psig. 4.24 Verify Main FDW operating. 4.25 Verify any RCP operating. 4.26 Verify AP/0/A/1700/025 (SSF EOP) Encl (Unit 1 OATC Actions During Fire) in progress or complete. **RNO:** Ensure SGs approaching 25" – 35" [55" – 65" acc] S/U level. 4.27 Place switches in CLOSE: __ 1FDW-31 __ 1FDW-40

This event is complete when the crew transfers to Subsequent Actions, or as directed by the Lead Examiner.

Rule 6
HPI

<u>HPI Pump Throttling Limits</u>

- HPI must be throttled to prevent violating the RV-P/T limit.

- HPI pump operation must be limited to two HPIPs when only one BWST suction valve (1HP-24 or 1HP-25) is open.

- HPI must be throttled ≤ 475 gpm/pump (including seal injection for A header) when only one HPI pump is operating in a header.

- Total HPI flow must be throttled ≤ 950 gpm including seal injection when 1A and 1B HPI pumps are operating with 1HP-409 open.

- Total HPI flow must be throttled < 750 gpm when all the following exist:
  - LPI suction is from the RBES
  - piggyback is aligned
  - either of the following exist:
    - only one piggyback valve is open (1LP-15 or 1LP-16)
    - only one LPI pump operating
    - HPI may be throttled under the following conditions:

HPI Forced Cooling in Progress:	**HPI Forced Cooling NOT in Progress:**
<u>All</u> the following conditions must exist: • <u>Core</u> SCM > 0 • CETCs decreasing	<u>All</u> the following conditions must exist: • <u>All</u> WR NIs ≤ 1% • <u>Core</u> SCM > 0 • Pzr level increasing • CRS concurrence required if throttling following emergency boration

<u>HPI Pump Minimum Flow Limit</u>

- Maintain ≥ 170 gpm indicated/pump. This is an instrument error adjusted value that ensures a real value of ≥ 65 gpm/pump is maintained. HPI pump flow less than minimum is allowed for up to 4 hours.

Enclosure 5.5
Pzr and LDST Level Control

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
NOTE Maintaining Pzr level >100″ [180″ acc] will ensure Pzr heater bundles remain covered.	
1. __ Utilize the following as necessary to maintain <u>desired</u> Pzr level: • 1A HPI Pump • 1B HPI Pump • 1HP-26 • 1HP-7 • 1HP-120 setpoint or valve demand • 1HP-5	**IF** 1HP-26 will **NOT** open, **THEN** throttle 1HP-410 to maintain desired Pzr level.
2. **IAAT** <u>makeup</u> to the <u>LDST</u> is desired, **THEN** makeup from 1A BHUT.	
3. **IAAT** it is desired to <u>secure</u> <u>makeup</u> to LDST, **THEN** secure makeup from 1A BHUT.	
4. **IAAT** it is desired to <u>bleed</u> letdown flow to 1A BHUT, **THEN** perform the following: A. Open: __ 1CS-26 __ 1CS-41 B. __ Position 1HP-14 to BLEED. C. __ Notify SRO.	
5. **IAAT** letdown <u>bleed</u> is **NO** longer desired, **THEN** position 1HP-14 to NORMAL.	

Enclosure 5.5
Pzr and LDST Level Control

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
6. **IAAT** 1C HPI PUMP is required, **THEN** perform Steps 7 - 9.	**GO TO** Step 10.
7. __ Open: • 1HP-24 • 1HP-25	1. **IF** both BWST suction valves (1HP-24 and 1HP-25) are closed, **THEN** perform the following: A. __ Start 1A LPI PUMP. B. __ Start 1B LPI PUMP. C. Open: __ 1LP-15 __ 1LP-16 __ 1LP-9 __ 1LP-10 __ 1LP-6 __ 1LP-7 D. **IF** two LPI Pumps are running only to provide HPI pump suction, **THEN** secure one LPI pump. E. Dispatch an operator to open 1HP-363 (Letdown Line To LPI Pump Suction Block) (A-1-119, U1 LPI Hatch Rm, N end). F. __ **GO TO** Step 8. 2. **IF** only one BWST suction valve (1HP-24 or 1HP-25) is open, **THEN** perform the following: A. **IF** three HPI pumps are operating, **THEN** secure 1B HPI PUMP. B. **IF** < 2 HPI pumps are operating, **THEN** start HPI pumps to obtain two HPI pump operation, preferably in opposite headers. C. __ **GO TO** Step 9.

Enclosure 5.5
Pzr and LDST Level Control

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
8. __ Start 1C HPI PUMP.	**IF** at least two HPI pumps are operating, **THEN** throttle 1HP-409 to maintain desired Pzr level.
9. Throttle the following as required to maintain desired Pzr level: 1HP-26 __ 1HP-27	1. __ **IF** at least two HPI pumps are operating, **AND** 1HP-26 will **NOT** open, **THEN** throttle 1HP-410 to maintain desired Pzr level. 2. **IF** 1A HPI PUMP <u>and</u> 1B HPI PUMP are operating, **AND** 1HP-27 will **NOT** open, **THEN** throttle 1HP-409 to maintain desired Pzr level.

Enclosure 5.5
Pzr and LDST Level Control

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
10. **IAAT** <u>LDST</u> <u>level</u> **CANNOT** be maintained, **THEN** perform Step 11.	**GO TO** Step 12.
11. __ Perform the following: • Open 1HP-24. • Open 1HP-25. • Close 1HP-16.	1. **IF** <u>both</u> BWST suction valves (1HP-24 and 1HP-25) are closed, **THEN** perform the following: A. __ Start 1A LPI PUMP. B. __ Start 1B LPI PUMP. C. Open: __ 1LP-15 __ 1LP-16 __ 1LP-9 __ 1LP-10 __ 1LP-6 __ 1LP-7 D. **IF** two LPI Pumps are running <u>only</u> to provide HPI pump suction, **THEN** secure one LPI pump. E. Dispatch an operator to open 1HP-363 (Letdown Line To LPI Pump Suction Block) (A-1-119, U1 LPI Hatch Rm, N end). F. __ **GO TO** Step 13. 2. **IF** <u>only one</u> BWST suction valve (1HP-24 or 1HP-25) is open, **AND** three HPI pumps are operating, **THEN** secure 1B HPI PUMP.
NOTE Maintaining Pzr level > 100” [180” acc] will ensure Pzr heater bundles remain covered.	
12.__ Operate Pzr heaters as required to maintain heater bundle integrity.	

Enclosure 5.5
Pzr and LDST Level Control

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
13. **IAAT** additional makeup flow to LDST is desired, **AND** 1A BLEED TRANSFER PUMP is operating, **THEN** dispatch an operator to close 1CS-48 (1A BHUT Recirc) (A-1-107, Unit 1 RC Bleed Transfer Pump Rm.).	
14. **IAAT** <u>two</u> Letdown Filters are desired, **THEN** perform the following: __ Open 1HP-17. __ Open 1HP-18	
15. __ **IAAT** <u>all</u> of the following exist: __ Letdown isolated __ LPSW available __ Letdown restoration desired **THEN** perform Steps 16 - 34. {41}	__ **GO TO** Step 35.
16. Open: 1CC-7 1CC-8	1. Notify CR SRO that letdown **CANNOT** be restored due to inability to restart the CC system. 2. **GO TO** Step 35.
17. Ensure only one CC pump running.	
18. Place the non-running CC pump in AUTO.	
19. Verify <u>both</u> are open: 1HP-1 1HP-2	1. **IF** 1HP-1 is closed due to 1HP-3 failing to close, **THEN GO TO** Step 21. 2. **IF** 1HP-2 is closed due to 1HP-4 failing to close, **THEN GO TO** Step 21.
20. __ **GO TO** Step 23.	

NOTE
Verification of leakage requires visual observation of East Penetration Room.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
21. __ Verify letdown line leak in East Penetration Room has occurred.	**GO TO** Step 23.
22. __ **GO TO** Step 35.	

Enclosure 5.5
Pzr and LDST Level Control

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
23. Monitor for unexpected conditions while restoring letdown.	
24. __ Verify <u>both</u> letdown coolers to be placed in service.	1. **IF** 1A letdown cooler is to be placed in service, **THEN** open: __ 1HP-1 __ 1HP-3 2. **IF** 1B letdown cooler is to be placed in service, **THEN** open: __ 1HP-2 __ 1HP-4 3. __ **GO TO** Step 26.
25. Open: __ 1HP-1 __ 1HP-2 __ 1HP-3 __ 1HP-4	
26. Verify <u>at least one</u> letdown cooler is aligned.	Perform the following: A. Notify CR SRO of problem. B. **GO TO** Step 35.
27. Close 1HP-6.	
28. Close 1HP-7.	
29. Verify letdown temperature < 125°F.	1. Open 1HP-13. 2. Close: __ 1HP-8 __ 1HP-9&11 3. **IF** <u>any</u> deborating IX is in service, **THEN** perform the following: A. __ Select 1HP-14 to NORMAL. B. __ Close 1HP-16. 4. Select LETDOWN HI TEMP INTLK BYP switch to BYPASS.

Enclosure 5.5
Pzr and LDST Level Control

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
30. __ Open 1HP-5.	
31. __ Adjust 1HP-7 for ≈ 20 gpm letdown.	
32. __ **WHEN** letdown temperature is < 125°F, **THEN** place LETDOWN HI TEMP INTLK BYP switch to NORMAL.	
33. __ Open 1HP-6.	
34. Adjust 1HP-7 to control desired letdown flow.	

NOTE

AP/32 (Loss of Letdown) provides direction to cool down the RCS to offset increasing pressurizer level.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
35. **IAAT** it is determined that letdown is unavailable due to equipment failures <u>or</u> letdown system leakage, **THEN** notify CR SRO to initiate AP/32 (Loss of Letdown).	
36. **IAAT** > 1 HPI pump is operating, **AND** additional HPI pumps are **NO** longer needed, **THEN** perform the following: A. Obtain SRO concurrence to reduce running HPI pumps. B. __ Secure the desired HPI pumps. C. Place secured HPI pump switch in AUTO, if desired.	
37. __ **IAAT** <u>all</u> the following conditions exist: __ Makeup from BWST **NOT** required __ LDST level > 55″ __ <u>All</u> control rods inserted __ Cooldown Plateau **NOT** being used **THEN** close: __ 1HP-24 __ 1HP-25	

Enclosure 5.5
Pzr and LDST Level Control

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
38. __ Verify 1CS-48 (1A BHUT Recirc) has been closed to provide additional makeup flow to LDST.	**GO TO** Step 40.
39. **WHEN** 1CS-48 (1A BHUT Recirc) is **NO** longer needed to provide additional makeup flow to LDST, **THEN** perform the following: A. Stop 1A BLEED TRANSFER PUMP. B. Locally position 1CS-48 (1A BHUT Recirc) <u>one</u> turn open (A-1-107, Unit 1 RC Bleed Transfer Pump Rm.). C. __ Close 1CS-46. D. Start 1A BLEED TRANSFER PUMP. E. Locally throttle 1CS-48 (1A BHUT Recirc) to obtain 90 - 110 psig discharge pressure. F. Stop 1A BLEED TRANSFER PUMP.	
40. __ Verify two Letdown Filters in service, **AND** <u>only one</u> Letdown filter is desired.	**GO TO** Step 42.
41. Perform <u>one</u> of the following: __ Place 1HP-17 switch to CLOSE. __ Place 1HP-18 switch to CLOSE.	
42. **WHEN** directed by CR SRO, **THEN EXIT** this enclosure.	

Enclosure 5.9

Extended EFDW Operation Rev 40

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
1. Monitor EFDW parameters on EFW graphic display.	
2. **IAAT** UST level is < 4', **THEN GO TO** Step 120.	
3. **IAAT** feeding both SGs with one MD EFDWP is desired, **THEN** perform Steps 4 - 7.	**GO TO** Step 8.
4. Place EFDW control valve on SG with **NO** EFDW flow to MANUAL and closed:	
5. Locally open: 1FDW-313 (1A EFDW Line Disch To 1A S/G X-Conn) (T-1, 1' N of M-16, 18' up); 1FDW-314 (1B EFDW Line Disch To 1B S/G X-Conn) (T-1, 3' S of M-24, 10' up)	
6. __ Ensure a MD EFDWP is operating.	
7. Throttle EFDW control valve on SG with **NO** EFDW flow to establish appropriate level per Rule 7 (SG Feed Control):	
8. Perform as required to maintain UST level > 7.5': __ Makeup with demin water. __ Place CST pumps in AUTO.	
9. __ **IAAT** all exist: __ Rapid cooldown **NOT** in progress; MD EFDWP operating for each available SG; EFDW flow in each header < 600 gpm; **THEN** place 1 TD EFDW PUMP switch in PULL TO LOCK.	

Step 4 and Step 7 valve table:

	1A SG		1B SG
	1FDW-315		1FDW-316

Enclosure 5.9

Extended EFDW Operation

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
10. __ Verify 1 TD EFDW PUMP operating.	__ **GO TO** Step 12.
11. Start TD EFDWP BEARING OIL COOLING PUMP.	

NOTE

- Loss of the condensate system for ≥ 25 minutes results in cooling down to LPI using the ADVs. If **NO** HWPs are operating, continuing this enclosure to restore the condensate system is a priority unless the CR SRO deems EOP activities higher priority. The 25 minute criterion is satisfied when a HWP is started and 1C-10 is 10% open.
- If the condensate system is operating, the remaining guidance establishes FDW recirc, monitors and maintains UST, and transfers EFDW suction to the hotwell if required.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
12. Notify CR SRO to set priority based on the NOTE above and EOP activities.	
13. **IAAT** it is determined that condensate flow **CANNOT** be restored within 25 minutes, **THEN GO TO** Step 90.	
14. __ Verify any HWP operating.	1. __ Place all CBP control switches to OFF. 2. __ **GO TO** Step 20.
15. __ Verify any CBP operating.	1. **IF** AP/11 restarted a HWP, **THEN GO TO** Step 22. 2. __ **GO TO** Step 41.
16. Verify 1C COND BOOSTER PUMP operating. {12}	1. Ensure only one CBP is operating. 2. **GO TO** Step 18.
17. Stop: {12} __ 1A COND BOOSTER PUMP __ 1B COND BOOSTER PUMP	
18. __ Ensure only one HWP is operating.	
19. __ **GO TO** Step 44.	

Enclosure 5.9

Extended EFDW Operation

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
20. __ Verify a loss of power event caused the loss of the secondary system.	**GO TO** Step 24.
21. Ensure AP/11 (Recovery From Loss of Power) is in progress.	
22. **WHEN** AP/11 (Recovery From Loss of Power) has restored 600v load centers, **AND** a HWP is operating, **THEN** dispatch an operator to start all CBP Aux Oil Pumps. (T-1/J-21)	
23. **WHEN** notified that all CBP Aux Oil pumps are operating, **THEN GO TO** Step 41.	
24. __ Place all HWP control switches to OFF.	
25. __ Place all CBP control switches to OFF.	
26. Place valve switches to close until valve travel is initiated: __ 1FDW-4 __ 1FDW-9	Continue.
27. Start: 1A FDWP AUXILIARY OIL PUMP 1B FDWP AUXILIARY OIL PUMP	Start as necessary: 1A FDWP EMERGENCY BRNG OIL PUMP 1B FDWP EMERGENCY BRNG OIL PUMP
28. Verify both: FWPT A BRG LUBE OIL PRESS > 4 psig __ FWPT B BRG LUBE OIL PRESS > 4 psig	1. **IF** both FDW pumps have BRG LUBE OIL PRESS < 4 psig, **THEN GO TO** Step 90. 2. Perform for the FDW pump that has BRG LUBE OIL PRESS < 4 psig: __ Close 1FDW-1 for 1A FDW pump. __ Close 1FDW-6 for 1B FDW pump.
29. Place in MANUAL and close: __ 1FDW-53 __ 1FDW-65	

Enclosure 5.9

Extended EFDW Operation

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
30. Place 1C-10 FAIL SWITCH in MANUAL.	
31. __ Close 1C-10.	
32. Make plant page to clear basement and third floor of non-essential personnel.	
33. __ Start one HWP.	
34. Verify < 25 minutes elapsed since loss of condensate.	1. Stop all HWPs. 2. **GO TO** Step 90.
35. Throttle 1C-10 controller 10% open to satisfy 25 minute system restart criteria.	
36. __ **WHEN** FWP SUCT HDR PRESS (1VB3) is ≥ 100 psig, **THEN** open 1C-10.	
37. Place 1C-10 FAIL SWITCH in FAIL OPEN.	
38. Dispatch an operator to start all CBP Aux Oil Pumps. (T-1/J-21)	
39. Maximize total recirc flow < 1200 gpm with one of the following: __ 1FDW-53 __ 1FDW-65	
40. **WHEN** five minutes have elapsed, **AND** notified that all CBP Aux Oil pumps are operating, **THEN** continue procedure.	
41. __ Start a second HWP.	
42. __ Start 1C COND BOOSTER PUMP. {12}	__ Start one available CBP.
43. __ Stop one operating HWP.	
44. Place control switch for one secured HWP in AUTO.	
45. Place control switch for one secured CBP in AUTO.	

Enclosure 5.9

Extended EFDW Operation

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
46. Perform the following: Position HWP LOAD SHED DEFEAT switch to a running HWP. Position CBP LOAD SHED DEFEAT switch to a running CBP.	
47. Place in MANUAL: __ 1FDW-53 __ 1FDW-65	
48. Establish 2300 - 6000 gpm total recirc flow with <u>one</u> of the following: __ 1FDW-53 __ 1FDW-65	
49. **IAAT** UST level **CANNOT** be maintained > 8.5', **THEN** locally open 1C-899 (Cond Recirc To UST Riser Throttle) (T-1/J-23).	
50. **IAAT** UST level increases > 11', **THEN** perform as required: __ Throttle demin water Locally throttle 1C-899 (Cond Recirc To UST Riser Throttle) (T-1/J-23)	
51. Verify closed: __ 1FDW-4 __ 1FDW-9	__ **GO TO** Step 58.

Enclosure 5.9

Extended EFDW Operation

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
52. Position switches in CLOSE: __ 1FDW-33 __ 1FDW-31 __ 1FDW-42 __ 1FDW-40	
53. Ensure closed: __ 1FDW-33 __ 1FDW-31 __ 1FDW-42 __ 1FDW-40	
54. Locally open: 1FDW-5 (1A FDWP Discharge Bypass) (T-1/SE of D-24 12' up) 1FDW-10 (1B FDWP Discharge Bypass) (T-1/N of D-26 9' up)	
55. **WHEN** FWP DISCH HDR PRESS (1VB3) is approximately equal to <u>either</u> of the following: • O1A1014 (FDWP 1A DISCHARGE PRESS) • O1A1391 (FDWP 1B DISCHARGE PRESS) **THEN** open: __ 1FDW-4 __ 1FDW-9	

Enclosure 5.9

Extended EFDW Operation

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
56. Locally close: 1FDW-5 (1A FDWP Discharge Bypass) (T-1/SE of D-24 12' up) 1FDW-10 (1B FDWP Discharge Bypass) (T-1/N of D-26 9' up)	

NOTE

Windmill protection may have required closure of FDW pump suction valve.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
57. Verify open: 1FDW-1 __ 1FDW-6	1. **IF** required, notify the WCC SRO to initiate investigation. 2. __ Note on Turnover sheet that FDW pump associated with closed valve is not available for use until problem resolved.
58. **IAAT** it is desired to re-establish Main FDW, **THEN** initiate Encl (Re-establishing Main FDW) of OP/1/A/1106/002 (Condensate And FDW System).	
59. **IAAT** EFDW has been secured per Encl (Re-establishing Main FDW) of OP/1/A/1106/002 (Condensate And FDW System), **THEN EXIT**.	

Enclosure 5.9

Extended EFDW Operation

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
60. **WHEN** UST level is < 4', **THEN** dispatch two operators to perform Encl 5.24 (Operation of the ADVs) in preparation for loss of vacuum. (**PS**)	
61. Verify power available to 1V-186 by using valve position indicating light.	Dispatch an operator to be in position at 1V-186 (Vacuum Breaker) (T-3, catwalk at 1C2 waterbox).

NOTE
1C-573 will be closed after vacuum is broken.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
62. Dispatch an operator with a safety harness to 1C-573 (MD EFDWPs Suction From UST) (T-1, SW of E-24, 8' above floor) to: __ Unlock and remove chain from 1C-573. Establish communication with Control Room.	
63. **WHEN** UST level is < 3', **THEN** continue.	
64. Open 1V-186.	Notify operator to open 1V-186 (Main Condenser Vacuum Breaker) (T-3, catwalk at 1C2 waterbox).
65. __ Stop all main vacuum pumps.	
66. __ Stop all CBPs.	
67. __ Stop all HWPs.	
68. Close: __ 1MS-47 __ 1AS-40	Dispatch an operator to close: __ 1MS-49 (1A CSAE Steam Supply) (T-3/F-26) 1MS-58 (1B CSAE Steam Supply) (T-3/G-26) 1MS-67 (1C CSAE Steam Supply) (T-3/H-26)

Enclosure 5.9

Extended EFDW Operation

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

NOTE

- 1C-573 is open unless Step 75 has been completed.
- While EFDW is secured, a transfer to LOHT is required only when directed by this enclosure or Rule 4 (Initiation of HPI Forced Cooling) conditions are met.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
69. **IAAT** UST level is < 1', **AND** 1C-573 (MD EFDWPs Suction From UST) is open, **THEN** perform Steps 70 - 71.	**GO TO** Step 72.
70. Perform the following: __ Stop 1A MD EFDWP. __ Stop 1B MD EFDWP.	
71. __ Verify 1C-391 open.	1. __ Stop 1TD EFDW PUMP. 2. Close: 1FDW-315 1FDW-316
72. Perform the following: A. Reduce MD EFDWP flow to < 440 gpm per pump. B. Notify crew of MD EFDWP flow limit while aligned to hotwell.	

NOTE

Vacuum gage or computer can be used. Vacuum is broken when either start to flat line. Do NOT change scale on computer trend once started.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
73. **WHEN** vacuum is broken, **THEN** continue.	

Enclosure 5.9

Extended EFDW Operation

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
74. **IAAT** MD EFDWPs are operating, **OR** available to operate, **THEN PERFORM** Steps 75 - 77.	**GO TO** Step 78.
75. __ Locally close 1C-573 (MD EFDWPs Suction From UST) (T-1, SW of E-24, 8' above floor).	1. **IF** 1TD EFDW PUMP is operating, **OR** operable, **THEN GO TO** Step 78. 2. **IF NO** EFDW pumps are operating, **THEN**: A. Notify CR SRO that a LOHT exists from loss of EFDW suction source. B. Notify CR SRO that Rule 3 will be performed to cross connect with alternate unit. C. Consider all U1 EFDW pumps inoperable, **AND GO TO** Rule 3.
76. __ Verify MD EFDWPs were stopped due to UST level < 1'.	**GO TO** Step 78.
77. Perform the following: A. Restart all MD EFDWPs that were stopped due to UST level < 1'. B. __ Resume feeding available SGs.	

Enclosure 5.9

Extended EFDW Operation

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
78. __ Verify 1 TD EFDW PUMP operating.	__ **GO TO** Step 82.
79. Dispatch operator to 1C-157 (TD EFDWP Suction From UST) to establish communication with CR (T-1/C-20).	
80. **WHEN** operator in place at 1C-157, **THEN** continue.	
81. __ Stop 1 TD EFDW PUMP.	
82. __ Locally close 1C-157 (TD EFDWP Suction From UST) (T-1/C-20).	1. **IF NO** EFDW pumps are operating, **THEN**: A. Notify CR SRO that a LOHT exists from loss of EFDW suction source. B. Notify CR SRO that Rule 3 will be performed to cross connect with alternate unit. C. Consider <u>all</u> U1 EFDW pumps inoperable, **AND GO TO** Rule 3. 2. __ **GO TO** Step 84.
83. Open 1C-391.	1. Attempt to locally open 1C-391 (TD EFDWP Suction From Hotwell) (T-1/C-20). 2. **IF** 1C-391 **CANNOT** be opened, **AND NO** EFDW pumps are operating, **THEN**: A. Notify CR SRO that a LOHT exists from loss of EFDW suction source. B. Notify CR SRO that Rule 3 will be performed to cross connect with alternate unit. C. Consider <u>all</u> U1 EFDW pumps inoperable, **AND GO TO** Rule 3.

Enclosure 5.9

Extended EFDW Operation

84. **IAAT** 1 TD EFDW PUMP operation is desired, **AND** all exist: __ Hotwell level is > 1″. __ Vacuum is broken. 1 TD EFDW PUMP successfully aligned to hotwell. **THEN**: A. __ Start 1 TD EFDW PUMP. B. __ Feed available SGs as required.	
85. Dispatch an operator to open: 1C-188 (Hotwell Emerg Makeup #1 Control Bypass) (T-1/W of E-24). {18} 1C-912 (UST Riser To HW Emerg Makeup #2 Auto Isol Bypass) (T-1/G-23)	
86. Notify TSC to evaluate methods to maintain secondary inventory including strategies located in EM 5.1 (Engineering Emergency Response Plan) and EM 5.2 (Evaluation By Station Management in the TSC - Beyond Design Basis Mitigation Strategies).	

Enclosure 5.9

Extended EFDW Operation

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
87. **IAAT** hotwell level is ≤ 1″, **THEN**: A. __ Stop all EFDWPs. B. Consider all U-1 EFDW pumps inoperable, **AND GO TO** Rule 3.	

NOTE

- This step provides general plant directions for the SRO and Management team. The user shall continue after the notification has been made.
- Swapping from TBVs to ADVs prevents overfilling the hotwell/condenser.
- Securing steam seals limits the water (condensation) that reaches the oil systems. Vacuum must be broken to secure steam seals.
- Engineering will determine when to allow secondary system restart.
- Beginning a cooldown assumes HPI is operating. If the SSF is supplying seals, then further discussion with the Management team should be undertaken prior to cooldown.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
88. Notify the CR SRO to direct the following as time and resources allow: • Transfer steam control from TBVs to ADVs. • Operate ADVs per U1 EOP Encl 5.24 (Operation of ADVs). • Begin Unit cool down to LPI per OP/1/A/1102/010 (Controlling Procedure For Unit Shutdown) using the ADVs. • Break vacuum per OP/1-2/A/1106/016 (Condenser Vacuum System). • Secure Steam Seals per OP/1/A/1106/13 (Steam Seal System).	
89. **WHEN** directed by CR SRO, **THEN EXIT**.	

Subsequent Actions

Parallel Actions

EP/1/A/1800/001
Page 1 of 1

CONDITION	ACTIONS	
1. PR NIs ≥ 5% FP **OR** NIs **NOT** decreasing	**GO TO** UNPP tab.	**UNPP**
2. All 4160V SWGR de-energized {13}	**GO TO** Blackout tab.	**BLACKOUT**
3. Core SCM indicates superheat	**GO TO** ICC tab.	**ICC**
4. Any SCM = 0°F	**GO TO** LOSCM tab.	**LOSCM**
5. Both SGs intentionally isolated to stop excessive heat transfer	**GO TO** EHT tab.	**LOHT**
6. Loss of heat transfer (including loss of all Main and Emergency FDW)	**GO TO** LOHT tab.	
7. Heat transfer is or has been excessive	**GO TO** EHT tab.	**EHT**
8. Indications of SGTR ≥ 25 gpm	**GO TO** SGTR tab.	**SGTR**
9. Turbine Building flooding **NOT** caused by rainfall event	**GO TO** TBF tab.	**TBF**
10. Inadvertent ES actuation occurred	Initiate AP/1/A/1700/042 (Inadvertent ES Actuation).	**ES**
11. Valid ES actuation has occurred or should have occurred	Initiate Encl 5.1 (ES Actuation).	**ES**
12. Power lost to all 4160V SWGR and any 4160V SWGR re-energized	• Initiate AP/11 (Recovery from Loss of Power). • **IF** Encl 5.1 (ES Actuation) has been initiated, **THEN** reinitiate Encl 5.1.	**ROP**
13. RCS leakage > 160 gpm with letdown isolated	Notify plant staff that Emergency Dose Limits are in affect using PA system.	**EDL**
14. Individual available to make notifications	• Announce plant conditions using PA system. • Notify OSM to reference the Emergency Plan and NSD 202 (Reportability).	**NOTIFY**

CRITICAL TASKS

CT-1 ICS must be taken to HAND and FDW adjusted to prevent tripping the reactor. Adjustment will be dependent on how much time it takes to place ICS in HAND.

CT-2 Reactor trip breakers must be opened to shut down the reactor.

SAFETY: Take a Minute

UNIT 0 (OSM)			
SSF Operable: Yes	KHU's Operable: U1 - OH, U2 - UG	LCTs Operable: 2	Fuel Handling: No

UNIT STATUS (CR SRO)

Unit 1 Simulator	Other Units	
Mode: 1	**Unit 2**	**Unit 3**
Reactor Power: 100%	Mode: 1	Mode: 1
Gross MWE: 895	100% Power	100% Power
RCS Leakage: 0.01 gpm No WCAP Action	EFDW Backup: Yes	EFDW Backup: Yes
RBNS Rate: 0.01 gpm		

Technical Specifications/SLC Items (CR SRO)

Component/Train	OOS Date/Time	Restoration Required Date/Time	TS/SLC #
AMSAC/DSS	0300	7 Days	16.7.2

Shift Turnover Items (CR SRO)

Primary

- Due to unanalyzed condition, the SSF should be considered INOP for Unit 1 if power levels are reduced below 85%. Evaluations must be performed prior to declaring the SSF operable following a return to power (after going below 85%).
- 1RIA-3 and 5 removed from RB.
- OATC is to perform a 5 minute Delith using OP/1/A/1103/004C (Deborating IXs) Encl. 4.4 (Unit 1 Deborating IX For RCS De-lith (Rx At Power))

Secondary

- Feedwater valve DP selected to A1 and B2 for maintenance
- AMSAC/DSS bypassed
- 1SSH-1, 1SSH-3, 1SD-2, 1SD-5, 1SD-140, 1SD-303, 1SD-355, 1SD-356 and 1SD-358 are closed with power supply breakers open per the Startup Procedure for SSF Overcooling Event.

Reactivity Management (CR SRO)

RCS Boron 83 ppmB	Gp 7 Rod Position: 92% Withdrawn	Batch additions as required for volume control.

Human Performance Emphasis (OSM)

Procedure Use and Adherence

Facility: **Oconee** Scenario No.: 3 Op-Test No.: 1

Examiners: ________________________ Operators: ________________________**SRO**

________________________ ________________________**OATC**

________________________ ________________________**BOP**

Initial Conditions:

- Reactor Power = 100%

Turnover:

- Feedwater valve DP selected to 1A1 and 1B2 for maintenance
- AMSAC/DSS bypassed

Event No.	Malfunction No.	Event Type*	Event Description
0a			
0b			
0c			
1	Override	C: BOP, SRO **(TS)**	1A RBCU high vibration, secure 1A and start 1B RBCU
2	MSI231	I: OATC, SRO	1A FDW Valve DP Signal Fails Low
3	MPS450	C: BOP, SRO **(TS)**	1B1 RCP Hi Vib, Power reduction
4	MPI281	I: OATC, SRO	ΔTc fails
5	Updater	C: BOP, SRO	1HP-14 fails to BLEED
6	MPS020	R: OATC, SRO **(TS)**	20 gpm Pri-Sec leak in 1B SG requires Manual S/D
7	MPS020 Updater	M: ALL	1TA Lockout, 1B SGTR • TBV on intact SG trips to MANUAL • 1HP-26 fails closed

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

Scenario 3

Event Summary:

Event 1: 1A RBCU will develop a vibration and alarm on the OAC. The OAC alarm response guide will direct the operator to attempt to reset the alarm and then secure the RBCU. The crew will contact engineering who will direct starting of the 1B RBCU in High speed. The RBCU will start in low speed first, then de-energize and change to High speed.

Event 2: The feedwater valve DP will fail low causing feedwater pump speed to increase. The OATC will have to take MFWPs to MANUAL and reduce FWPT speed. The crew will perform AP/28 (ICS Instrumentation Failures). ICS will be returned to AUTO.

Event 3: RCP 1B1 will experience high vibration that will require using AP/16 (RCP Malfunction) to perform a power reduction to below 70% to remove from service.

Event 4: When the 1B1 RCP is tripped, ΔTc will fail and feedwater will not re-ratio. The OATC may attempt to control ΔTc with the ΔTc controller in MANUAL but this will not work either. The OATC will then be required to take both FDW LOOP MASTERS to HAND in order to re-ratio feedwater.

Event 5: 1HP-14 will fail in the BLEED position. Crew will be required to enter AP/2, (Excessive RCS Leakage). The crew will close 1HP-6 and throttle 1HP-7 to maintain Pzr Level.

Event 6: A 20 gpm SGTL in the 1B SG will require entry into AP/31, (Primary to Secondary Leakage) and perform a rapid unit shutdown using AP/29 (Rapid Unit Shutdown) with ICS in MANUAL.

Event 7: Bus 1TA will lockout. This will cause the 1A1 RCP to de-energize and the Reactor to trip (only 2 RCPs operating). When the reactor trips, the SGTL will degrade into a 200 gpm SGTR. The TBV on the 1A SG will trip to MANUAL. 1HP-26 will not open requiring the crew to open 1HP-410 to inject into the RCS.

Op-Test No.: **ILT48** Scenario No.: **3** Event No.: **1** Page 1 of 2

Event Description: **1A RBCU high vibration, secure 1A and start 1B RBCU (C, BOP, SRO)(TS)**

Time	Position	Applicant's Actions or Behavior
		Plant Response: OAC alarm: • O1D1361, RBCU FAN 1A VIB
	SRO/BOP	**Crew Response:** • BOP will Refer to OAC ARG (O1D1361, RBCU FAN 1A VIB) 1. Depress the RBCU OAC Vibration Alarm Reset Pushbutton **[It will not reset]** 2. If the alarm doesn't clear, stop the RBCU. **[BOP will secure the 1A RBCU]** **[Alarm will not reset until the ALARM RESET P/B is depressed]** 3. Notify Engineering for an evaluation ***Booth cue: Using time compression as SM & engineering request that 1B RBCU be started in HIGH SPEED.*** ***OP/1/A/1104/015*** **OP/1/A/1104/015 Reactor Building Cooling System,** Rev 42 **Encl 4.3 (RBCU Operation), Section 4, Starting RBCUs** **NOTE:** When starting RBCUs or changing LPSW flows, RB pressure will change as RB temperature changes. 4.1 Verify RB pressure within limits of PT/1/A/0600/001 (Periodic Instrument Surveillance). 4.2 Begin monitoring RB absolute pressure. (OAC Turn On Code: 1RBPA) {8} 4.3 **IF** personnel inside containment, announce over plant page that starting RBCU(s). {11} **NOTE:** Starting RBCUs can affect the following: RBCU bearing temperatures, RBCU vibration, RBNS level, 1RIA-47 level, RB pressure/temperature. 4.4 Place desired switch to "HIGH" or "LOW": 1A RBCU 1B RBCU 1C RBCU

This event is complete when 1B RBCU is started, or as directed by the Lead Examiner.

Op-Test No.: **ILT48** Scenario No.: **3** Event No.: **1** Page 2 of 2

Event Description: **1A RBCU high vibration, secure 1A and start 1B RBCU (C, BOP, SRO)(TS)**

Time	Position	Applicant's Actions or Behavior
	BOP	***OP/1/A/1104/015*** **Crew Response:** **NOTE:** • When changing LPSW flows, RB pressure will change as RB temperature changes. • Each RBCU must have ≥ 550 gpm Inlet Flow or ≥ 750 gpm Outlet Flow to meet flow requirements of SLC 16.9.12. 4.5 Position valves as required for RB cooling: • 1LPSW-18 (1A RBCU OUTLET) • 1LPSW-21 (1B RBCU OUTLET) • 1LPSW-24 (1C RBCU OUTLET) ***TS 3.6.5, REACTOR BUILDING SPRAY AND COOLING TRAINS*** ***Condition B (7 days) Restore reactor building cooling train to OPERABLE status.***

This event is complete when 1B RBCU is started, or as directed by the Lead Examiner.

Op-Test No.: **ILT48** Scenario No.: **3** Event No.: **2** Page 1 of 6

Event Description: **1A FDW Valve DP Signal Fails Low (I, OATC, SRO)**

Time	Position	Applicant's Actions or Behavior
		AP/1/A/1700/028
		Plant Response: • FDW pump speed increases • FDW Control Valves will throttle closed to limit flow • FDW Pump discharge pressure increases
	SRO/OATC	**Crew Response**: • Crew should perform Plant Transient Response (PTR). • OATC should place both FDW pump ICS stations in MANUAL and reduce FDW pump speed to ~ pre-transient valve. • The OATC may take the Diamond & both FDW Masters to HAND • SRO will enter AP/1/A/1700/028, ICS Instrumentation Failure
		Examiner Note: OATC may take FDW Loop Masters and Diamond to HAND as well. These are standard PTR actions.
		AP/1/A/1700/028 Rev 20
		4.1 Provide control bands as required.
		4.2 Initiate notification of the following: __ OSM to reference the following: • OMP 1-14 (Notifications) • Emergency Plan __ STA
		4.3 Verify a power transient ≥ 5% has occurred. **RNO: GO TO** Step 4.5.
		4.4 Notify Rx Engineering and discuss the need for a maneuvering plan.
		4.5 Use the following, as necessary, to determine the applicable section from table in Step 4.6: • OAC alarm video • OAC display points • Control Board indications • SPOC assistance, as needed
		4.6 **GO TO** the applicable section per the following table:

	Section	Failure
	4H	Feedwater Valve ΔP

This event is complete when a valid Feedwater Valve DP input to ICS has been selected and ICS is returned to AUTO, or when directed by the lead examiner.

Op-Test No.: **ILT48** Scenario No.: **3** Event No.: **2** Page 2 of 6

Event Description: **1A FDW Valve DP Signal Fails Low (I, OATC, SRO)**

Time	Position	Applicant's Actions or Behavior

	SRO/OATC	***AP/1/A/1700/028***
		
		<u>Crew Response</u>:
		
		<u>AP/28, Section 4H</u>
		
		<u>NOTE</u>
		• If Feedwater Valve ΔP failed high, both MFDWPs go to low speed stop.
		• If Feedwater Valve ΔP failed low, the following will occur:
		  • Both MFDWPs go to high speed stop
		  • Feedwater control valves close to reduce increased Feedwater flow
		  • Feedwater pump(s) may trip on high discharge pressure
		
		1. Ensure the following in HAND:
		__ 1A MAIN FDW PUMP
		__ 1B MAIN FDW PUMP
		
		2. Notify SPOC to investigate and repair the failed Feedwater Valve DP instrumentation.
		Booth Cue: When notified as SPOC, inform the crew that all work is complete on FDW Valve dp and it is now a valid signal.
		
		3. Select a valid Feedwater Valve DP input to ICS with selector switch.
		
		4. **WHEN** a valid Feedwater Valve DP input has been restored to ICS, **THEN GO TO** OP/1/A/1102/004 A Encl 4.4 (Placing ICS Stations To Auto).
		Examiner Note: Crew should select 1A2 FDW Valve dp and return ICS to AUTO.
		
		<u>OP/1/A/1102/004 A Encl 4.4</u> Rev 10
		
		1.1 Verify CTP ≥ 3%
		1.2 Review PT/0/A/1103/020
		1.3 Ensure dedicated operator assigned to monitor/operate ICS
		1.4 Perform pre-job brief including precautions from SOMP 1-02 (Reactivity Management) and applicable Limits & Precautions of PT/0/A/1103/020 (Power Maneuvering Predictions) (R.M.)
		1.5 Ensure R2 reactivity management controls are established in Control Room per SOMP 1-02 (Reactivity Management)

This event is complete when a valid Feedwater Valve DP input to ICS has been selected and ICS is returned to AUTO, or when directed by the lead examiner.

Op-Test No.: **ILT48** Scenario No.: **3**	Event No.: **2**	Page 3 of 6
Event Description: **1A FDW Valve DP Signal Fails Low (I, OATC, SRO)**		

Time	Position	Applicant's Actions or Behavior
	SRO/OATC	*OP/1/A/1102/004 A* **Crew Response**: **OP/1/A/1102/004 A Encl 4.4 Section 2** 2.1 Ensure "RATE SET" thumbwheels at 0.0. 2.2 **IF** TURBINE MASTER is in HAND, perform Section 3 **(N/A)** 2.3 **IF** either TBV is in HAND, perform Section 4 **(N/A)** 2.4 **IF** REACTOR MASTER **OR** DIAMOND is in manual, perform Section 5 ***Examiner Note: Section 5 may or may NOT be needed based on actions taken during PTR*** **OP/1/A/1102/004 A Encl 4.4 Section 5** 5.1 **IF** Rx Master is in HAND, perform the following: **(N/A)** 5.2 **IF** both SGs are off of Level Control, perform the following: 5.2.1 IF selected Tave (O1E2086) is different from Tave setpoint (O1E2087) by more than ± 0.15°F, perform the following: A. Simultaneously ensure 1A & 1B FDW Masters in HAND **NOTE:** Cycling the setpoint selector may result in a Star Module failure. This is expected for this condition and entry into AP/28 (ICS Instrument Failures is **NOT** required. The Star Module failure shall be cleared before the ICS is returned to Auto. B. On REACTOR MASTER, cycle Tave setpoint selector between 565°F and 585°F five times C. **IF** Star Module failed, perform the following: **(N/A)** D. On REACTOR MASTER adjust Tave setpoint (O1E2078) towards selected Tave (O1E2086) 5.2.2 Verify selected Tave is within ± 0.15°F of Tave setpoint 5.3 IF either SG is on Level Control, adjust Tave setopint (O1E2087) to 579°F 5.4 Place DIAMOND in AUTO 5.5 Return to Section 2 (Procedure)

This event is complete when a valid Feedwater Valve DP input to ICS has been selected and ICS is returned to AUTO, or when directed by the lead examiner.

Op-Test No.: **ILT48** Scenario No.: **3**	Event No.: **2**	Page 4 of 6
Event Description: **1A FDW Valve DP Signal Fails Low (I, OATC, SRO)**		

Time	Position	Applicant's Actions or Behavior
	SRO/OATC	*OP/1/A/1102/004 A* **Crew Response**: **OP/1/A/1102/004 A Encl 4.4 Section 2** 2.5 **IF** DELTA Tc is in HAND, perform Section 6 **(N/A)** 2.6 **IF** STM GENERATOR MASTER or either FDW MASTER is in HAND, perform Section 7 (Placing FDW To Auto) **Section 7 may or may NOT be needed based on actions taken during PTR** **OP/1/A/1102/004 A Encl 4.4 Section 7** 7.1 **IF** SG Master is in HAND, perform the following: **(N/A)** 7.2 **IF** 1A **OR** 1B FDW Master is **NOT** in AUTO, perform the following: 7.2.1 Select 1A & 1B FDW MASTERs to "MEAS VAR" 7.2.2 **IF** both 1A **AND** 1B FDW Master Measured Variables are on the caret: A. Select 1A & 1B FDW MASTERs to "POS" B. Simultaneously ensure 1A & 1B FDW MASTERs in AUTO 7.2.3 **IF** 1A **OR** 1B FDW Master Measured Variable is **NOT** on the caret **(N/A)** 7.3 Return to Section 2 (Procedure) **OP/1/A/1102/004 A Encl 4.4 Section 2** 2.7 **IF any** FDW valves are in HAND, perform Section 8 **(N/A)** 2.8 **IF** either Main FDW Pump is in HAND, perform Section 9

This event is complete when a valid Feedwater Valve DP input to ICS has been selected and ICS is returned to AUTO, or when directed by the lead examiner.

Op-Test No.: **ILT48** Scenario No.: **3**	Event No.: **2**	Page 5 of 6
Event Description: **1A FDW Valve DP Signal Fails Low (I, OATC, SRO)**		

Time	Position	Applicant's Actions or Behavior
	SRO/OATC	*OP/1/A/1102/004 A* **Crew Response**: **OP/1/A/1102/004 A Encl 4.4 Section 9** 9.1 **IF** lowest FDW valve ΔP is **NOT** ≈ 35 psid, adjust either of the following until the lowest FDW valve ΔP ≈ 35 psid: (R.M.) • 1A MAIN FDW PUMP • 1B MAIN FDW PUMP 9.2 Verify lowest FDW VALVE ΔP ≈ 35 psid. 9.3 **IF** 1A MAIN FDW PUMP operating in "HAND", place 1A MAIN FDW PUMP (ICS) in "AUTO". 9.4 **IF** 1B MAIN FDW PUMP operating in "HAND", place 1B MAIN FDW PUMP (ICS) in "AUTO". 9.5 Return to Section 2 (Procedure). **OP/1/A/1102/004 A Encl 4.4 Section 2** 2.9 Verify ICS in full Auto. **CAUTION:** Adjusting THP, Tave or Delta Tc setpoint too fast can cause plant instability. 2.10 **IF NOT** being controlled by another procedure, perform the following: 2.10.1 **IF** THP (O1E2088) is **NOT** ≈ 885 psig, slowly adjust THP Setpoint (O1E2089) to ≈ 885 psig. (R.M.) 2.10.2 **IF** Tave Setpoint (O1E2087) is **NOT** at ≈ 579°F, slowly adjust Tave Setpoint to ≈ 579°F. (R.M.) 2.10.3 **IF** Delta Tc is **NOT** ≈ 0.0, adjust Delta Tc Setpoint (O1E2091) to ≈ 0.0°F. (R.M.) 2.11 **IF** both FDWP suction flows are **NOT** within 1 x 10 6 lb/hr of each other, adjust FDWP BIAS per Enclosure 4.3 (Adjusting FDWP BIAS).

This event is complete when a valid Feedwater Valve DP input to ICS has been selected and ICS is returned to AUTO, or when directed by the lead examiner.

Op-Test No.: **ILT48** Scenario No.: **3**	Event No.: **2**	Page 6 of 6
Event Description: **1A FDW Valve DP Signal Fails Low (I, OATC, SRO)**		

Time	Position	Applicant's Actions or Behavior
	SRO/OATC	*OP/1/A/1102/004 A* **Crew Response**: **OP/1/A/1102/004 A Encl 4.4 Section 2** 2.12 **IF** desired, adjust CTP as follows: (R.M.) 2.12.1 Review current mechanical maneuvering rates per PT/0/A/1103/020 (Power Maneuvering Predictions). 2.12.2 **IF** desired to increase power, perform the following: A. **WHEN** ICS has been in full Auto (Integrated Mode) for > 10 minutes, continue at Step 2.12.3. {6} 2.12.3 Ensure selected "HOLD". 2.12.4 Ensure desired setting selected ("%/MIN" or "%/HR") on "RATE" pushbuttons. 2.12.5 Ensure desired rate selected on "RATE SET" thumbwheels. 2.12.6 Insert desired CTPD SET using "INCREASE/DECREASE" pushbuttons. 2.12.7 Ensure "HOLD" is **NOT** selected. 2.12.8 **WHEN** desired CTP is achieved, return "RATE SET" thumbwheels to 0.0.

This event is complete when a valid Feedwater Valve DP input to ICS has been selected and ICS is returned to AUTO, or when directed by the lead examiner.

Op-Test No.: **ILT48** Scenario No.: **3**	Event No.: **3**	Page 1 of 12
Event Description: **1B1 RCP Hi Vib, Power reduction (C: BOP, SRO)**		

Time	Position	Applicant's Actions or Behavior
	SRO/OATC BOP	**<u>Plant Response</u>**: • 1SA9/D-2 RC Pump Vibration High in alarm *1SA9/D-2* **<u>Crew Response</u>**: SRO will direct the BOP to refer to ARG 1SA-9/D-2 **<u>1SA-9/D-2</u>** 3.1 Use one of the following means to verify RCP vibration conditions: • Verify vibration reading on RCP OAC Display Group RCP. • **IF** the OAC is unavailable, verify the alarm by referring to RCP Vibration Monitoring Chart Recorder (ON1RCCR0430). (RCP Panel on 6th floor AHU Room) **NOTE:** Vibration indication of both RCPs in a Loop trending up together without any changes to RCS conditions (Temp/Press) is a symptom of a Vibration Monitor power supply failure. 3.2 **IF** indications of both RCPs in a Loop are trending up together without any changes to RCS conditions (Temp/Press), swap Vibration Monitor power supplies as follows: **[Only 1 RCP experiencing vibrations] NA** 3.3 **IF** MODE 1 or 2, initiate AP/1/A/1700/016 (Abnormal Reactor Coolant Pump Operation). **NOTE:** Vibrations are expected to increase due to changing RCS temperature/pressure. 3.4 **IF** MODE 3, 4 or 5 **AND** vibration increase is **NOT** due to changing RCS temperature/pressure, initiate AP/1/A/1700/016 (Abnormal Reactor Coolant Pump Operation). 3.5 Monitor RCP parameters. 3.6 Contact PM2 Group for analysis of RCP parameters and to install additional monitoring equipment. 3.7 Initiate a CR for Engineering to document potential vibration effects on RCS Piping.

This event is complete when the 1B1 RCP is tripped, or when directed by the lead examiner.

Op-Test No.: **ILT48** Scenario No.: **3**	Event No.: **3**	Page 2 of 12
Event Description: **1B1 RCP Hi Vib, Power reduction (C: BOP, SRO)**		

Time	Position	Applicant's Actions or Behavior
	SRO/OATC BOP	***AP/1/A/1700/016*** **Crew Response**: **AP/1/A/1700/016 Abnormal Reactor Coolant Pump Operation** Rev 33 4.1 **IAAT** any RCP meets immediate trip criteria of Encl 5.1 (RCP Immediate Trip Criteria), **THEN** perform Steps 4.2 - 4.11. **[Vibrations will NOT meet the immediate trip criteria]** **RNO: GO TO** Step 4.12. **NOTE** If affected RCP has a seal failure, and immediate trip criteria not met, then continue to Section 4A (Seal Failure) to ensure Seal Failure guidance steps are read. Section 4A (Seal Failure) contains steps to quickly secure affected RCP should the need arise. 4.12 **IAAT** either of the following apply: __ Any RCP approaching immediate trip criteria of Encl 5.1 (RCP Immediate Trip Criteria) __ There is an immediate need to stop a RCP at this time **THEN** perform Steps 4.13 - 4.15. **RNO: GO TO** Step 4.16. ***Examiner Note: The SRO may decide to remove the RCP from service at this time and proceed to step 4.13. It they do not, they will proceed to Step 4.16 per the RNO (Page 15).*** 4.13 Verify Rx Power > 70%. 4.14 Initiate Encl 5.2 (Rapid Power Reduction). (Page 16) 4.15 **WHEN** Rx Power is ≤ 70%, **THEN GO TO** Step 4.2. 4.2 Verify MODE 1 or 2. 4.3 Verify Rx power is ≤ 70% as indicated on all NIs. 4.4 Verify three RCPs will remain operating after affected RCP is tripped. 4.5 Verify any SG on Low Level Limits. **RNO: GO TO** Step 4.8.

This event is complete when the 1B1 RCP is tripped, or when directed by the lead examiner.

Op-Test No.: **ILT48**	Scenario No.: **3**	Event No.: **3/4**	Page 3 of 12
Event Description:	**1B1 RCP Hi Vib, Power reduction (C: BOP, SRO)** **ΔTc fails (I: OATC, SRO)**		

Time	Position	Applicant's Actions or Behavior
	SRO/OATC BOP	***AP/1/A/1700/016*** **<u>Crew Response</u>**: 4.8 Verify FDW masters in Auto. 4.9 Stop the <u>affected</u> RCP. 4.10 Verify ICS re-ratios feedwater to establish desired Delta Tc. ***Examiner Note: ICS will NOT re-ratio feedwater correctly, this is Event 4.*** **RNO:** 1. Place DELTA Tc station in HAND. 2. Manually adjust DELTA Tc station to achieve desired Delta Tc. ***Examiner Note: DELTA Tc controller will not function in HAND which will require the OATC to place both FDW LOOP MASTERS in HAND to control DELTA Tc.*** **<u>CAUTION</u>** <u>Total</u> feedwater flow should be maintained constant to prevent changes in core reactivity.
	OATC	3. **IF** DELTA Tc station does **NOT** control, **THEN** perform the following: A. Place the following in HAND: __ 1A FDW MASTER __ 1B FDW MASTER B. Manually adjust FDW masters to achieve desired Delta Tc. 4. **IF** there has been a failure of the DELTA Tc controller, **THEN** notify SPOC to repair. 4.11 **GO TO** Step 4.29. 4.29 **IAAT** any of the following indicate external RCP seal leakage: __ RB RIAs increasing or in alarm __ RCS Tave constant with LDST level decreasing more than normal __ Quench Tank level rate increasing __ RB Normal Sump rate increasing __ Visual confirmation **THEN** initiate AP/02 (Excessive RCS Leakage).

Event 3 is complete when the 1B1 RCP is tripped, Event 4 is complete when the OATC adjusts DTc to within 0±2°F, or when directed by the lead examiner.

Op-Test No.: **ILT48**	Scenario No.: **3**	Event No.: **3/4**	Page 4 of 12
Event Description:	**1B1 RCP Hi Vib, Power reduction (C: BOP, SRO)** **ΔTc fails (I: OATC, SRO)**		

Time	Position	Applicant's Actions or Behavior
	SRO/OATC BOP	***AP/1/A/1700/016*** **<u>Crew Response</u>**: 4.30 Initiate Encl 4.3 (Special Instructions for < 4 RCP Operation) of OP/1/A/1102/004 (Operation at Power). (Page 20) 4.31 **IAAT** <u>either</u> of the following conditions is met: __ a RCP has been shut down for ≥ 3 hours, {9} __ a RCP with high oil level has been shut down **THEN** close the associated RCP motor cooler inlet/outlet valve: __ 1LPSW-7&8 (1A1 RCP) __ 1LPSW-9&10 (1B1 RCP) __ 1LPSW-13&14 (1A2 RCP) __ 1LPSW-11&12 (1B2 RCP) 4.32 **IAAT** <u>either</u> of the following has exceeded 260°F including transient situations: __ O1A1253 - O1A1256 (RCP UPPER SEAL HOUSING TEMP) __ O1A1910 - O1A1913 (RCP SEAL RETURN TEMP) **THEN** closely monitor seal parameters for degradation until an Engineering evaluation is completed due to potential for seal ring and elastomer damage. **<u>NOTE</u>** Operating experience has shown that failure of RC Pump components located internal to the RCS can create loose debris which can lead to fuel clad failures. These type RC Pump failures may cause Loose Parts Monitor alarms immediately and increased RCS radioactivity later. 4.33 Verify 1RIA 57 or 1RIA 58 have increased. **RNO: GO TO** Step 4.35.

Event 4 is complete when the OATC adjusts DTc to within 0±2°F, or when directed by the lead examiner.

Op-Test No.: **ILT48**	Scenario No.: **3**	Event No.: **3/4**	Page 5 of 12
Event Description:	**1B1 RCP Hi Vib, Power reduction (C: BOP, SRO)** **ΔTc fails at (I: OATC, SRO)**		

Time	Position	Applicant's Actions or Behavior
	SRO/OATC BOP	*AP/1/A/1700/016* **Crew Response**: 4.35 **IAAT** a RCP has been tripped due to exceeding Immediate Trip Criteria on a RCP motor, **THEN** contact RCP engineer prior to restart. 4.36 **IAAT** both are met: __ There has been a failure of the DELTA Tc controller __ The DELTA Tc controller has been repaired **THEN** initiate OP/1/A/1102/004 A Encl (Placing ICS Stations To Auto). 4.37 Verify any RCP that was shut down had a high vibration alarm. 4.38 Initiate a PIP for Engineering to document potential vibration effects on RCS piping. 4.39 **WHEN** conditions permit, **THEN EXIT** this procedure. ***TS 3.10.1 STANDBY SHUTDOWN FACILITY (SSF), Once Reactor Power is reduced below 85% the SSF must be declared inoperable. Conditions A-E (7 Days) Restore to operable status.*** ***Alternate Path from step 4.12*** 4.16 Announce AP entry using the PA system. 4.17 Notify OSM to request evaluation by RCP Component Engineer. 4.18 **IAAT** the failure is identified, **THEN GO TO** the applicable section per the following table: [ ] **Section** / **Failure** [ ] 4B / Abnormal Vibration **Section 4B Abnormal Vibration** 1. **IAAT** any RCP meets immediate trip criteria of Encl 5.1 (RCP Immediate Trip Criteria), **THEN** perform Steps 2 - 11. **RNO: GO TO** Step 12**. [RCP Vibrations will NOT reach trip criteria]**

Event 4 is complete when the OATC adjusts DTc to within 0±2°F, or when directed by the lead examiner.

Op-Test No.: **ILT48**	Scenario No.: **3**	Event No.: **3/4**	Page 6 of 12
Event Description:	**1B1 RCP Hi Vib, Power reduction (C: BOP, SRO)** **ΔTc fails at (I: OATC, SRO)**		

Time	Position	Applicant's Actions or Behavior
	SRO/OATC BOP	*AP/1/A/1700/016* **Crew Response**: 12. Verify RCP vibration indication is available for monitoring in Control Room. 13. Monitor RCS flow for indication of degradation. 14. Verify all CETCs < 630°F. (Turn-on code "ITC") 15. Monitor RCP parameters for operational abnormalities: __ OAC Display: (Turn-on Code "RCP") • Motor bearing temperatures • Seal return temperature • Seal return flow • RCP motor input power __ Loose Parts Monitor 16. **IAAT** high vibration exists per statalarm 1SA-9/D-2, (RC PUMP VIBRATION HIGH) **AND** vibration continues to increase with the potential to exceed trip criteria **THEN** perform Steps 17 - 27. **RNO: GO TO** Step 28. 17. Verify MODE 1 or 2. 18. Verify three RCPs will remain operating after affected RCP is tripped. 19. Verify Rx power is ≤ 70% as indicated on all NIs. **RNO:** 1.__Direct an RO to initiate Encl 5.2 (Rapid Power Reduction) **(Page 19)** 2.__**WHEN** Rx power is ≤ 70% on all NIs, **THEN** continue this procedure. 20. Verify any SG on Low Level Limits. **RNO: GO TO** Step 23. 23. Verify FDW masters in Auto. 24. Stop the affected RCP.

Event 4 is complete when the OATC adjusts DTc to within 0±2°F, or when directed by the lead examiner.

Op-Test No.: **ILT48**	Scenario No.: **3**	Event No.: **3/4**	Page 7 of 12
Event Description:	**1B1 RCP Hi Vib, Power reduction (C: BOP, SRO)** **ΔTc fails at (I: OATC, SRO)**		

Time	Position	Applicant's Actions or Behavior
	SRO/OATC BOP	***AP/1/A/1700/016***

Crew Response:

25. Verify ICS re-ratios feedwater to establish desired ΔTc.
    RNO:
    1. __ Place DELTA Tc station in HAND.
    2. __ Manually adjust DELTA Tc station to achieve desired Δ Tc.

    CAUTION
    Total feedwater flow should be maintained constant to prevent changes in core reactivity.

Examiner Note: ICS will NOT re-ratio feedwater correctly, this is Event 4.

    3. __ **IF** DELTA Tc station does **NOT** control, **THEN** perform the following:
       A. Place the following in HAND:
          __ 1A FDW MASTER
          __ 1B FDW MASTER
       B. __ Manually adjust FDW masters to achieve desired Δ Tc.
    4. __ **IF** there has been a failure of the DELTA Tc controller, **THEN** notify SPOC to repair.

26. Initiate Encl 4.3 (Special Instructions for < 4 RCP Operation) of OP/1/A/1102/004 (Operation at Power). (**Page 20**)

27. Initiate the following notifications:
    __ Notify OSM to make required notifications of OMP 1-14 (Notifications).
    __ Notify Rx Engineering and request a power maneuver plan, if needed.
    __ Notify SOC if load reduction was required.
    __ Notify Chemistry to take RCS boron samples on a 1 hour frequency.

NOTE
Operating experience has shown that failure of RC Pump components located internal to the RCS can create loose debris which can lead to fuel clad failures. These type RC Pump failures may cause Loose Parts Monitor alarms immediately and increased RCS radioactivity later.

28. Verify 1RIA-57 or 1RIA-58 have increased.
    RNO: GO TO Step 30.

Event 4 is complete when the OATC adjusts DTc to within 0±2°F, or when directed by the lead examiner.

Op-Test No.: **ILT48**	Scenario No.: **3**	Event No.: **3/4**	Page 8 of 12
Event Description:	**1B1 RCP Hi Vib, Power reduction (C: BOP, SRO)** **ΔTc fails at (I: OATC, SRO)**		

Time	Position	Applicant's Actions or Behavior
	SRO/OATC BOP	***AP/1/A/1700/016*** **<u>Crew Response</u>**: 30. **IAAT** an RCP has been shut down for ≥ 3 hours, **THEN** close the associated RCP motor cooler inlet/outlet valve: __ 1LPSW-7&8 (1A1 RCP) __ 1LPSW-9&10 (1B1 RCP) __ 1LPSW-13&14 (1A2 RCP) __ 1LPSW-11&12 (1B2 RCP) 31. **IAAT** a RCP has been tripped due to exceeding Immediate Trip Criteria on a RCP motor, **THEN** contact RCP engineer prior to restart. 32. **IAAT** both are met: __ There has been a failure of the DELTA Tc controller __ The DELTA Tc controller has been repaired **THEN** initiate OP/1/A/1102/004 A Encl (Placing ICS Stations To Auto). 33. Initiate a PIP for Engineering to document potential vibration effects on RCS piping. 34. **WHEN** conditions permit, **THEN EXIT** this procedure.

Event 4 is complete when the OATC adjusts DTc to within 0±2°F, or when directed by the lead examiner.

Op-Test No.: **ILT48**	Scenario No.: **3**	Event No.: **3/4**	Page 9 of 12
Event Description:	**1B1 RCP Hi Vib, Power reduction (C: BOP, SRO)** **ΔTc fails (I: OATC, SRO)**		

Time	Position	Applicant's Actions or Behavior
	SRO/OATC BOP	*AP/1/A/1700/016* **Crew Response**: **Encl 5.2 Rapid Power Reduction** **NOTE** • This enclosure should be performed by an RO. • The step to verify ICS in AUTO means that the ICS is capable of responding to a MAXIMUM RUNBACK signal. 1. Verify ICS in AUTO. 2. Initiate MAXIMUM RUNBACK to ≤ 70% 3. **WHEN** Rx Power is ≤ 70% as indicated by all NIs, **THEN** press MAXIMUM RUNBACK to stop runback 4. Notify CR SRO that Rx Power is ≤ 70% 5. Adjust CTPD SET to match CTP DEMAND 6. Stop the 1E1 and 1E2 HTR DRN PUMPs 7. Verify Rx Power was reduced ≥ 15% within a 1 hour period. 8. Notify Primary Chemistry to perform Tech Spec SR 3.4.11.2 as required. 9. **EXIT** this enclosure.

Event 4 is complete when the OATC adjusts DTc to within 0±2°F, or when directed by the lead examiner.

Op-Test No.: **ILT48**	Scenario No.: **3**	Event No.: **3/4**	Page 10 of 12
Event Description:	**1B1 RCP Hi Vib, Power reduction (C: BOP, SRO)** **ΔTc fails (I: OATC, SRO)**		

Time	Position	Applicant's Actions or Behavior
	SRO/OATC BOP	*OP/1/A/1102/004* **Crew Response**: **OP/1/A/1102/004 OPERATIONS AT POWER, Encl 4.3 Special Instructions For < 4 RCP Operations** Rev 144 2.1 **IF** conditions permit, log the current quadrant power tilt and the position of the ΔTC controller prior to securing a RCP during power operations. **NOTE:** • Instructions for performing OAC trends are located in Working With Trends enclosure of OP/0/A/1103/020 A (Operator Aid Computer Use). • Only the first 6 points will be displayed initially; press "Page Down" key to see second 6 points. 2.2 Using turn-on code T6 3RCP, digitally trend the following data at one minute intervals: Point ID — Description O1P0889 — CORE THERMAL POWER BEST O1P0877 — INCORE IMBALANCE O1E3335 — API GROUP AVE FOR GROUP 7 O1E3336 — API GROUP AVE FOR GROUP 8 O1P0737 — INCORE TILT QUADRANT W-X O1P0738 — INCORE TILT QUADRANT X-Y O1P0739 — INCORE TILT QUADRANT Y-Z O1P0740 — INCORE TILT QUADRANT Z-W O1I0828 — RC COLD LEG A1 TEMP O1I0829 — RC COLD LEG A2 TEMP O1I0830 — RC COLD LEG B1 TEMP O1I0831 — RC COLD LEG B2 TEMP 2.3 After steady state conditions are attained, perform the following: 2.3.1 Check NI calibration. 2.3.2 **IF** NI calibration is **NOT** within requirements of Limit and Precaution Step 2.2.6, calibrate NIs to Thermal Power Best. (R.M.) **NOTE:** The 100% Power Imbalance curves also apply for runs at reduced power. 2.4 Maintain Control Rod position and Power Imbalance within COLR limits.

Event 4 is complete when the OATC adjusts DTc to within 0±2°F, or when directed by the lead examiner.

Op-Test No.: **ILT48**	Scenario No.: **3**	Event No.: **3/4**	Page 11 of 12
Event Description:	**1B1 RCP Hi Vib, Power reduction (C: BOP, SRO)** **ΔTc fails (I: OATC, SRO)**		

Time	Position	Applicant's Actions or Behavior
	SRO/OATC BOP	***OP/1/A/1102/004*** **Crew Response**: **NOTE:** The Maximum Allowed Power Setpoint (Pmax) is reduced when operating for extended periods with a 3 RC Pump Configuration as a conservative action. 2.5 Perform the following: 2.5.1 **IF** expected to operate for an extended period of time with only 3 RCPs operating, notify I&E to adjust Flux/ Imbalance /Flow trip setpoints for 3 RCP operation per AM/1/A/0315/017 (TXS RPS Channels A, B, C, And D Parameter Changes For Abnormal/Normal Operating Conditions). (R.M.) ____________________ ______ Person Notified Date 2.5.2 **IF AT ANY TIME** Quadrant Power Tilt problems exist, notify I&E to Adjust Flux/Imbalance/Flow trip setpoints as required to comply with TS 3.2.3 per AM/1/A/0315/017 (TXS RPS Channels A, B, C, And D Parameter Changes For Abnormal/Normal Operating Conditions). (R.M.) ____________________ ______ Person Notified Date **NOTE:** • Operations Management/Reactor Engineering Group should be consulted for value to use for high flux alarm setpoint. • Instructions for Adjusting Alarm Setpoints On The NI Recorder are in OP/0/A/1108/001 (Curves And General Information). 2.6 Adjust high flux alarm setpoint per Operations Management/Reactor Engineering Group recommendations. (Alarm setpoint is adjusted on the NI Recorder). (R.M.) **NOTE:** 'D' bleed pressure may **NOT** be high enough to run the FDWP turbines. 2.7 Maintain Auxiliary Steam available to the FDWP turbines. 2.8 **IF** 1SSH-9 (SSH DISCH CTRL BYPASS) is being used to control Steam Seal Header pressure, throttle 1SSH-9 as required to maintain desired SSH pressure during the load reduction to secure an RCP.

Event 4 is complete when the OATC adjusts DTc to within 0±2°F, or when directed by the lead examiner.

Op-Test No.: **ILT48** Scenario No.: **3**	Event No.: **3/4**	Page 12 of 12
Event Description: **1B1 RCP Hi Vib, Power reduction (C: BOP, SRO) ∆Tc fails (I: OATC, SRO)**		

Time	Position	Applicant's Actions or Behavior
	SRO/OATC BOP	***OP/1/A/1102/004*** **Crew Response**: **NOTE:** RCS pressure decrease in the loop with two RCPs running is expected. This may cause acceptance criteria of PT/1/A/0600/001 (Periodic Instrument Surveillance) **NOT** to be met. 2.9 Place note on CR turnover sheet indicating the following: "Be aware of the effect of the indicated pressure on the margin to trip setpoint for the Reactor Protective System trips associated with RCS pressure."

Event 4 is complete when the OATC adjusts DTc to within 0±2°F, or when directed by the lead examiner.

Op-Test No.: **ILT48** Scenario No.: **3**		Event No.: **5**	Page 1 of 3
Event Description: **1HP-14 fails to BLEED (C: BOP, SRO)**			

Time	Position	Applicant's Actions or Behavior
		AP/1/A/1700/002
		Plant Response: • OAC alarm: 1HP-14 = BLEED • OAC alarm: 1HP-14 LDST BYPASS (NOT NORMAL)
		Crew Response:
	SRO/BOP	The SRO should initiate AP/1/A/1700/002 (Excessive RCS Leakage)
		AP/1/A/1700/002 (Excessive RCS Leakage) Rev 015
		3.1 Verify HPI operating
		3.2 **IAAT** RC makeup flow is > 100 gpm, **AND** Pzr level is decreasing, **THEN** close 1HP-5
		Examiner Note: If 1HP-5 is closed , Encl 5.5 will used to re-open when required.
		3.3 **IAAT** all the following exist: **(N/A)** __ RCS leakage > NORMAL MAKEUP CAPABILITY (≈ 160 gpm) with letdown isolated __ Pzr level decreasing __ SG Tube Leakage NOT indicated __ LPI DHR NOT providing core cooling **THEN** perform the following: A. Ensure Rx is tripped B. Initiate Unit 1 EOP
		4.1 Initiate Pzr and LDST level makeup using Unit 1 EOP Encl 5.5 as necessary. (**Page 44**)
		4.2 Announce AP entry using PA system
		4.3 **IAAT** LPI DHR in service, **AND** RCS leakage > LDST makeup capability (≈ 50 gpm), **THEN GO TO** AP/26 **(N/A)**

Event 5 is complete when the standby HPI pump switch is returned to AUTO, or as directed by the Lead Examiner.

Op-Test No.: **ILT48** Scenario No.: **3** Event No.: **5** Page 2 of 3

Event Description: **1HP-14 fails to BLEED (C: BOP, SRO)**

Time	Position	Applicant's Actions or Behavior
	SRO/BOP	***AP/1/A/1700/002*** **Crew Response:** 4.4 Initiate the following notifications: __ OSM to reference the following: • RP/0/A/1000/001 (Emergency Classification) • OMP 1-14 (Notifications) • Encl 5.9 (Oversight Guidlines) __ STA __ RP 4.5 Monitor the following trends to determine leak area (AB or RB) and trend for degradation: __ T6 AP/02 __ T6 WASTE __ RIAs 4.6 Verify specific leak location is identified 4.7 Initiate Encl 5.1 (Leak Rate Determination) Leak Rate = _____ (**MU**) + _____ (**SI**) - _____ (**LD**) - _____ (**TSR**) = _____ 4.8 **WHEN** leak area/failure is identified, **THEN GO TO** applicable step that best fits leak area/failure:

√	Area/ Failure	Symptoms	Step
	1HP-14 failure	1HP-14 failed in BLEED position ↓ LDST level ↑ 1A BHUT level	4.155

4.155 Verify 1A LD Filter in service

RNO: 1. **IF** 1A LD Filter is out of service for maintenance, **THEN** restore 1A LD Filter per in progress procedure **(N/A)**

2. Open 1HP-17

Event 5 is complete when the standby HPI pump switch is returned to AUTO, or as directed by the Lead Examiner.

Op-Test No.: **ILT48** Scenario No.: 3	Event No.: **5**	Page 3 of 3
Event Description: **1HP-14 fails to BLEED (C: BOP, SRO)**		

Time	Position	Applicant's Actions or Behavior
	SRO/BOP	***AP/1/A/1700/002*** **Crew Response:** 4.156 Close 1HP-6 **NOTE** Tech Spec 3.4.9 applies when indicated Pzr level > 260" (corrected value for 285") 4.157 Adjust 1HP-7, as needed, to control: • BLEED flow out of failed 1HP-14 • Pzr level 4.158 Dispatch an operator to open 1HP-196 (Filter Diversion Inlet) (A-2-LDST Hatch Area) 4.159 Verify CC system in operation 4.160 Position the standby HPI pump switch to OFF 4.161 Initiate monitoring RCP parameters 4.162 Throttle 1HP-31 to establish 12 - 15 gpm SEAL INLET HDR FLOW 4.163 **WHEN** 1HP-196 (Filter Diversion Inlet) is open, **THEN** close 1CS-26 4,164 Close the following: __ 1CS-27 __ 1CS-32 & 37 4.165 Open 1HP-6 4.166 Throttle 1HP-31 to establish ≈ 32 gpm SEAL INLET HDR FLOW 4.167 Adjust 1HP-7 to establish desired letdown flow 4.168 Position standby HPI pump switch to AUTO 4.169 **WHEN** 1HP-14 has been repaired, **THEN** perform the following: A. Ensure 1HP-14 in NORMAL B. Open 1HP-26 C. Ensure HPI valves are aligned such that a letdown path will be present after 1HP-196 is closed D. Close 1HP-196 ***Examiner Note: 1HP-14 will NOT be repaired.***

Event 5 is complete when the standby HPI pump switch is returned to AUTO, or as directed by the Lead Examiner.

Op-Test No.: **ILT48**	Scenario No.: **3**	Event No.: **6**	Page 1 of 8
Event Description:	**20 gpm Pri-Sec leak in 1B SG requires Manual S/D (R: OATC, SRO) (TS)**		

Time	Position	Applicant's Actions or Behavior
		AP/1/A/1700/031
		Plant Response: • 1SA8/A9 (RM AREA MONITOR RADIATION HIGH) • 1SA8/E10 (N-16 RM PRIMARY TO SECONDARY TUBE LEAK) • 1SA8/D10 (RM CSAE EXHAUST RADIATION HIGH) • 1SA8/B9 (RM PROCESS MONITOR RADIATION HIGH) • 1RIA-40 in alarm • 1RIA 60 in alarm and indicating ≅ 20 gpm
		Crew Response:
	SRO OATC/BOP	SRO will enter AP/1/A/1700/031 Primary To Secondary Leakage Rev 21
		AP/1/A/1700/031
		NOTE The total primary to secondary leak rate can be determined by the following means: • OAC point O1P1599 (EST TOTAL PRI TO SEC LEAKRATE) if OAC primary to secondary leak rate calculation available (including 1RIA-40 operable with CSAE OFF-GAS BLOWER operating). • Sum of 1RIA-59 and 1RIA-60 readings if both operable and reactor power > 40%. • Allowable leakage per Tech Spec 3.4.13 is 150 gpd through any one SG. • Estimated SGTR leak rate formula: Leak rate = ____ + ____ - ____ - ____ = ____ **MU** **SI** **LD** **TSR** Where: MU = Makeup Flow SI = Seal Inlet Hdr Flow LD = Letdown TSR = Total Seal Return Flow If the EOP is **NOT** already in progress, entry will be directly to the SGTR tab. RIA-59 / 60 and RIA-16 / 17 on the unaffected SG may indicate up to 2 % of the value of the detector on the affected SG due to radiation shine from the steam line carrying radioactive steam from the SG with the tube leak.

This event is complete when Reactor power has been reduced > 10% and auxiliaries have been transferred, or when directed by the lead examiner.

Op-Test No.: **ILT48**	Scenario No.: **3**	Event No.: **6**	Page 2 of 8
Event Description:	**20 gpm Pri-Sec leak in 1B SG requires Manual S/D (R: OATC, SRO) (TS)**		

Time	Position	Applicant's Actions or Behavior
		AP/1/A/1700/031
		Crew Response:
	SRO OATC/BOP	4.1 **IAAT** primary to secondary leak rate is ≥ 25 gpm (≥ 36,000 gpd), **THEN GO TO** Unit 1 EOP.
		4.2 **IAAT** either of the following exists for 1RIA-54: __ is in High alarm __ inoperable **THEN** perform Steps 4.3 - 4.4.
		NOTE The white tags can be created and hung after the TBS pump breakers are opened.
		4.3 Dispatch an operator to open and white tag the following: __ 1XD-R3C (1A TURBINE BUILDING SUMP PUMP BKR) __ 1XE-R3D (1B TURBINE BUILDING SUMP PUMP BKR)
		4.4 Notify Secondary Chemistry to perform the following: __ Obtain a TBS sample. __ Recommend TBS release path.
		4.5 Initiate notification of the following: __ OSM to reference the following: • OMP 1-14 (Notifications) • Emergency Plan __ STA
		NOTE 1RIA-59 and 1RIA-60 are considered inoperable below 40% power.
		4.6 **IAAT** notified by Chemistry that 1RIA-40 is inoperable because the minimum detection limit is too high, **AND** 1RIA-59 or 1RIA-60 is inoperable, **THEN** perform Encl 5.9 (1RIA-40 Inoperable Due to Failure to Meet Minimum Detectable Limit**)**.
		4.7 **IAAT** primary to secondary leakage exceeds 30 gpd, **THEN** perform Steps 4.8 – 4.9. **[Pri-Sec leak rate ~ 20 gpm]**

This event is complete when Reactor power has been reduced > 10% and auxiliaries have been transferred, or when directed by the lead examiner.

Op-Test No.: **ILT48**	Scenario No.: **3**	Event No.: **6**	Page 3 of 8
Event Description:	**20 gpm Pri-Sec leak in 1B SG requires Manual S/D (R: OATC, SRO) (TS)**		

Time	Position	Applicant's Actions or Behavior
	SRO OATC/BOP	***AP/1/A/1700/031*** **<u>Crew Response</u>:** 4.8 Dispatch AO to reroute Unit 1 CSAE drains to the CST per OP/1-2/A/1106/016 (Condenser Vacuum System). 4.9 Initiate Encl 5.2 (Reduction of Secondary Leakage and Cross-Unit Contamination). 4.10 **IAAT** tube leakage is large enough to be indicated by an increase in normal RC makeup flow or a decrease in Pzr level, **THEN GO TO** Step 4.86. 4.86 Verify OAC primary to secondary leak rate calculation available (including 1RIA-40 operable with CSAE OFFGAS BLOWER operating). 4.87 Determine primary to secondary leakage rate using OAC point O1P1599 (EST TOTAL PRI TO SECLEAKRATE). 4.88 **GO TO** Step 4.93. 4.93 Initiate log readings from the following every 15 minutes in the Auto Log: • 1RIA-16 • 1RIA-17 • 1RIA-40 • 1RIA-59 (when Rx power > 40 %) • 1RIA-60 (when Rx power > 40 %) 4.94 Initiate a unit shutdown to meet requirements of Encl 5.1 (Unit Shutdown Requirements) using the following, as applicable: • AP/29 (Rapid Unit Shutdown) (**Page 30**) • OP/1/A/1102/004 (Operation at Power) • OP/1/A/1102/010 (Controlling Procedure for Unit Shutdown) ***Booth Cue: If asked, Unit 2 will continue actions in AP/31*** 4.95 **IAAT** primary to secondary leakage increases, **THEN** modify shutdown as required by Encl 5.1 (Unit Shutdown Requirements). 4.96 Notify OSM to refer to Tech Spec. 3.10.1 Basis to determine SSF operability.

This event is complete when Reactor power has been reduced > 10% and auxiliaries have been transferred, or when directed by the lead examiner.

Op-Test No.: **ILT48**	Scenario No.: **3**	Event No.: **6**	Page 4 of 8
Event Description:	**20 gpm Pri-Sec leak in 1B SG requires Manual S/D (R: OATC, SRO) (TS)**		

Time	Position	Applicant's Actions or Behavior
		AP/1/A/1700/031
		Crew Response:
	SRO OATC/BOP	4.97 Notify plant personnel, using the PA system, to stay clear of the affected MS line and the powdex.
		4.98 Notify Radwaste to stop all liquid releases in progress until sample results assures release rates within limits.
		4.99 Stop all gaseous releases in progress until sample results assure release rates within limits.
		4.100 **IAAT** all the following exist: __ Primary to secondary leak rate < 100 gpd (< 0.0694 gpm) __ 1RIA-40 inoperable __ Rx Power ≤ 40 % **THEN** notify RP and Primary Chemistry to sample CSAE off-gas and RCS every 4 hours.
		4.101 Make up to the UST only as necessary to maintain UST level > 7.5 '.
		4.102 Notify the following that a shutdown is in progress due to primary to secondary leakage: __ RP __ Primary Chemistry __ Secondary Chemistry
		4.103 Verify affected SG identified.
		4.104 Verify entry into this procedure was due to one of the following: __ Tube leakage large enough to be indicated by an increase in normal RC makeup flow or a decrease in Pzr level __ Tritium sample indicating ≥75 gpd primary to secondary leak
		TS 3.4.13 RCS OPERATIONAL LEAKAGE, ***Condition B due to Primary to Secondary LEAKAGE not within limit (12 hours/36 hours) Be in Mode 3 / Mode 5.***

This event is complete when Reactor power has been reduced > 10% and auxiliaries have been transferred, or when directed by the lead examiner.

Op-Test No.: **ILT48** Scenario No.: **3**	Event No.: **6**	Page 5 of 8
Event Description: **20 gpm Pri-Sec leak in 1B SG requires Manual S/D (R: OATC, SRO) (TS)**		

Time	Position	Applicant's Actions or Behavior
	SRO OATC/BOP	*AP/1/A/1700/029* **Crew Response:** **AP/1/A/1700/029 Rapid Unit Shutdown** Rev 13

NOTE
The CR SRO should read this procedure and it should **NOT** be used when EOP entry conditions exist.

4.1 Initiate Encl 5.1 (Support Actions During Rapid Unit Shutdown) (**Page 32**)

4.2 Announce AP entry using the PA system

4.3 **IAAT** both of the following apply:
- __ It is desired to stop power decrease
- __ CTP > 18 %

THEN perform Steps 4.4 - 4.7

RNO: GO TO Step 4.8

4.4 Verify ICS in AUTO

RNO: 1. Stop manual power reduction
2. **GO TO** Step 4.6

NOTE
Due to the power decrease initiated in this AP, the current plant configuration must be compared to the normal plant configuration in OP/1/A/1102/004 (Operation at Power) power reduction enclosure. Equivalent steps performed by this AP should be signed off as intent met. Any steps **NOT** performed by this AP must be evaluated in preparation for power increase or continued shutdown.

4.6 Initiate OP/1/A/1102/004 (Operation at Power) power reduction enclosure

4.7 **WHEN** conditions permit, **THEN** perform one of the following:
- __ Depress MAXIMUM RUNBACK to resume power reduction
- __ **GO TO** appropriate operating procedure for continued operation

4.8 Verify ICS in AUTO

RNO: 1. Initiate manual power reduction to desired power level
2. **GO TO** Step 4.10

This event is complete when Reactor power has been reduced > 10% and auxiliaries have been transferred, or when directed by the lead examiner.

Op-Test No.: **ILT48**	Scenario No.: **3**	Event No.: **6**	Page 6 of 8
Event Description:	**20 gpm Pri-Sec leak in 1B SG requires Manual S/D (R: OATC, SRO) (TS)**		

Time	Position	Applicant's Actions or Behavior
	SRO OATC/BOP	***AP/1/A/1700/029*** **Crew Response:** 4.10 Verify both Main FDW pumps running. **NOTE** • 1B Main FDW Pump is the preferred pump to be shutdown first. • To lower 1B Main FDW Pump suction flow, bias is adjusted counter-clockwise. • To lower 1A Main FDW Pump suction flow, bias is adjusted clockwise. 4.11 Adjust bias for first Main FDW pump desired to be shutdown until Suction flow is ≈ 1 x 10^6 lbm/hr less than remaining Main FDW pump suction flow. 4.12 **WHEN** core thermal power is < 65% FP, **THEN** continue. ***Examiner Note: Power should already be < 70% due to the power reduction to remove a RCP from service.*** 4.13 **IAAT** both Main FDW pumps running, **AND** both of the following exist: __ 1B Main FDW Pump is first pump to be shut down __ Any of the following alarms actuate and remain in alarm: • FWP B FLOW MINIMUM (1SA-16/A-3) • FWP B FLOW BELOW MIN (1SA-16/A-4) **THEN** trip 1B Main FDW Pump. 4.14 **IAAT** both Main FDW pumps running, **AND** both of the following exist: __ 1A Main FDW Pump is first pump to be shut down __ Any of the following alarms actuate and remain in alarm: • FWP A FLOW MINIMUM (1SA-16/A-1) • FWP A FLOW BELOW MIN (1SA-16/A-2) **THEN** trip 1A Main FDW Pump. 4.15 Verify Turbine-Generator shutdown is required. 4.16 Start the TURBINE TURNING GEAR OIL PUMP.

This event is complete when Reactor power has been reduced > 10% and auxiliaries have been transferred, or when directed by the lead examiner.

Op-Test No.: **ILT48**	Scenario No.: **3**	Event No.: **6**	Page 7 of 8
Event Description:	**20 gpm Pri-Sec leak in 1B SG requires Manual S/D (R: OATC, SRO) (TS)**		

Time	Position	Applicant's Actions or Behavior
	SRO OATC/BOP	*AP/1/A/1700/029* **Crew Response:** 4.17 Start 1A through 1E TURBINE BRNG OIL LIFT PUMPS. 4.18 Start the TURBINE MOTOR SUCTION PUMP. 4.19 **IAAT** both of the following apply: __ ICS in automatic __ NI power is ≤ 18% **THEN** deselect MAXIMUM RUNBACK. 4.20 Verify Turbine-Generator shutdown is required. 4.21 __ **WHEN** NI power ≤ 18%, **THEN** depress turbine TRIP pushbutton. 4.22 __ Verify all TURBINE STOP VALVES closed. **Enclosure 5.1 Support Actions During Rapid Unit Shutdown** 1. Notify WCC SRO to initiate Encl 5.2 (WCC SRO Support During Rapid Unit Shutdown). 2. Start the following pumps: __ 1A FDWP SEAL INJECTION PUMP __ 1A FDWP AUXILIARY OIL PUMP __ 1B FDWP AUXILIARY OIL PUMP __ 1B FDWP SEAL INJECTION PUMP 3. **WHEN** CTP is ≤ 80%, **THEN** continue. 4. Stop 1E1 HTR DRN PUMP. 5. Place 1HD-254 switch to OPEN. 6. Stop 1E2 HTR DRN PUMP. 7. Place 1HD-276 switch to OPEN.

This event is complete when Reactor power has been reduced > 10% and auxiliaries have been transferred, or when directed by the lead examiner.

Op-Test No.: **ILT48**	Scenario No.: **3**	Event No.: **6**	Page 8 of 8
Event Description:	**20 gpm Pri-Sec leak in 1B SG requires Manual S/D (R: OATC, SRO) (TS)**		

Time	Position	Applicant's Actions or Behavior
		AP/1/A/1700/029
		Crew Response:
	SRO OATC/BOP	8. Verify Turbine-Generator shutdown is required.
		9. Place the following transfer switches to MAN: __ 1TA AUTO/MAN __ 1TB AUTO/MAN
		10. Close 1TA SU 6.9 KV FDR.
		11. Verify 1TA NORMAL 6.9 KV FDR opens.
		12. Close 1TB SU 6.9 KV FDR.
		13. Verify 1TB NORMAL 6.9 KV FDR opens.
		14. Place the following transfer switches to MAN: __ MFB1 AUTO/MAN __ MFB2 AUTO/MAN
		15. Close E11 MFB1 STARTUP FDR.
		16. Verify N11 MFB1 NORMAL FDR opens.
		17. Close E21 MFB2 STARTUP FDR.
		18. Verify N21 MFB2 NORMAL FDR opens.
		19. Notify CR SRO that Unit auxiliaries have been transferred.
		20. **IAAT** 1SSH-9 is **NOT** closed, **AND** CTP is ≤ 75%, **THEN** throttle 1SSH-9 to Maintain Steam Seal Header pressure 2.5 - 4.5 psig.
		21. **WHEN** CTP ≤ 65%, **THEN** place the following in MANUAL and close: __ 1FDW-53 __ 1FDW-65
		22. __ **IAAT** load is ≤ 550 MWe, **THEN** perform Steps 23 - 24.

This event is complete when Reactor power has been reduced > 10% and auxiliaries have been transferred, or when directed by the lead examiner.

Op-Test No.: **ILT48** Scenario No.: **3** Event No.: **7** Page 1 of 9

Event Description: **1TA Lockout, 1B SGTR (M: All)**

Time	Position	Applicant's Actions or Behavior
		EOP
		Plant Response: • Rx Trip • 1SA-8/B-9 RM Process Monitor Radiation High • 1SA8/D10 (RM CSAE EXHAUST RADIATION HIGH)
		Crew Response: • SRO will direct the OATC to perform IMAs and the BOP to perform a symptom check.
	SRO	***IMAs***
		EOP Immediate Actions Rev 40
	OATC	3.1 Depress REACTOR TRIP pushbutton. 3.2 Verify reactor power < 5% FP and decreasing. 3.3 Depress the turbine TRIP pushbutton 3.4 Verify all turbine stop valves closed. 3.5 Verify RCP seal injection available.
		SYMPTOM CHECK
	BOP	The BOP will verify the following:

Power Range NIs **NOT** < 5% Power Range NIs **NOT** decreasing	Rule 1, *ATWS/Unanticipated Nuclear Po Production*
Any SCM < 0°F	Rule 2, *Loss Of SCM*
Loss of Main and Emergency FDW (including unsuccessful manual initiation of EFDW)	Rule 3, *Loss of Main or Emerg FDW* Rule 4, *Initiation of HPI Forced Cooling* (Inability to feed SGs and > 2300 psig, N limit reached, or PZR level > 375")
Uncontrolled Main steam line(s) pressure decrease	Rule 5, *Main Steam Line Break*
CSAE Offgas alarms Process monitor alarms (RIA-40, 59,60), Area monitor alarms (RIA-16/17)	None (SGTR Tab is entered when identi SG Tube Leakage > 25 gpm)

SRO will review IMAs and transfer to the Subsequent Actions Tab.

This event is complete when the crew minimizes core SCM, or when directed by the lead examiner.

Op-Test No.: **ILT48** Scenario No.: **3**	Event No.: **7**	Page 2 of 9
Event Description: **1TA Lockout, 1B SGTR (M: All)**		

Time	Position	Applicant's Actions or Behavior
	SRO OATC/BOP	***Subsequent Actions Tab*** **Crew Response:** ***Examiner Note: The crew may not recognize the SGTL has degraded into a SGTR initially so steps in the SA tab were included. When the crew recognizes the SGTR, they should transfer to the SGTR tab.*** (Page 37) **as directed by the Subsequent Actions, Parallel Action Page** (Page 52). 4.1 Verify all control rods in Groups 1 – 7 fully inserted. 4.2 Verify Main FDW in operation. 4.3 Verify either: __ Main FDW overfeeding causing excessive temperature decrease. __ Main FDW underfeeding causing SG level decrease below setpoint. **RNO:** __ **GO TO** Step 4.5. 4.5 **IAAT** Main FDW is operating, **AND** level in any SG is > 96% on the Operating Range, **THEN** perform Steps 4.6 - 4.8. **RNO:** __ **GO TO** Step 4.9. 4.9 **IAAT** TBVs **CANNOT** control SG pressure at desired setpoint, **AND** TBVs **NOT** intentionally isolated, **THEN** manually control pressure in affected SGs using either: __ TBVs __ Dispatch two operators to perform Encl 5.24 (Operation of the ADVs) ***Examiner Note: The 1A TBVs have failed closed in AUTO. They can be operated in MANUAL.*** 4.10 Verify 1RIA-40 operable with CSAE OFF-GAS BLOWER operating. 4.11 **GO TO** Step 4.14. 4.14 Verify <u>both</u> are closed: __ 1MS-17 __ 1MS-26

This event is complete when the crew minimizes core SCM, or when directed by the lead examiner.

Op-Test No.: **ILT48** Scenario No.: **3**	Event No.: **7**	Page 3 of 9
Event Description: **1TA Lockout, 1B SGTR (M: All)**		

Time	Position	Applicant's Actions or Behavior
		Subsequent Actions Tab
		Crew Response:
	SRO OATC/BOP	4.15 Verify ES is required. **RNO**: 1. __ Initiate Encl 5.5 (Pzr and LDST Level Control).(Page 44) 2. __ **GO TO** Step 4.17.
		4.17 Open: __ PCB 20 __ PCB 21
		4.18 Verify Generator Field Breaker open.
		4.19 Verify EXCITATION is OFF.
		4.20 Verify Aux Bldg and Turbine Bldg Instrument Air pressure ≥ 90 psig.
		4.21 Verify ICS/NNI power available.
		4.22 Verify all 4160V switchgear (1TC, 1TD & 1TE) energized.
		4.23 Verify both SGs > 550 psig.
		4.24 Verify Main FDW operating.
		4.25 Verify any RCP operating.
		4.26 Verify AP/0/A/1700/025 (SSF EOP) Encl (Unit 1 OATC Actions During Fire) in progress or complete. **RNO:** Ensure SGs approaching 25″ - 35″ [55″ - 65″ acc] S/U level.
		4.27 Place switches in CLOSE: __ 1FDW-31 __ 1FDW-40
		4.27 Place switches in CLOSE: __ 1FDW-31 __ 1FDW-40

This event is complete when the crew minimizes core SCM, or when directed by the lead examiner.

Op-Test No.: **ILT48** Scenario No.: **3** Event No.: **7** Page 4 of 9

Event Description: **1TA Lockout, 1B SGTR (M: All)**

Time	Position	Applicant's Actions or Behavior
		Subsequent Actions Tab
		Crew Response:
	SRO OATC/BOP	4.28 Verify SFP Cooling: {42} __ SFP Cooling in service __ SFP level normal
		4.29 Verify all SCMs > 0°F.
		4.30 Verify both SGs intentionally isolated to stop excessive heat transfer. **RNO:** __ **GO TO** Step 4.32.
		4.32 Verify heat transfer exists.
		4.33 Verify primary to secondary heat transfer has been excessive. **RNO:** __ **GO TO** Step 4.35.
		4.35 Verify indications of SGTR ≥ 25 gpm.
		4.36 **GO TO** SGTR tab.
		Examiner Note: The crew should recognize that the SGTL has degraded to a SGTR at this point.
		SGTR Tab
		1. Verify Rx tripped.
		2. Maintain Pzr level 140″ - 180″ [175″ - 215″ acc] by initiating Encl 5.5 (Pzr and LDST Level Control). (Page 44)
		Examiner Note: 1HP-26 has failed in the closed position.
		3. Ensure Parallel Actions Page reviewed.
		NOTE The remainder of this page may be given to an RO. The Procedure Director may continue.
		4. Start:
	CT-1	__ A OUTSIDE AIR BOOSTER FAN __ B OUTSIDE AIR BOOSTER FAN

This event is complete when the crew minimizes core SCM, or when directed by the lead examiner.

Op-Test No.: **ILT48**	Scenario No.: **3**	Event No.: **7**	Page 5 of 9

Event Description: **1TA Lockout, 1B SGTR (M: All)**

Time	Position	Applicant's Actions or Behavior
	SRO OATC/BOP	***SGTR Tab*** **<u>Crew Response</u>:** 5. Notify Unit 3 to start: __ 3A OUTSIDE AIR BOOSTER FAN __ 3B OUTSIDE AIR BOOSTER FAN 6. Perform the following: A. __ Monitor RIAs 16 and 17 to identify all SGs with a tube rupture. B. __ Inform SRO of results. 7. Dispatch an operator to open: __ 1XD-R3C (A Turb Bldg Sump Pump Bkr) (T-1, G-27) __ 1XE-R3D (B Turb Bldg Sump Pump Bkr) (T-1, J-27) 8. Notify RP to survey both MS lines for radiation. 9. **GO TO** Step 28. 28. Secure any unnecessary offsite release paths. (Main Vacuum Pumps, TDEFDWP, Emergency Steam Air Ejector, etc.). 29. Verify Main FDW or EFDW controlling properly. 30. Open: __ 1HP-24 __ 1HP-25 31. Secure makeup to LDST. 32. Maintain both SG pressures < 950 psig using either: __ TBVs __ Dispatch two operators to perform Encl 5.24 (Operation of the ADVs) ***Examiner Note: 1A TBVs have tripped to HAND.*** 33. **IAAT** all the following exist: __ All SCMs > 0°F __ ES Bypass Permit satisfied __ RCS pressure controllable **THEN** perform Steps 34 - 35.

This event is complete when the crew minimizes core SCM, or when directed by the lead examiner.

Op-Test No.: **ILT48** Scenario No.: **3** Event No.: **7** Page 6 of 9

Event Description: **1TA Lockout, 1B SGTR (M: All)**

Time	Position	Applicant's Actions or Behavior
		SGTR Tab
		Crew Response:
	SRO OATC/BOP	34. Bypass applicable ES: To Bypass HPI: __ Bypass HPI CH A, B, C To Bypass LPI: __ Bypass LPI CH A, B, C
		35. Bypass applicable Diverse ES: To Bypass HPI: __ Bypass Diverse HPI To Bypass LPI: __ Bypass Diverse LPI
		NOTE Leak rate prior to reducing SCM is input to Cool Down Plateau at Steps 103 and 203.
		36. Estimate SGTR leak rate: _____ + _____ - _____ - _____ = _____ gpm **MU SI LD TSR LR** Where: MU =Makeup Flow SI =Seal Inlet Hdr Flow LD =Letdown Flow TSR =Total Seal Return Flow LR =Leak Rate
		37. Verify any RCP operating.
		38. Maintain RCP NPSH during the reduction of SCM: • OAC • Encl 5.18 (P/T Curves)
		NOTE • If normal pzr spray is available, efforts should be made to minimize core SCM ≤ 15°F **IF** allowed by RCP NPSH requirements. • If normal pzr spray is **NOT** available, minimize core SCM as low as safely achievable.

This event is complete when the crew minimizes core SCM, or when directed by the lead examiner.

Op-Test No.: **ILT48**	Scenario No.: **3**	Event No.: **7**	Page 7 of 9

Event Description: **1TA Lockout, 1B SGTR (M: All)**

Time	Position	Applicant's Actions or Behavior
	SRO OATC/BOP ***CT-2***	***SGTR Tab*** **Crew Response:** 39. Reduce and maintain core SCM at minimum using any/all of the following methods: __ De-energize all Pzr heaters __ Use Pzr spray __ Maintain Pzr level 140″ - 180″ [175″ - 215″ acc] **NOTE** • The rate of fill of the SG with the tube rupture should be considered when deciding to use alternate depressurization methods. • Pzr spray, if available, is preferred to maintain SCM at minimum after using the PORV. This will prevent repetitive cycling of the PORV. 40. **IAAT** RCS de-pressurization methods are inadequate in minimizing core SCM, **THEN** perform Step 40 - 42. **NOTE** BWST temperature should be used in determining Pzr spray nozzle ΔT. Computer point O1P3367 provides Pzr spray nozzle ΔT information. 41. Verify Pzr spray nozzle ΔT ≥ 410°F. 42. Close: __ 1LWD-1 __ 1LWD-2 43. Cycle PORV as necessary. 44. Verify 1SA-2/C-8 (AFIS HEADER A INITIATED) lit. **RNO**: __ Select OFF for both digital channels on AFIS HEADER A. 45. Verify 1SA-2/D-8 (AFIS HEADER B INITIATED) lit. **RNO**: __ Select OFF for both digital channels on AFIS HEADER B. 46. Verify RCS temperature > 532°F. **NOTE** Close monitoring of RCS pressure is essential during the cooldown if ES has not been bypassed. Slowing the cooldown and stopping Pzr spray momentarily may be needed as ES Bypass Permit is approached to avoid ES actuation.

This event is complete when the crew minimizes core SCM, or when directed by the lead examiner.

Op-Test No.: **ILT48** Scenario No.: **3**	Event No.: **7**	Page 8 of 9
Event Description: **1TA Lockout, 1B SGTR (M: All)**		

Time	Position	Applicant's Actions or Behavior
	SRO OATC/BOP	*SGTR Tab* **Crew Response:** 47. Initiate a cooldown as follows: __ Decrease SG pressure to 835 - 845 psig using any of the following: • TBV setpoint adjusted to 710 - 720 psig • TBVs in manual • ADVs __ Maximize cooldown rate limited only by the ability to maintain Pzr level > 100″ [180″ acc]. 48. **WHEN** SG pressure is 835 - 845 psig, **THEN** adjust SG pressure as necessary to maintain an RCS temperature band of 525°F - 532°F. 49. **IAAT** any affected SG approaches overfill: • Any SCM ≤ 0°F: LOSCM setpoint • All SCMs > 0°F: 285″ [315″ acc] XSUR **THEN** perform Steps 49 - 51. **RNO**: __ **GO TO** Step 52. 50. Verify TBVs available for steaming affected SGs. 51. Open on all affected SGs:

	1A SG		1B SG
	1MS-17		1MS-18

NOTE
Steaming a SG to prevent overfill should continue even if Tech Spec cooldown rates are exceeded.

52. Steam affected SGs to prevent overfill.

53. Verify at least one open:
__ 1MS-24
__ 1MS-33

This event is complete when the crew minimizes core SCM, or when directed by the lead examiner.

Op-Test No.: **ILT48** Scenario No.: **3** Event No.: **7** Page 9 of 9

Event Description: **1TA Lockout, 1B SGTR (M: All)**

Time	Position	Applicant's Actions or Behavior
	SRO OATC/BOP	***SGTR Tab***

Crew Response:

54. Verify a SG without a tube leak is available to supply the Aux Steam header.

55. Open on the SG without a tube leak:

	1A SG		1B SG
	1MS-24		1MS-33

56. Close on the SG with a tube leak:

	1A SG		1B SG
	1MS-24		1MS-33

57. Open 1AS-40 while closing 1MS-47.

58. Close on all affected SGs:

	1A SG		1B SG
	1MS-79		1MS-76
	1MS-82		1MS-84
	1MS-35		1MS-36

59. Close 1SSH-9.

60. Verify one SG isolated due to steam leak.
RNO: __**GO TO** Step 68.

68. Verify all SCMs > 0°F.

69. **GO TO** applicable step based on number of RCPs operating:

	Number of RCPs Operating	Applicable Step
	4	69
	1,2 or 3	70
	None	90

71. Verify steaming both SGs.
RNO: __ **GO TO** Step 87.

87. Initiate AP/31 (Primary to Secondary Leakage) Encl 5.2 (Reduction of Secondary Leakage and Cross-Unit Contamination).

This event is complete when the crew minimizes core SCM, or when directed by the lead examiner.

Rule 6
HPI

<u>HPI Pump Throttling Limits</u>

- HPI <u>must</u> be throttled to prevent violating the RV-P/T limit.
- HPI pump operation <u>must</u> be limited to two HPIPs when only one BWST suction valve (1HP-24 <u>or</u> 1HP-25) is open.
- HPI <u>must</u> be throttled ≤ 475 gpm/pump (including seal injection for A header) when <u>only one</u> HPI pump is operating in a header.
- Total HPI flow <u>must</u> be throttled ≤ 950 gpm including seal injection when 1A <u>and</u> 1B HPI pumps are operating with 1HP-409 open.
- Total HPI flow <u>must</u> be throttled < 750 gpm when <u>all</u> the following exist:
  - LPI suction is from the RBES
  - piggyback is aligned
  - either of the following exist:
    - <u>only one</u> piggyback valve is open (1LP-15 <u>or</u> 1LP-16)
    - <u>only one</u> LPI pump operating
- HPI <u>may</u> be throttled under the following conditions:

HPI Forced Cooling in Progress:	HPI Forced Cooling NOT in Progress:
<u>All</u> the following conditions must exist: • <u>Core</u> SCM > 0 • CETCs decreasing	<u>All</u> the following conditions must exist: • <u>All</u> WR NIs ≤ 1% • <u>Core</u> SCM > 0 • Pzr level increasing • SRO concurrence required if throttling following emergency boration

<u>HPI Pump Minimum Flow Limit</u>

- Maintain ≥ 170 gpm indicated/pump. This is an instrument error adjusted value that ensures a real value of ≥ 65 gpm/pump is maintained. HPI pump flow less than minimum is allowed for up to 4 hours.

Enclosure 5.5
Pzr and LDST Level Control

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
NOTE Maintaining Pzr level >100″ [180″ acc] will ensure Pzr heater bundles remain covered.	
1. __ Utilize the following as necessary to maintain <u>desired</u> Pzr level: • 1A HPI Pump • 1B HPI Pump • 1HP-26 • 1HP-7 • 1HP-120 setpoint or valve demand • 1HP-5	**IF** 1HP-26 will **NOT** open, **THEN** throttle 1HP-410 to maintain desired Pzr level.
2. **IAAT** <u>makeup</u> to the <u>LDST</u> is desired, **THEN** makeup from 1A BHUT.	
3. **IAAT** it is desired to <u>secure</u> <u>makeup</u> to LDST, **THEN** secure makeup from 1A BHUT.	
4. **IAAT** it is desired to <u>bleed</u> letdown flow to 1A BHUT, **THEN** perform the following: A. Open: __ 1CS-26 __ 1CS-41 B. __ Position 1HP-14 to BLEED. C. __ Notify SRO.	
5. **IAAT** letdown <u>bleed</u> is **NO** longer desired, **THEN** position 1HP-14 to NORMAL.	

Enclosure 5.5
Pzr and LDST Level Control

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
6. **IAAT** 1C HPI PUMP is required, **THEN** perform Steps 7 - 9.	**GO TO** Step 10.
7. __ Open: • 1HP-24 • 1HP-25	1. **IF** both BWST suction valves (1HP-24 and 1HP-25) are closed, **THEN** perform the following: A. __ Start 1A LPI PUMP. B. __ Start 1B LPI PUMP. C. Open: __ 1LP-15 __ 1LP-16 __ 1LP-9 __ 1LP-10 __ 1LP-6 __ 1LP-7 D. **IF** two LPI Pumps are running only to provide HPI pump suction, **THEN** secure one LPI pump. E. Dispatch an operator to open 1HP-363 (Letdown Line To LPI Pump Suction Block) (A-1-119, U1 LPI Hatch Rm, N end). F. __ **GO TO** Step 8. 2. **IF** only one BWST suction valve (1HP-24 or 1HP-25) is open, **THEN** perform the following: A. **IF** three HPI pumps are operating, **THEN** secure 1B HPI PUMP. B. **IF** < 2 HPI pumps are operating, **THEN** start HPI pumps to obtain two HPI pump operation, preferably in opposite headers. C. __ **GO TO** Step 9.

Enclosure 5.5
Pzr and LDST Level Control

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
8. __ Start 1C HPI PUMP.	**IF** at least two HPI pumps are operating, **THEN** throttle 1HP-409 to maintain desired Pzr level.
9. Throttle the following as required to maintain desired Pzr level: 1HP-26 __ 1HP-27	1. __ **IF** at least two HPI pumps are operating, **AND** 1HP-26 will **NOT** open, **THEN** throttle 1HP-410 to maintain desired Pzr level. 2. **IF** 1A HPI PUMP <u>and</u> 1B HPI PUMP are operating, **AND** 1HP-27 will **NOT** open, **THEN** throttle 1HP-409 to maintain desired Pzr level.

Enclosure 5.5
Pzr and LDST Level Control

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
10. **IAAT** <u>LDST</u> <u>level</u> **CANNOT** be maintained, **THEN** perform Step 11.	**GO TO** Step 12.
11. __ Perform the following: • Open 1HP-24. • Open 1HP-25. • Close 1HP-16.	1. **IF** <u>both</u> BWST suction valves (1HP-24 and 1HP-25) are closed, **THEN** perform the following: A. __ Start 1A LPI PUMP. B. __ Start 1B LPI PUMP. C. Open: __ 1LP-15 __ 1LP-16 __ 1LP-9 __ 1LP-10 __ 1LP-6 __ 1LP-7 D. **IF** two LPI Pumps are running <u>only</u> to provide HPI pump suction, **THEN** secure one LPI pump. E. Dispatch an operator to open 1HP-363 (Letdown Line To LPI Pump Suction Block) (A-1-119, U1 LPI Hatch Rm, N end). F. __ **GO TO** Step 13. 2. **IF** <u>only one</u> BWST suction valve (1HP-24 or 1HP-25) is open, **AND** three HPI pumps are operating, **THEN** secure 1B HPI PUMP.

NOTE
Maintaining Pzr level > 100” [180” acc] will ensure Pzr heater bundles remain covered.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
12.__ Operate Pzr heaters as required to maintain heater bundle integrity.	

Enclosure 5.5
Pzr and LDST Level Control

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
13. **IAAT** additional makeup flow to LDST is desired, **AND** 1A BLEED TRANSFER PUMP is operating, **THEN** dispatch an operator to close 1CS-48 (1A BHUT Recirc) (A-1-107, Unit 1 RC Bleed Transfer Pump Rm.).	
14. **IAAT** <u>two</u> Letdown Filters are desired, **THEN** perform the following: __ Open 1HP-17. __ Open 1HP-18	
15. __ **IAAT** <u>all</u> of the following exist: __ Letdown isolated __ LPSW available __ Letdown restoration desired **THEN** perform Steps 16 - 34. {41}	__ **GO TO** Step 35.
16. Open: 1CC-7 1CC-8	1. Notify CR SRO that letdown **CANNOT** be restored due to inability to restart the CC system. 2. **GO TO** Step 35.
17. Ensure only one CC pump running.	
18. Place the non-running CC pump in AUTO.	
19. Verify <u>both</u> are open: 1HP-1 1HP-2	1. **IF** 1HP-1 is closed due to 1HP-3 failing to close, **THEN GO TO** Step 21. 2. **IF** 1HP-2 is closed due to 1HP-4 failing to close, **THEN GO TO** Step 21.
20. __ **GO TO** Step 23.	

NOTE
Verification of leakage requires visual observation of East Penetration Room.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
21. __ Verify letdown line leak in East Penetration Room has occurred.	**GO TO** Step 23.
22. __ **GO TO** Step 35.	

Enclosure 5.5
Pzr and LDST Level Control

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
23. Monitor for unexpected conditions while restoring letdown.	
24. __ Verify <u>both</u> letdown coolers to be placed in service.	1. **IF** 1A letdown cooler is to be placed in service, **THEN** open: __ 1HP-1 __ 1HP-3 2. **IF** 1B letdown cooler is to be placed in service, **THEN** open: __ 1HP-2 __ 1HP-4 3. __ **GO TO** Step 26.
25. Open: __ 1HP-1 __ 1HP-2 __ 1HP-3 __ 1HP-4	
26. Verify <u>at least one</u> letdown cooler is aligned.	Perform the following: A. Notify CR SRO of problem. B. **GO TO** Step 35.
27. Close 1HP-6.	
28. Close 1HP-7.	
29. Verify letdown temperature < 125°F.	1. Open 1HP-13. 2. Close: __ 1HP-8 __ 1HP-9&11 3. **IF** <u>any</u> deborating IX is in service, **THEN** perform the following: A. __ Select 1HP-14 to NORMAL. B. __ Close 1HP-16. 4. Select LETDOWN HI TEMP INTLK BYP switch to BYPASS.

Enclosure 5.5
Pzr and LDST Level Control

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
30. __ Open 1HP-5.	
31. __ Adjust 1HP-7 for ≈ 20 gpm letdown.	
32. __ **WHEN** letdown temperature is < 125°F, **THEN** place LETDOWN HI TEMP INTLK BYP switch to NORMAL.	
33. __ Open 1HP-6.	
34. Adjust 1HP-7 to control desired letdown flow.	

NOTE

AP/32 (Loss of Letdown) provides direction to cool down the RCS to offset increasing pressurizer level.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
35. **IAAT** it is determined that letdown is unavailable due to equipment failures <u>or</u> letdown system leakage, **THEN** notify CR SRO to initiate AP/32 (Loss of Letdown).	
36. **IAAT** > 1 HPI pump is operating, **AND** additional HPI pumps are **NO** longer needed, **THEN** perform the following: A. Obtain SRO concurrence to reduce running HPI pumps. B. __ Secure the desired HPI pumps. C. Place secured HPI pump switch in AUTO, if desired.	
37. __ **IAAT** <u>all</u> the following conditions exist: __ Makeup from BWST **NOT** required __ LDST level > 55″ __ <u>All</u> control rods inserted __ Cooldown Plateau **NOT** being used **THEN** close: __ 1HP-24 __ 1HP-25	

Enclosure 5.5
Pzr and LDST Level Control

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
38. __ Verify 1CS-48 (1A BHUT Recirc) has been closed to provide additional makeup flow to LDST.	**GO TO** Step 40.
39. **WHEN** 1CS-48 (1A BHUT Recirc) is **NO** longer needed to provide additional makeup flow to LDST, **THEN** perform the following: A. Stop 1A BLEED TRANSFER PUMP. B. Locally position 1CS-48 (1A BHUT Recirc) <u>one</u> turn open (A-1-107, Unit 1 RC Bleed Transfer Pump Rm.). C. __ Close 1CS-46. D. Start 1A BLEED TRANSFER PUMP. E. Locally throttle 1CS-48 (1A BHUT Recirc) to obtain 90 - 110 psig discharge pressure. F. Stop 1A BLEED TRANSFER PUMP.	
40. __ Verify two Letdown Filters in service, **AND** <u>only one</u> Letdown filter is desired.	**GO TO** Step 42.
41. Perform <u>one</u> of the following: __ Place 1HP-17 switch to CLOSE. __ Place 1HP-18 switch to CLOSE.	
42. **WHEN** directed by CR SRO, **THEN EXIT** this enclosure.	

Subsequent Actions

Parallel Actions

EP/1/A/1800/001
Page 1 of 1

CONDITION	ACTIONS	
1. PR NIs ≥ 5% FP **OR** NIs **NOT** decreasing	**GO TO** UNPP tab.	**UNPP**
2. All 4160V SWGR de-energized {13}	**GO TO** Blackout tab.	**BLACKOUT**
3. Core SCM indicates superheat	**GO TO** ICC tab.	**ICC**
4. Any SCM = 0°F	**GO TO** LOSCM tab.	**LOSCM**
5. Both SGs intentionally isolated to stop excessive heat transfer	**GO TO** EHT tab.	**LOHT**
6. Loss of heat transfer (including loss of all Main and Emergency FDW)	**GO TO** LOHT tab.	
7. Heat transfer is or has been excessive	**GO TO** EHT tab.	**EHT**
8. Indications of SGTR ≥ 25 gpm	**GO TO** SGTR tab.	**SGTR**
9. Turbine Building flooding **NOT** caused by rainfall event	**GO TO** TBF tab.	**TBF**
10. Inadvertent ES actuation occurred	Initiate AP/1/A/1700/042 (Inadvertent ES Actuation).	**ES**
11. Valid ES actuation has occurred or should have occurred	Initiate Encl 5.1 (ES Actuation).	**ES**
12. Power lost to all 4160V SWGR and any 4160V SWGR re-energized	• Initiate AP/11 (Recovery from Loss of Power). • **IF** Encl 5.1 (ES Actuation) has been initiated, **THEN** reinitiate Encl 5.1.	**ROP**
13. RCS leakage > 160 gpm with letdown isolated	Notify plant staff that Emergency Dose Limits are in affect using PA system.	**EDL**
14. Individual available to make notifications	• Announce plant conditions using PA system. • Notify OSM to reference the Emergency Plan and NSD 202 (Reportability).	**NOTIFY**

SGTR
Parallel Actions

EP/1/A/1800/001
Page 1 of 1

CONDITION	ACTIONS	
1. **AFTER** Rx trip pushbutton Depressed: PR NIs ≥ 5% FP **OR** NIs **NOT** decreasing	**GO TO** UNPP tab.	**UNPP**
2. All 4160V SWGR de-energized {13}	**GO TO** Blackout tab.	**BLACKOUT**
3. Core SCM indicates superheat	**GO TO** ICC tab.	**ICC**
4. Any SCM = 0°F, **AND** HPI forced cooling **NOT** in progress	**IF** NOT previously performed, **THEN GO TO** LOSCM tab.	**LOSCM**
5. Both SGs intentionally isolated to stop excessive heat transfer	**GO TO** EHT tab.	**LOHT**
6. Loss of heat transfer	**GO TO** LOHT tab.	
7. Heat transfer is or has been excessive	**GO TO** EHT tab.	**EHT**
8. Indications of SGTR in another SG after SGTR tab initiated	**RETURN TO** beginning of SGTR tab.	**SGTR**
9. Inadvertent ES actuation occurred	Initiate AP/1/A/1700/042 (Inadvertent ES Actuation).	**ES**
10. Valid ES actuation has occurred or should have occurred	Initiate Encl 5.1 (ES Actuation).	**ES**
11. Power lost to all 4160V SWGR and any 4160V SWGR re-energized	• Initiate AP/11 (Recovery from Loss of Power). • **IF** Encl 5.1 (ES Actuation) has been initiated, **THEN** reinitiate Encl 5.1.	**ROP**
14. Individual available to make notifications	• Announce plant conditions using PA system. • Notify OSM to reference the Emergency Plan and AD-LS-ALL-0006 (Notification/Reportability Evaluation). • Notify plant staff that Emergency Dose Limits are in affect using PA system.	**NOTIFY And EDL**

CRITICAL TASKS

CT-1 Outside Air Booster Fans are started to minimize radiation exposure to control room personnel. (Within 30 minutes of SGTR) TCA #20

CT-2 SCM is minimized to reduce the radioactive release to the atmosphere by minimizing the Pri – Sec leak rate.

SAFETY: Take a Minute

UNIT 0 (OSM)			
SSF Operable: Yes	KHU's Operable: U1 - OH, U2 - UG	LCTs Operable: 2	Fuel Handling: No

UNIT STATUS (CR SRO)

Unit 1 Simulator	**Other Units**	
Mode: 1	**Unit 2**	**Unit 3**
Reactor Power: 100%	Mode: 1	Mode: 1
Gross MWE: 894	100% Power	100% Power
RCS Leakage: 0.01 gpm No WCAP Action	EFDW Backup: Yes	EFDW Backup: Yes
RBNS Rate: 0.01 gpm		

Technical Specifications/SLC Items (CR SRO)

Component/Train	OOS Date/Time	Restoration Required Date/Time	TS/SLC #
AMSAC/DSS	0300	7 Days	16.7.2

Shift Turnover Items (CR SRO)

Primary

- Due to unanalyzed condition, the SSF should be considered INOP for Unit 1 if power levels are reduced below 85%. Evaluations must be performed prior to declaring the SSF operable following a return to power (after going below 85%).
- 1RIA-3 and 5 removed from RB.

Secondary

- Feedwater valve DP selected to A1 and B2 for maintenance
- AMSAC/DSS bypassed
- 1SSH-1, 1SSH-3, 1SD-2, 1SD-5, 1SD-140, 1SD-303, 1SD-355, 1SD-356 and 1SD-358 are closed with power supply breakers open per the Startup Procedure for SSF Overcooling Event.

Reactivity Management (CR SRO)

RCS Boron 83 ppmB	Gp 7 Rod Position: 92% Withdrawn	Batch additions as required for volume control.

Human Performance Emphasis (OSM)

Procedure Use and Adherence

Facility: **Oconee** Scenario No.: 4 Op-Test No.: 1

Examiners: ______________________ Operators: ______________________**SRO**

______________________ ______________________**OATC**

______________________ ______________________**BOP**

Initial Conditions:

- Reactor Power = Critical below POAH

Turnover:

- LDST pressure low
- Unit startup in progress

Event No.	Malfunction No.	Event Type*	Event Description
0a			
0b			
0d			
0c			
1	Override	C: BOP, SRO **(TS)**	Pressurize LDST with H2 (1H-1 will fail open requiring LDST vent to return to acceptable LDST pressure)
2		R: OATC, SRO	Increase power to 6-7 %
3	Override	C: BOP, SRO	1B FWPT Auxiliary Oil Pump Trip
4	Override	C: BOP, SRO	1C HWP Casing Water Level Low
5		SRO **(TS)**	TD EFDWP oil sump dry
6	Override	C: OATC, SRO	PORV fails open
7	MCR022	C: OATC, SRO	Dropped Control Rod(s) requiring a reactor trip
8	MSS270 MSS360	M: ALL	1A MSLB inside containment • 1B MD EFDW fails to start in AUTO • 1C HPIP fails to start on ES

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

Scenario 4

Event Summary

Event 1: The BOP will increase the pressure in the LDST using OP/1/A/1106/017. 1H-1 (Hydrogen to LDST valve) will fail open resulting in overpressurization of the LDST. This will cause all HPI pumps to be declared INOPERABLE until pressure is reduced.

Event 2: The OATC will increase power from below POAH to ~ 6 – 7 %.

Event 3: The Auxiliary Oil Pump for the 1A FWPT will trip causing the Emergency Oil Pump to start. Per the ARG, the candidate will attempt to start the Auxiliary Oil Pump which will fail. Shortly afterwards, the alarm for FWPT 1A Emergency Oil Pump Overload will alarm which will require the candidate to attempt to start the Auxiliary Oil Pump. Not being able to start it, they will be directed to stop the Turning Gear Oil Pump and Emergency Oil pump.

Event 4: The 1C HWP will receive a casing low level alarm. This will require the BOP to start a standby HWP and secure the 1C HWP.

Event 5: An AO reports that the TD EFDWP oil sump is dry. The SRO will address Tech Specs. The SRO should direct the OATC to place the TD EFDW pump switch in Pull To Lock (PTL).

Event 6: The PORV will fail open causing RCS pressure to decrease rapidly. The operator will be required to close 1RC-4 (PORV Block valve) in order to stop the pressure decrease.

Event 7: Two control rods will fall into the core requiring a manual reactor trip.

Event 8: When the reactor trips, a steam line break will occur inside containment. The 1B MD EFDW pump will not start when the MFWPs trip so it will require manual start in order to feed the 1B SG. 1C HPIP will fail to start on ES which will require the operators to open 1HP-409 to provide flow to the B HPI header if required.

Op-Test No.: **ILT48**	Scenario No.: **4**	Event No.: **1**	Page 1 of 4

Event Description: **Pressurize LDST with H2 (1H-1 will fail open requiring LDST vent to return to acceptable LDST pressure) (C: BOP, SRO)(TS)**

Time	Position	Applicant's Actions or Behavior
		OP/1/A/1106/017
	SRO	**Crew Response**: • SRO directs the BOP to add H2 to the LDST using OP/1/A/1106/017 (Hydrogen System) Enclosure 4.5 (Unit 1 LDST H2 Addition).
		OP/1/A/1106/017 Rev 122
	BOP	2.1 Notify Chemistry of hydrogen addition prior to adding hydrogen. {21} ____________________ ____ Person Notified Date
		NOTE: • OP/0/A/1108/001 (Curves And General Information) and computer may be referred to for LDST Pressure vs Level curve. {7} • LDST Maximum Pressure vs Indicated Level Curve should **NOT** be exceeded when pressurizing LDST. • If Unit 1 is shutdown and will be placed in MODE 5, Nitrogen should be added to LDST to maintain LDST Pressure vs Level. • If Unit 1 is shutdown and will **NOT** be placed in MODE 5, Hydrogen should be added to LDST to maintain LDST Pressure vs Level.
		2.2 Immediately prior to pressurization determine lowest reading of diverse LDST level indications: _____ inches.
		2.3 For existing LDST level determine LDST Pressure allowable per LDST Pressure vs Level curve: _____ psig.
		2.4 Notify Operator at H2 Cage to pressurize primary hydrogen.
		NOTE: Operator should be in constant communication with CR to close 1H-26 if 1H-1 fails open.
		BOOTH CUE: When directed to open 1H-26, use Manual Valves and position 1H-93 approximately 20% open
		2.5 Direct Operator to open 1H-26 (LDST Block). (A-2-N of LDST Rm)

This event is complete when LDST pressure is returned to within limit, or when directed by the lead examiner.

Op-Test No.: **ILT48**	Scenario No.: **4**	Event No.: **1**	Page 2 of 4
Event Description:	**Pressurize LDST with H2 (1H-1 will fail open requiring LDST vent to return to acceptable LDST pressure) (C: BOP, SRO) (TS)**		

Time	Position	Applicant's Actions or Behavior
	SRO BOP	***OP/1/A/1106/017*** **Crew Response**: ***Examiner Booth Note: Once LDST pressure is being increased, 1H-1 (LDST SUPPLY) will fail open.*** 2.6 Direct Operator to use explosive detector to monitor the following: • Pressurized, non-welded H2 piping and fittings within local area of addition • Loop seal (A-2-N of LDST Rm) 2.7 Cycle 1H-1 (H2 TO LDST) as required to pressurize LDST per LDST Pressure vs Level curve. ***Booth Note: When 1H-1 is opened, Fire Timer 1 to fail it open.*** 2.8 **WHEN** Hydrogen addition complete, ensure closed 1H-1 (H2 TO LDST). ***Examiner Note: BOP should determine that 1H-1 has failed open and direct the AO to close 1H-26.*** 2.9 Direct Operator to close 1H-26 (LDST Block). (A-2-N of LDST Rm) ***Booth Note: 1H-26 will not be closed until LDST pressure is outside acceptable range.*** • 1SA-02/D-2, HP Approaching LDST Operating Limits, actuates • BOP refers to the ARG. ***1SA-2/D-2*** **1SA-2/D-2** Rev 33 3.1 Verify LDST pressure/level are within the acceptable operating region of the LDST PRESSURE vs. LEVEL enclosure in OP/0/A/1108/001 (Curves and General Information). (**Page 6**) **[It will NOT be within limits and will require Both Trains of HPI be declared INOPERABLE…. TS 3.5.2]** 3.2 **IF** necessary, vent LDST to GWD per OP/1/A/1104/002 (HPI System). 3.3 **IF** necessary, add hydrogen to establish desired LDST pressure per OP/1/A/1106/017 (Hydrogen System).

This event is complete when LDST pressure is returned to within limit, or when directed by the lead examiner.

Op-Test No.: **ILT48** Scenario No.: **4** Event No.: **1** Page 3 of 4

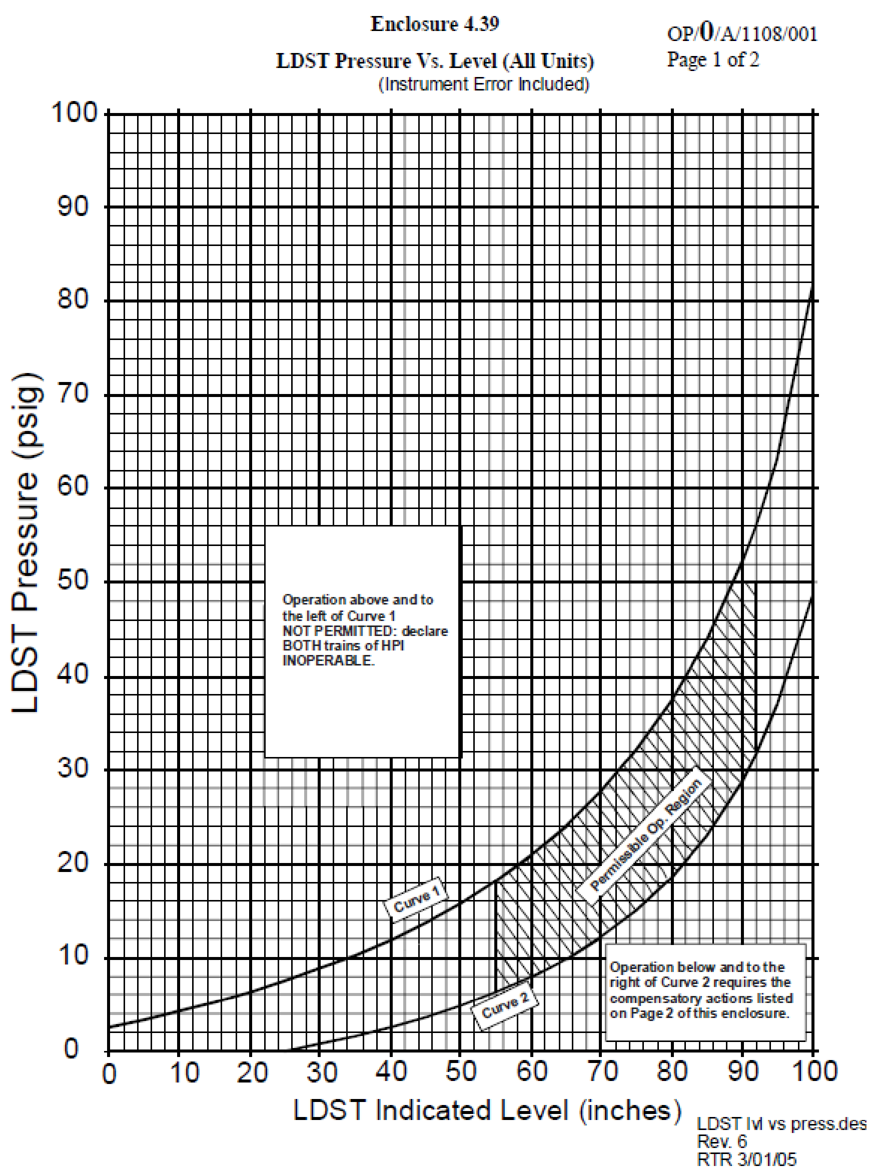
Event Description: **Pressurize LDST with H2 (1H-1 will fail open requiring LDST vent to return to acceptable LDST pressure) (C: BOP, SRO) (TS)**

Time	Position	Applicant's Actions or Behavior
		OP/1/A/1104/002
		Crew Response:
	SRO	• SRO directs the BOP to vent LDST to GWD per OP/1/A/1104/002 (HPI System), Encl. 4.16, (Lowering LDST Pressure)
	BOP	**OP/1/A/1104/002 (HPI System), Encl. 4.16, (Lowering LDST Pressure)** Rev 167
		3.1 Close 1GWD-20 (LDST Vent Blk). (A-2-LDST Hatch Area)
		3.2 Open 1GWD-19 (LDST VENT).
		CAUTION: LDST pressure should be within curves of Enclosure "LDST Pressure Vs Level" of OP/0/A/1108/001 (Curves and General Information).
		NOTE: If LDST pressure is < 30 psig, leakage from BWST into HPI System may occur. (R.M.)
		3.3 Throttle open 1GWD-20 (LDST Vent Blk) until LDST pressure begins to **slowly** decrease **and** GWD system can maintain vent header. (A-2-LDST Hatch Area)
		3.4 **IF** required, start Standby GWD Compressor per OP/1-2/A/1104/018 (GWD System).
		3.5 **WHEN** desired LDST pressure obtained, close 1GWD-19 (LDST VENT).
		3.6 **IF** started, stop Standby GWD Compressor.
		3.7 Throttle ≈ 1/4 turn open 1GWD-20 (LDST Vent Blk). (A-2-LDST Hatch Area)
		TS 3.5.2, HIGH PRESSURE INJECTION ***Condition C.2 (3 hours) Verify by administrative means that the ADV flow path for each steam generator is OPERABLE.*** ***Condition C.3 (72 hours) Restore HPI train to Operable status.*** ***Condition H (Immediately) Enter LCO 3.0.3*** ***TS 3.0.3 (12 hours) be in Mode 3***

This event is complete when LDST pressure is returned to within limit, or when directed by the lead examiner.

Op-Test No.: **ILT48** Scenario No.: **4** Event No.: **1** Page 4 of 4

Event Description: **Pressurize LDST with H2 (1H-1 will fail open requiring LDST vent to return to acceptable LDST pressure) (C: BOP, SRO) (TS)**

Time	Position	Applicant's Actions or Behavior
	SRO BOP	***OP/0/A/1108/001*** 

This event is complete when LDST pressure is returned to within limit, or when directed by the lead examiner.

Op-Test No.: **ILT48**	Scenario No.: **4**	Event No.: **2**	Page 1 of 5
Event Description:	**Increase power to 6-7 % (R: OATC, SRO)**		

Time	Position	Applicant's Actions or Behavior
		OP/1/A/1102/001
		Crew Response:
	SRO	• SRO directs the OATC to increase power to ~7% using OP/1/A/1102/001 (Controlling Procedure for Unit Startup), Encl. 4.7, starting at step 3.36
		OP/1/A/1102/001 (Controlling Procedure for Unit Startup), Encl. 4.7, Step 3.36 Rev 309
		NOTE: • Point Of Adding Heat (POAH) is normally achieved from 0.05 to 0.15% power on Wide Range Indications. {27} • When POAH is achieved: TBVs will begin to open, 1HP-120 will begin to close, TAVE will increase, and SUR will decrease with negative Moderator Temperature Coefficient. (R.M.) • Wide Range indications are used since Source Range NIs saturate. (R.M.)
	OATC	3.36 Begin reactor power increase to 0.5 - 1.0 % at ≤ 0.5 DPM SUR. (R.M.)
		3.37 **WHEN** above POAH, begin reactor power increase to 2.5 - 3.5 %. (R.M.)
		3.38 **WHILE** power increases, begin increasing 1HP-120 (RC VOLUME CONTROL) setpoint to establish 215" to 225" PZR Level.
		NOTE: • TAVE error is blocked when on Low Level Limit and TAVE is < setpoint. • Core reactivity effects are minimized with Rx in automatic. (R.M.)
		3.39 **WHEN** at 2.5 - 3.5 % Power, perform the following: (R.M.) 3.39.1 Place REACTOR MASTER to "AUTO". 3.39.2 Place DIAMOND to "AUTO". 3.39.3 Ensure TURBINE MASTER Setpoint to 880 - 890 psig.
		3.40 Perform the following: • Ensure complete Enclosure "Prior To Entry Into MODE 1" of PT/1/A/0630/001 (Mode Change Verification). {55} • Review mechanical maneuvering rates and allowable ramp rates in PT/0/A/1103/020 (Power Maneuvering Guidelines). {54} (R.M.)

This event is complete when power is stable at ~ 6-7 %, or when directed by the lead examiner.

Op-Test No.: **ILT48**	Scenario No.: **4**	Event No.: **2**	Page 2 of 5
Event Description:	**Increase power to 6-7 % (R: OATC, SRO)**		

Time	Position	Applicant's Actions or Behavior
	OATC	*OP/1/A/1102/001* **Crew Response:** 3.41 **IF AT ANY TIME** all the following: • All operable T Cold indications > 550°F • SSF inoperable **only** due to low decay heat, notify SM the SSF is Available for Unit 1. 3.42 Ensure acceptable point status for plant startup for MODE 1: • OAC Alarm Screen Review • OAC Point Processing Log **NOTE:** OAC Points can be found on Turn-On Code FDW02 3.43 Set temporary alarms on the following: • OAC Point O1E2129 (FDW LOOP A COMPOSITE VALVE DEMAND) temporary alarm set at 9.8%. • OAC Point O1E2130 (FDW LOOP B COMPOSITE VALVE DEMAND) temporary alarm set at 9.8%. • Note on Turnover sheet temporary alarms set on Composite Valve Demand **NOTE:** • At Composite Valve Demand of 8.8% decreasing, ICS removes a valve sequencing bias that forces the Startup Control valves open to approximately 90% and the Main Control Valves to close. • At Composite Valve Demand of 9.8% increasing, ICS inserts a valve sequencing bias that forces the Startup Control valves to close to approximately 10% and the Main Control Valves to open. • When Composite Valve Demand valve sequencing bias is inserted at 9.8% on a power increase and then decreases below 8.8%, the unit is subject to a possible FDW transient due to the valve sequencing bias being inserted and then subsequently removed. A power change may be required to stabilize FDW flow above **OR** below sequencing bias setpoints.

This event is complete when power is stable at ~ 6-7 %, or when directed by the lead examiner.

Op-Test No.: **ILT48** Scenario No.: **4** Event No.: **2** Page 3 of 5

Event Description: **Increase power to 6-7 % (R: OATC, SRO)**

Time	Position	Applicant's Actions or Behavior
	OATC	***OP/1/A/1102/001*** **<u>Crew Response</u>:** 3.44 **WHILE** power change is in progress, monitor the following indications: • Appropriate ranged NIs • Neutron error • RCS Loop ΔT (Curve for "Loop ΔT Vs Reactor Power" is in PT/1/A/0600/001) • FDW Flow (Curve for "Expected Feedwater Flow Per Header Vs Reactor Power" is in OP/0/A/1108/001) • OAC Point O1E2129 (FDW LOOP A COMPOSITE VALVE DEMAND) • OAC Point O1E2130 (FDW LOOP B COMPOSITE VALVE DEMAND) 3.45 Begin power increase to 6% to 7% per Enclosure 4.16 (CTP Adjustments) (**Page 10**) 3.46 Ensure 'E' Heater outlet temperature being maintained at upper end of 100-180^{O}F band. 3.47 **WHILE** power increasing in this enclosure, throttle to maintain 2300 to 6000 gpm on operating FDWP: • 1FDW-53 (1A FDWP RECIRC CONTROL) • 1FDW-65 (1B FDWP RECIRC CONTROL) 3.48 **WHEN** Reactor Power is > 5%, perform the following: • Ensure MODE 1 selected on OAC. • Ensure MODE 1 selected for Unit 1 in TSAIL. • Announce on Plant Page "Unit 1 has entered MODE 1". • Notify Assistant Outage Manager of Unit 1 entry into MODE 1. ______________________ ______/______ Person Notified Date / Time • Remove note from turnover sheet: "When in MODE 2, evaluate or restrict evolutions involving MS, FDW, and EFDW to minimize changes to RCS temperature and reactor power." (R.M.) • Remove note from turnover sheet: "In MODE 1 or 2, except during PT/0/A/0711/001 (ZPPT), if either loop TAVE is < 532°F, perform SR 3.4.2.1 per PT/1/A/0600/001 (Periodic Instrument Surveillance)". • Begin Primary to Secondary Leakage Monitoring During Startup per OP/0/A/1106/031 (Primary to Secondary Leak Rate Monitoring and Instrumentation).

This event is complete when power is stable at ~ 6-7 %, or when directed by the lead examiner.

Op-Test No.: **ILT48** Scenario No.: **4**	Event No.: **2**	Page 4 of 5
Event Description: **Increase power to 6-7 % (R: OATC, SRO)**		

Time	Position	Applicant's Actions or Behavior
	OATC	*OP/1/A/1102/001* **Crew Response:** 3.49 Perform the following per PT/0/A/0230/001 (Radiation Monitor Check): • Ensure 1RIA-48 alarm setpoints adjusted for Mode 1. • Ensure 1RIA-49 alarm setpoints adjusted for Mode 1. 3.50 Ensure complete **one** of the following to secure minimum FDW Flow to SGs: • **IF** in progress, Enclosure 4.10 (Providing Minimum FDW Flow to SGs) • **IF** in progress, Enclosure "Providing Minimum FDW Flow to SGs" of OP/1/A/1102/010 (Controlling Procedure For Unit Shutdown). **OP/1/A/1102/001 Enclosure 4.16 (CTP Adjustments)** 2.1 Verify REACTOR MASTER in AUTO 2.2 Verify Diamond in AUTO 2.3 **IF** expected power change < 1%, ensure R2 reactivity management control established per SOMP 1-02 2.4 **IF** expected power change > 1%, ensure R1 reactivity management control established per SOMP 1-02 3.1 **WHILE** enclosure is in progress, monitor the following indications: • Appropriate NIs • Neutron error • FDW flow 3.2 **IF AT ANY TIME** hold in power is desired, ensure HOLD selected 3.3 **IF AT ANY TIME** hold in power is NOT required, ensure HOLD is NOT selected

This event is complete when power is stable at ~ 6-7 %, or when directed by the lead examiner.

Op-Test No.: **ILT48**	Scenario No.: **4**	Event No.: **2**	Page 5 of 5
Event Description:	**Increase power to 6-7 % (R: OATC, SRO)**		

Time	Position	Applicant's Actions or Behavior
	OATC	***OP/1/A/1102/001*** **Crew Response:** **OP/1/A/1102/001 Enclosure 4.16 (CTP Adjustments)** 3.4 **IF** change in power/rate is desired, perform the following: 3.4.1 Review the following regarding current power change: • Appropriate :controlling enclosure of this procedure • PT/0/A/1103/020 (Power Maneuvering Predictions) • **IF** in progress, PT/0/A/0811/001 (Power Escalation Test) • **IF** available, Maneuvering Plan • COLR for CRD Groups 5-8 position limits, Imbalance, & QPT 3.4.2 Ensure HOLD is selected 3.4.3 Ensure selected %/MIN or %/HR on RATE SET pushbutton 3.4.4 Ensure desired rate selected on RATE SET thumbwheels 3.4.5 Ensure rate selected is within above limits 3.4.6 Insert desired CTPD SET using INCREASE/DECREASE pushbuttons 3.4.7 Ensure CTPD SET is within above limits 3.4.8 Ensure HOLD is **NOT** selected 3.4.9 **WHEN** desired CTP is achieved, select 0.0 on RATE SET thumbwheels

This event is complete when power is stable at ~ 6-7 %, or when directed by the lead examiner.

Op-Test No.: **ILT48** Scenario No.: **4** Event No.: **3** Page 1 of 1

Event Description: 1**B FWPT Auxiliary Oil Pump Trip (C, BOP, SRO)**

Time	Position	Applicant's Actions or Behavior
	SRO/BOP	**Plant Response:** • 1SA-08/C-6 FWPT "B" EMERGENCY OIL PUMP RUN in alarm • FWPT B Emergency Oil Pump starts **Crew Response:** SRO will direct the BOP to refer to 1SA-08/C-6. ***1SA-08/C-3*** **1SA-08/C-6 FWPT "B" EMERGENCY OIL PUMP RUN** Rev 35 3.1 Verify that B FWPT emergency oil pump is running. 3.2 **IF** applicable, verify B FWPT is still on turning gear. **[It will be]** 3.3 Try to restart B FWPT auxiliary oil pump. **[It will fail to start]** 3.4 **IF** restart fails, notify Maintenance for repairs. ***Booth Operator Note: Approximately 2 minutes after firing timer 3, Timer 12 will auto actuate which will trip the Emergency Oil Pump and cause 1SA-08/C-7, (FWPT "B" EMERGENCY OIL PUMP OVERLOAD) to alarm.*** ***1SA-08/C-4*** **1SA-08/C-7 FWPT "B" EMERGENCY OIL PUMP OVERLOAD** 3.1 **IF** available, start Auxiliary Oil Pump and stop Emergency Oil Pump. 3.2 **IF** AOP is **NOT** available, stop Turning Gear Motor and emergency Bearing Oil Pumps. 3.3 Notify Maintenance for repairs. 3.4 As soon as EBOP **OR** Auxiliary Oil Pump becomes available, start pump and place Turbine on Turning Gear.

This event is complete when Turning Gear Motor is secured, or as directed by the Lead Examiner.

Op-Test No.: **ILT48**	Scenario No.: **4**	Event No.: **4**	Page 1 of 1
Event Description: **1C HWP Casing Water Level Low (C: BOP, SRO)**			

Time	Position	Applicant's Actions or Behavior
	SRO/BOP	***1SA-9/E-5*** **Plant Response**: • 1SA-9/E-5 HWP C CASING WATER LEVEL LOW **Crew Response**: BOP will address the ARG **1SA-9/E-5** Rev 47 3.1 **IF** '1C' HWP is in operation, then immediately: • Start a standby HWP. • Trip '1C' HWP. • Bypass Powdex. **[Open 1C-14/1C-15]** • Decrease load. 3.2 Monitor hotwell level. 3.3 Determine cause of low level alarm (possible suction filter clogging) and initiate corrective action necessary to return pump to normal operation. ***Examiner Note: The crew may use OP/1/A/1106/002 (Condensate and FDW System) to bypass Powdex*** **OP/1/A/1106/002 Enclosure 4.19 (Placing Powdex In/Out of Service)** Rev 169 3.1 **IF** Powdex is to be removed from service for an extended period of time **AND** condensate system will NOT be shutdown, perform the following: 3.1.1 Ensure MSDD System in service 3.1.2 Notify Chemist that Powdex will be removed from service for an extended period of time 3.2 Ensure Open 1C-14/1C-15 (POL DEMIN BYPASS CONTROL) 3.3 Place note on Turnover sheet that Powdex has been removed from service 3.4 Notify Chemist that Powdex has been removed from service

This event is complete when the standby HWP has been started, or as directed by the lead examiner.

Op-Test No.: **ILT48** Scenario No.: **4**	Event No.: **5**	Page 1 of 1
Event Description: **TD EFDWP oil sump dry (SRO)(TS)**		

Time	Position	Applicant's Actions or Behavior
	SRO	**Plant response:** **Simulator Operator call the Control Room as the WCC SRO and report that the Basement AO found the Unit 1 TD EFDWP oil sump with no oil indicating on the dipstick. Report that the WCC and FIN-24 are investigating the situation to determine the cause of the problem. No oil has been found leaking from any equipment.** **Crew response:** • SRO should make the decision to place TD EFDWP in "Pull to Lock". **TS 3.3.14 EMERGENCY FEEDWATER (EFW) PUMP INITIATION CIRCUITRY** **Condition B.1 (Immediately) Declare the affected EFW pump inoperable.** **TS 3.7.5 EMERGENCY FEEDWATER (EFW) SYSTEM** **Condition B.1 (72 hours) Restore turbine driven EFW pump and EFW flow path to OPERABLE status.** • SRO refer to TS 3.3.14 Condition B. • Declare the affected EFWP inoperable Immediately • SRO refer to TS 3.7.5 Condition B1 Restore TD EFDWP within 72 hours ***Booth Cue: If asked, inform crew that the TD was on the purifier last shift.***

This event is complete when the Tech Spec determination has been made or when directed by the lead examiner.

Op-Test No.: **ILT48** Scenario No.: **4** Event No.: **6** Page 1 of 2

Event Description: **PORV fails open (C: OATC, SRO)(TS)**

Time	Position	Applicant's Actions or Behavior
	SRO/OATC	***AP/1/A/1700/044*** **Plant Response:** • 1SA-18/A1 (Pressurizer Relief Valve Flow) in alarm • 1RC-66 indicates open • Acoustic monitor indicates 1RC-66 open • RCS pressure decreasing **Crew Response**: • BOP should recognize that RCS pressure is below PORV setpoint and close the PORV Block Valve (1RC-4). This is an Immediate Action from AP/44 Abnormal Pressurizer Pressure Control. • SRO should enter AP/1/A/1700/044 **AP/1/A/1700/044 Abnormal Pressurizer Pressure Control** Rev 4 **Immediate Manual Actions**
	CT-1	3.1 **IAAT** PORV is open, **AND** RC pressure is < setpoint (2400 psig (HIGH) or 480 psig (LOW)), **THEN** close 1RC-4. 3.2 **IAAT** RC pressure < 2155 psig, **AND** 1RC-1 indicates open, **THEN** select 1RC-1 to CLOSE. 3.3 **IAAT** all the following conditions exist: __ RC pressure < 2155 psig __ RC pressure decreasing without a corresponding decrease in PZR level **THEN** close 1RC-3. **Subsequent Actions** 4.1 Announce AP entry using the PA system. 4.2 **GO TO** the applicable step per the following table:

	Failure Caused RCS Pressure	Step
	Decrease	4.3
	Increase	4.18

This event is complete when 1RC-4 is closed and RCS pressure is stable, or as directed by the lead examiner.

Op-Test No.: **ILT48** Scenario No.: **4** Event No.: **6** Page 2 of 2

Event Description: **PORV fails open (C: OATC, SRO)(TS)**

Time	Position	Applicant's Actions or Behavior
	SRO/OATC	***AP/1/A/1700/044*** **Crew Response**: 4.3 Verify 1RC-4 is closed. 4.4 Verify 1RC-3 is closed. **NOTE** 1RC-3 must **NOT** be allowed to be closed for ≥ 36 minutes at a time to avoid a thermal transient in piping between 1RC-3 and the PZR spray nozzle. 4.5 Position 1RC-3 as required to maintain RC pressure within desired band. 4.6 **GO TO** Step 4.13. 4.13 Verify PZR heaters maintaining RCS pressure within desired band. 4.14 Notify SPOC to repair malfunctioning component. 4.15 Ensure requirements of following are met: __ TS 3.4.1 (RCS Pressure, Temperature, and Flow Departure from Nucleate Boiling Limits) __ TS 3.4.9 (Pressurizer) __ TS 3.4.12 (Low Temperature Overpressure Protection System) __ SLC 16.5.1 (Reactor Coolant System Vents) 4.16 **WHEN** repairs complete, **THEN** place following components in desired position for current plant conditions as determined by CR SRO: __ 1RC-1 __ 1RC-3 __ 1RC-4 __ PZR heater bank #1 __ PZR heater bank #2 __ PZR heater bank #3 __ PZR heater bank #4 ***TS 3.4.1, REACTOR COOLANT SYSTEM*** ***Condition A (2 hours) Restore RCS DNB parameter(s) to within limit.*** ***COLR DNB Limit = 2125 psig***

This event is complete when 1RC-4 is closed and RCS pressure is stable, or as directed by the lead examiner.

Op-Test No.: **ILT48** Scenario No.: **4** Event No.: **7** Page 1 of 1

Event Description: **Dropped Control Rod(s) requiring a reactor trip (C: OATC, SRO)**

Time	Position	Applicant's Actions or Behavior
	SRO/OATC BOP	***AP/1/A/1700/001*** **Plant Response:** • Group 6 Rod 3 drops into the core • Group 6 Rod 6 drops into the core • Statalarm 1SA-2/A-10 (CRD GLOBAL TROUBLE) • Statalarm 1SA-2/B-10 (CRD ASYMMETRIC ROD POSITION ERROR) • Statalarm 1SA-2/D-9 (CRD OUT INHIBIT) • Statalarm 1SA-5/A-5 (1A RPS TROUBLE) • Statalarm 1SA-5/B-5 (1B RPS TROUBLE) • Statalarm 1SA-5/D-5 (1D RPS TROUBLE) **Crew Response:** • Crew should recognize 2 dropped control rods and trip the reactor in accordance with OMP 1-18 **If the crew does not recognize the 2nd dropped control rod, they will enter AP/1/A/1700/001 (Unit Runback)** **AP/1/A/1700/001 (Unit Runback)** Rev15 **NOTE** • If more than one runback condition exists, ICS will respond by selecting the fastest runback rate and the lowest load limit. The most limiting runback will be the one with the fastest runback rate and the shortest duration. • It is possible for a FDWP to become unable to feed the SGs but not be tripped. In this case a signal would not be sent to RPS or the EFDWP start circuit. 4.1 **GO TO** the most limiting section per the following table: [ ] | 4H | Asymmetric Control Rod (1% / min to 55% power) 1. **IAAT** a more limiting runback occurs, **THEN GO TO** Subsequent Actions Step 4.1. 2. **IAAT** more than one control rod is dropped or misaligned ≥ 6.5% (9″) from the group average, **THEN** trip the Rx.

This event is complete when the reactor is manually tripped, or as directed by the lead examiner.

Op-Test No.: **ILT48** Scenario No.: **4** Event No.: **8** Page 1 of 9

Event Description: **1A MSLB inside containment (M: All)**

Time	Position	Applicant's Actions or Behavior
	SRO/OATC BOP	***EOP*** **Plant Response:** • 1SA-2/D-3, RC Press High/Low • Statalarm 1SA-02/A-9 (MS PRESS HIGH/LOW) **Crew Response:** ***Examiner Note: Crew will be performing IMAs and Subsequent Actions as a result of the manual reactor trip due to two dropped control rods.*** ***IMAs*** ***EOP Immediate Actions*** Rev 40 3.1 Depress REACTOR TRIP pushbutton. 3.2 Verify reactor power < 5% FP and decreasing. 3.3 Depress the turbine TRIP pushbutton 3.4 Verify all turbine stop valves closed. 3.5 Verify RCP seal injection available. ***SYMPTOM CHECK*** The BOP will verify the following:

Power Range NIs **NOT** < 5% Power Range NIs **NOT** decreasing	Rule 1, *ATWS/Unanticipated Nuclear Po Production*
Any SCM < 0°F	Rule 2, *Loss Of SCM*
Loss of Main and Emergency FDW (including unsuccessful manual initiation of EFDW)	Rule 3, *Loss of Main or Emerg FDW* Rule 4, *Initiation of HPI Forced Cooling* (Inability to feed SGs and > 2300 psig, N limit reached, or PZR level > 375")
Uncontrolled Main steam line(s) pressure decrease	Rule 5, *Main Steam Line Break*
CSAE Offgas alarms Process monitor alarms (RIA-40, 59,60), Area monitor alarms (RIA-16/17)	None (SGTR Tab is entered when identi SG Tube Leakage > 25 gpm)

CT-2

Examiner note: BOP should manually start the 1B MD EFDWP.

BOP will perform Rule 5 (Main Steam Line Break) (**Page 25**)

SRO will review IMAs and transfer to the Subsequent Actions Tab.

This event is complete when the crew has transferred to the FCD tab, or as directed by the lead examiner.

Op-Test No.: **ILT48** Scenario No.: **4** Event No.: **8** Page 2 of 9

Event Description: **1A MSLB inside containment (M: All)**

Time	Position	Applicant's Actions or Behavior
		Subsequent Actions Tab
		Crew Response:
	SRO/OATC	SRO will review the Subsequent Action Tab Parallel Action (Yellow) page (**Page 56**) and transfer to the Excessive Heat Transfer (EHT)Tab.
		EHT Tab
		SRO will review the EHT Tab Parallel Action (Yellow) page and determine that ES has actuated and direct the OATC to perform Encl. 5.1 ES Actuation (**Page 36**)
		1. Verify any SG pressure < 550 psig. **[1A SG should be < 550 psig at this point]**
		2. Ensure Rule 5 (Main Steam Line Break) in progress or complete.
		3. Place the following in HAND and decrease demand to zero on all affected SGs:

	1A SG		1B SG
	1FDW-32		1FDW-41
	1FDW-35		1FDW-44

4. Close the following on all affected SGs:

	1A SG		1B SG
	1FDW-372		1FDW-382
	1MS-17		1MS-26
	1MS-79		1MS-76
	1MS-35		1MS-36
	1MS-82		1MS-84
	1FDW-368		1FDW-369

5. Verify level in both SGs < 96% O.R.

6. **IAAT** core SCM is > 0°F, **THEN** perform Steps 7 and 8.
RNO: GO TO Step 9.

7. Throttle HPI per Rule 6 (HPI).

8. Verify letdown in service.
RNO: __ **IF** desired to restore letdown, **THEN** initiate Encl 5.5 (Pzr and LDST Level Control). (**Page 28**)

This event is complete when the crew has transferred to the FCD tab, or as directed by the lead examiner.

Op-Test No.: **ILT48** Scenario No.: **4** Event No.: **8** Page 3 of 9

Event Description: **1A MSLB inside containment (M: All)**

Time	Position	Applicant's Actions or Behavior
		EHT Tab
		Crew Response:
	SRO/OATC	9. Verify any SG has an intact secondary boundary (intact SG). **[1B SG is intact]**

NOTE
If only one SG is intact and has been isolated for SGTR, the following steps will unisolate and use it for heat removal.

10. Open the following on all intact SGs:

	1A SG		1B SG
	1FDW-372		1FDW-382
	1FDW-368		1FDW-369
	1MS-17		1MS-26

11. Start MDEFDWP associated with all intact SGs:

1A SG		1B SG
1A MDEFDWP		1B MDEFDWP

12. Feed and steam all intact SGs to stabilize RCS P/T using either:
- TBVs
- Dispatch two operators to perform Encl 5.24 (Operation of the ADVs).

13. **GO TO** Step 32.

32. Verify any:
__ HPI has operated in the injection mode while **NO** RCPs were operating
__ A cooldown below 400°F at > 100°F/hr has occurred
RNO: GO TO Step 34.

33. Initiate Rule 8 (Pressurized Thermal Shock (PTS)).

34. Verify both closed:
__ 1MS-24
__ 1MS-33

This event is complete when the crew has transferred to the FCD tab, or as directed by the lead examiner.

Op-Test No.: **ILT48**	Scenario No.: **4**	Event No.: **8**	Page 4 of 9
Event Description: **1A MSLB inside containment (M: All)**			

Time	Position	Applicant's Actions or Behavior
		EHT Tab
		Crew Response:
	SRO/OATC	35. Open 1AS-8.
		36. Close 1SSH-9.
		37. Perform notifications: __ Notify Chemistry to determine RCS boron concentration. __ Notify Secondary Chemistry to check for indications of SGTR. {2} __ Notify RP to check for indications of SGTR.
		38. **IAAT** RCS boron is determined to be insufficient for adequate SDM, **THEN** initiate Encl 5.11 (RCS Boration).
		39. **IAAT** all exist: __ ES Bypass Permit satisfied __ All SCMs > 0°F __ RCS pressure controllable **THEN** perform Steps 40 - 41.
		RNO: GO TO Step 42.
		40. Bypass applicable ES: To Bypass HPI: __ Bypass HPI ES CH A,B,C To Bypass LPI: __ Bypass LPI ES CH A,B,C
		41. Bypass applicable Diverse ES: To Bypass HPI: __ Bypass Diverse HPI To Bypass LPI: __ Bypass Diverse LPI
		42. Verify any SG is dry.
		NOTE • Minimizing SCM reduces tensile stress on the SG. • PORV should be used if Pzr spray is not available. • Procedure progression may continue when actions to minimize SCM are in progress.

This event is complete when the crew has transferred to the FCD tab, or as directed by the lead examiner.

Op-Test No.: **ILT48**	Scenario No.: **4**	Event No.: **8**	Page 5 of 9
Event Description:	**1A MSLB inside containment (M: All)**		

Time	Position	Applicant's Actions or Behavior
		EHT Tab
		Crew Response:
	SRO/OATC	43. Maintain minimum SCM using the following methods as necessary: __ De-energize all Pzr heaters __ Use Pzr spray __ Throttle HPI to maintain Pzr level > 100″ [180″ acc] __ Use PORV
		44. Verify any RCP operating. **RNO: GO TO** Step 46.
		45. Maintain RCP NPSH. • OAC • Encl 5.18 (P/T Curves)
		46. Initiate Encl 5.16 (SG Tube-to-Shell ΔT Control).
		NOTE RCP 1A1 provides the best Pzr spray.
		47. **IAAT** all exist: __ **<** one RCP operating in any loop __ All SCMs > 0°F __ RCP available in an idle loop **THEN** initiate Encl 5.6 (RCP Restart) to start one RCP in each idle loop.
		48. **IAAT** all exist: __ RBS actuated __ RB pressure < 10 psig __ 1RIA-57 **NOT** in alarm __ 1RIA-58 **NOT** in alarm **THEN** stop both RBS pumps.
		49. **IAAT** Tcold approaches 470°F, **AND** all RCPs are operating, **THEN** ensure < four RCPs are operating.
		50. **IAAT** BWST level is ≤ 19', **THEN** initiate Encl 5.12 (ECCS Suction Swap to RBES).
		51. Verify all SCMs > 0°F.

This event is complete when the crew has transferred to the FCD tab, or as directed by the lead examiner.

Op-Test No.: **ILT48** Scenario No.: **4** Event No.: **8** Page 6 of 9

Event Description: **1A MSLB inside containment (M: All)**

Time	Position	Applicant's Actions or Behavior
		EHT Tab
		Crew Response:
	SRO/OATC	52. Verify indications of SGTR ≥ 25 gpm. **RNO:** __ **GO TO** Step 54.
		54. Verify required RCS makeup flow within normal makeup capability.
		55. Verify either: __ Any SG isolated __ Any SG has an unisolable steam leak
		56. **GO TO** FCD tab.
		Forced Cooldown Tab
		1. **IAAT** cooldown rate **CANNOT** be controlled within Tech Spec limits: • Tcold ≥ 270°F: ≤ 50°F / ½ hr • Tcold < 270°F: ≤ 25°F / ½ hr **THEN GO TO** EHT tab.
		2. Verify letdown in service. **RNO:** 1. __ Ensure CC System in operation. 2. __ **IF** 1A Letdown Cooler available, **THEN** open the following: __ 1HP-1 __ 1HP-3 3. __ **IF** 1B Letdown Cooler available, **THEN** open the following: __ 1HP-2 __ 1HP-4 4. Close the following: __ 1HP-6 __ 1HP-7 5. __ Open 1HP-5. 6. __ Adjust 1HP-7 for ≈ 20 gpm letdown. 7. __ Open 1HP-6. 8. __ Adjust 1HP-7 to control desired letdown flow.
		3. Establish and maintain appropriate level per Rule 7 (SG Feed Control) and pressure in available intact SGs.
		4. **IAAT** Tcold approaches 470°F, **THEN** ensure < four RCPs operating.

This event is complete when the crew has transferred to the FCD tab, or as directed by the lead examiner.

Op-Test No.: **ILT48**	Scenario No.: **4**	Event No.: **8**	Page 7 of 9
Event Description: **1A MSLB inside containment (M: All)**			

Time	Position	Applicant's Actions or Behavior
		Forced Cooldown Tab
		Crew Response:
	SRO/OATC	5. **IAAT** Tcold approaches 300°F, **THEN** ensure < three RCPs operating.
		6. **IAAT** all the following exist: __ ES Bypass Permit satisfied __ All SCMs > 0°F __ RCS pressure controllable **THEN** perform Steps 7 - 8.
		7. Bypass applicable ES: To Bypass HPI: __ Bypass HPI ES CH A,B,C To Bypass LPI: __ Bypass LPI ES CH A,B,C
		8. Bypass applicable Diverse ES: To Bypass HPI: __ Bypass Diverse HPI To Bypass LPI: __ Bypass Diverse LPI
		9. **IAAT** any SG is < 700 psig, **AND** AFIS is **NOT** actuated on that SG, **THEN** select OFF on both Digital Channels 1&2 for that header:

	A Header		B Header
	DIG CH 1 OFF		DIG CH 1 OFF
	DIG CH 2 OFF		DIG CH 2 OFF

10. Stabilize RCS temperature.

11. Close 1HP-26.

12. Stop 1C HPI Pump.

13. Adjust 1HP-120 for desired setpoint.

This event is complete when the crew has transferred to the FCD tab, or as directed by the lead examiner.

Op-Test No.: **ILT48** Scenario No.: **4** Event No.: **8** Page 8 of 9

Event Description: **1A MSLB inside containment (M: All)**

Time	Position	Applicant's Actions or Behavior
		RULE 5
		Crew Response:
	BOP	1. Perform on affected headers:

	A Header		B Header
	On AFIS HEADER A, depress CH. 1 INIT.		On AFIS HEADER B, depress CH. 1 INIT.
	On AFIS HEADER A, depress CH. 2 INIT.		On AFIS HEADER B, depress CH. 2 INIT.
	Select OFF for 1A MD EFDWP.		Select OFF for 1B MD EFDWP.
	Trip both Main FDWPTs.		Trip both Main FDWPTs.
	Close 1FDW-315.		Close 1FDW-316.
	Place 1FDW-33 switch to CLOSE.		Place 1FDW-42 switch to CLOSE.
	Place 1FDW-31 switch to CLOSE.		Place 1FDW-40 switch to CLOSE.
	Close 1PSW-22.		Close 1PSW-24.
	Close 1PSW-23.		Close 1PSW-25.

Examiner Note: The 1B MD EFDW Pump failed to start automatically.

2. Verify 1 TD EFDW PUMP operating.

RNO:
1__**IF** MD EFDWP for the intact SG is operating SG is operating, **THEN GO TO** Step 5. **[IT WILL NOT BE OPERATING]**
2.__Start 1 TD EFDW PUMP.

3. Verify 1 TD EFDW PUMP is feeding affected SGs. **[1FDW-315 is closed]**
RNO:
GO TO Step 5.

5. Verify 1B SG is an affected SG.
RNO:
GO TO Step 7.

This event is complete when the crew has transferred to the FCD tab, or as directed by the lead examiner.

Op-Test No.: **ILT48**	Scenario No.: **4**	Event No.: **8**	Page 9 of 9
Event Description: **1A MSLB inside containment (M: All)**			

Time	Position	Applicant's Actions or Behavior
		RULE 5
		Crew Response:
	BOP	7. **WHEN** overcooling is stopped, **THEN** adjust steaming of unaffected SG to maintain CETCs constant using either: __ TBVs __ Dispatch two operators to perform Encl 5.24 (Operation of the ADVs).
		CAUTION Thermal shock conditions may develop if HPI is **NOT** throttled and RCS pressure **NOT** controlled.
		8. **WHEN** all exist: __ Core SCM > 0°F __ Rx power ≤ 1% __ Pzr level increasing **THEN** continue.
		9. Verify ES HPI actuated.
		10. Place Diverse HPI in BYPASS.
		11. Perform both: __ Place ES CH 1 in MANUAL. __ Place ES CH 2 in MANUAL.
		12. Perform the following to stabilize RCS P/T: __ Throttle HPI. __ Reduce 1HP-120 setpoint to control at >100″ [180″ acc]. __ Adjust steaming of unaffected SG as necessary to maintain CETCs constant.
		13. **WHEN** CETCs have stabilized, **THEN** resume use of Tc for RCS temperature control.
		14. Ensure Rule 3 (Loss of Main or Emergency FDW) is in progress or complete.
		15. Ensure Rule 8 (Pressurized Thermal Shock (PTS)) is in progress or complete.
		16. **WHEN** directed by CRS, **THEN EXIT**.

This event is complete when the crew has transferred to the FCD tab, or as directed by the lead examiner.

Rule 6
HPI

HPI Pump Throttling Limits

- HPI must be throttled to prevent violating the RV-P/T limit.
- HPI pump operation must be limited to two HPIPs when only one BWST suction valve (1HP-24 or 1HP-25) is open.
- HPI must be throttled ≤ 475 gpm/pump (including seal injection for A header) when only one HPI pump is operating in a header.
- Total HPI flow must be throttled ≤ 950 gpm including seal injection when 1A and 1B HPI pumps are operating with 1HP-409 open.
- Total HPI flow must be throttled < 750 gpm when all the following exist:
  - LPI suction is from the RBES
  - piggyback is aligned
  - either of the following exist:
    - only one piggyback valve is open (1LP-15 or 1LP-16)
    - only one LPI pump operating
- HPI may be throttled under the following conditions:

HPI Forced Cooling in Progress:	HPI Forced Cooling NOT in Progress:
All the following conditions must exist: • Core SCM > 0 • CETCs decreasing	All the following conditions must exist: • All WR NIs ≤ 1% • Core SCM > 0 • Pzr level increasing • SRO concurrence required if throttling following emergency boration

HPI Pump Minimum Flow Limit

- Maintain ≥ 170 gpm indicated/pump. This is an instrument error adjusted value that ensures a real value of ≥ 65 gpm/pump is maintained. HPI pump flow less than minimum is allowed for up to 4 hours.

Enclosure 5.5
Pzr and LDST Level Control

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
NOTE Maintaining Pzr level >100″ [180″ acc] will ensure Pzr heater bundles remain covered.	
1. __ Utilize the following as necessary to maintain desired Pzr level: • 1A HPI Pump • 1B HPI Pump • 1HP-26 • 1HP-7 • 1HP-120 setpoint or valve demand • 1HP-5	**IF** 1HP-26 will **NOT** open, **THEN** throttle 1HP-410 to maintain desired Pzr level.
2. **IAAT** makeup to the LDST is desired, **THEN** makeup from 1A BHUT.	
3. **IAAT** it is desired to secure makeup to LDST, **THEN** secure makeup from 1A BHUT.	
4. **IAAT** it is desired to bleed letdown flow to 1A BHUT, **THEN** perform the following: A. Open: __ 1CS-26 __ 1CS-41 B. __ Position 1HP-14 to BLEED. C. __ Notify SRO.	
5. **IAAT** letdown bleed is **NO** longer desired, **THEN** position 1HP-14 to NORMAL.	

Enclosure 5.5
Pzr and LDST Level Control

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
6. **IAAT** 1C HPI PUMP is required, **THEN** perform Steps 7 - 9.	**GO TO** Step 10.
7. __ Open: • 1HP-24 • 1HP-25	1. **IF** both BWST suction valves (1HP-24 and 1HP-25) are closed, **THEN** perform the following: A. __ Start 1A LPI PUMP. B. __ Start 1B LPI PUMP. C. Open: __ 1LP-15 __ 1LP-16 __ 1LP-9 __ 1LP-10 __ 1LP-6 __ 1LP-7 D. **IF** two LPI Pumps are running only to provide HPI pump suction, **THEN** secure one LPI pump. E. Dispatch an operator to open 1HP-363 (Letdown Line To LPI Pump Suction Block) (A-1-119, U1 LPI Hatch Rm, N end). F. __ **GO TO** Step 8. 2. **IF** only one BWST suction valve (1HP-24 or 1HP-25) is open, **THEN** perform the following: A. **IF** three HPI pumps are operating, **THEN** secure 1B HPI PUMP. B. **IF** < 2 HPI pumps are operating, **THEN** start HPI pumps to obtain two HPI pump operation, preferably in opposite headers. C. __ **GO TO** Step 9.

Enclosure 5.5
Pzr and LDST Level Control

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
8. __ Start 1C HPI PUMP.	**IF** at least two HPI pumps are operating, **THEN** throttle 1HP-409 to maintain desired Pzr level.
9. Throttle the following as required to maintain desired Pzr level: 1HP-26 __ 1HP-27	1. __ **IF** at least two HPI pumps are operating, **AND** 1HP-26 will **NOT** open, **THEN** throttle 1HP-410 to maintain desired Pzr level. 2. **IF** 1A HPI PUMP <u>and</u> 1B HPI PUMP are operating, **AND** 1HP-27 will **NOT** open, **THEN** throttle 1HP-409 to maintain desired Pzr level.

Enclosure 5.5
Pzr and LDST Level Control

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
10. **IAAT** LDST level **CANNOT** be maintained, **THEN** perform Step 11.	**GO TO** Step 12.
11. __ Perform the following: • Open 1HP-24. • Open 1HP-25. • Close 1HP-16.	1. **IF** both BWST suction valves (1HP-24 and 1HP-25) are closed, **THEN** perform the following: A. __ Start 1A LPI PUMP. B. __ Start 1B LPI PUMP. C. Open: __ 1LP-15 __ 1LP-16 __ 1LP-9 __ 1LP-10 __ 1LP-6 __ 1LP-7 D. **IF** two LPI Pumps are running only to provide HPI pump suction, **THEN** secure one LPI pump. E. Dispatch an operator to open 1HP-363 (Letdown Line To LPI Pump Suction Block) (A-1-119, U1 LPI Hatch Rm, N end). F. __ **GO TO** Step 13. 2. **IF** only one BWST suction valve (1HP-24 or 1HP-25) is open, **AND** three HPI pumps are operating, **THEN** secure 1B HPI PUMP.

NOTE

Maintaining Pzr level > 100” [180” acc] will ensure Pzr heater bundles remain covered.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
12.__ Operate Pzr heaters as required to maintain heater bundle integrity.	

Enclosure 5.5
Pzr and LDST Level Control

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
13. **IAAT** additional makeup flow to LDST is desired, **AND** 1A BLEED TRANSFER PUMP is operating, **THEN** dispatch an operator to close 1CS-48 (1A BHUT Recirc) (A-1-107, Unit 1 RC Bleed Transfer Pump Rm.).	
14. **IAAT** two Letdown Filters are desired, **THEN** perform the following: __ Open 1HP-17. __ Open 1HP-18	
15. __ **IAAT** all of the following exist: __ Letdown isolated __ LPSW available __ Letdown restoration desired **THEN** perform Steps 16 - 34. {41}	__ **GO TO** Step 35.
16. Open: 1CC-7 1CC-8	1. Notify CR SRO that letdown **CANNOT** be restored due to inability to restart the CC system. 2. **GO TO** Step 35.
17. Ensure only one CC pump running.	
18. Place the non-running CC pump in AUTO.	
19. Verify both are open: 1HP-1 1HP-2	1. **IF** 1HP-1 is closed due to 1HP-3 failing to close, **THEN GO TO** Step 21. 2. **IF** 1HP-2 is closed due to 1HP-4 failing to close, **THEN GO TO** Step 21.
20. __ **GO TO** Step 23.	

NOTE
Verification of leakage requires visual observation of East Penetration Room.

21. __ Verify letdown line leak in East Penetration Room has occurred.	**GO TO** Step 23.
22. __ **GO TO** Step 35.	

Enclosure 5.5
Pzr and LDST Level Control

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
23. Monitor for unexpected conditions while restoring letdown.	
24. __ Verify <u>both</u> letdown coolers to be placed in service.	1. **IF** 1A letdown cooler is to be placed in service, **THEN** open: __ 1HP-1 __ 1HP-3 2. **IF** 1B letdown cooler is to be placed in service, **THEN** open: __ 1HP-2 __ 1HP-4 3. __ **GO TO** Step 26.
25. Open: __ 1HP-1 __ 1HP-2 __ 1HP-3 __ 1HP-4	
26. Verify <u>at least one</u> letdown cooler is aligned.	Perform the following: A. Notify CR SRO of problem. B. **GO TO** Step 35.
27. Close 1HP-6.	
28. Close 1HP-7.	
29. Verify letdown temperature < 125°F.	1. Open 1HP-13. 2. Close: __ 1HP-8 __ 1HP-9&11 3. **IF** <u>any</u> deborating IX is in service, **THEN** perform the following: A. __ Select 1HP-14 to NORMAL. B. __ Close 1HP-16. 4. Select LETDOWN HI TEMP INTLK BYP switch to BYPASS.

Enclosure 5.5
Pzr and LDST Level Control

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
30. __ Open 1HP-5.	
31. __ Adjust 1HP-7 for ≈ 20 gpm letdown.	
32. __ **WHEN** letdown temperature is < 125°F, **THEN** place LETDOWN HI TEMP INTLK BYP switch to NORMAL.	
33. __ Open 1HP-6.	
34. Adjust 1HP-7 to control desired letdown flow.	

NOTE

AP/32 (Loss of Letdown) provides direction to cool down the RCS to offset increasing pressurizer level.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
35. **IAAT** it is determined that letdown is unavailable due to equipment failures or letdown system leakage, **THEN** notify CR SRO to initiate AP/32 (Loss of Letdown).	
36. **IAAT** > 1 HPI pump is operating, **AND** additional HPI pumps are **NO** longer needed, **THEN** perform the following: A. Obtain SRO concurrence to reduce running HPI pumps. B. __ Secure the desired HPI pumps. C. Place secured HPI pump switch in AUTO, if desired.	
37. __ **IAAT** all the following conditions exist: __ Makeup from BWST **NOT** required __ LDST level > 55″ __ All control rods inserted __ Cooldown Plateau **NOT** being used **THEN** close: __ 1HP-24 __ 1HP-25	

Enclosure 5.5
Pzr and LDST Level Control

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
38. __ Verify 1CS-48 (1A BHUT Recirc) has been closed to provide additional makeup flow to LDST.	**GO TO** Step 40.
39. **WHEN** 1CS-48 (1A BHUT Recirc) is **NO** longer needed to provide additional makeup flow to LDST, **THEN** perform the following: A. Stop 1A BLEED TRANSFER PUMP. B. Locally position 1CS-48 (1A BHUT Recirc) <u>one</u> turn open (A-1-107, Unit 1 RC Bleed Transfer Pump Rm.). C. __ Close 1CS-46. D. Start 1A BLEED TRANSFER PUMP. E. Locally throttle 1CS-48 (1A BHUT Recirc) to obtain 90 - 110 psig discharge pressure. F. Stop 1A BLEED TRANSFER PUMP.	
40. __ Verify two Letdown Filters in service, **AND** <u>only one</u> Letdown filter is desired.	**GO TO** Step 42.
41. Perform <u>one</u> of the following: __ Place 1HP-17 switch to CLOSE. __ Place 1HP-18 switch to CLOSE.	
42. **WHEN** directed by CR SRO, **THEN EXIT** this enclosure.	

EOP Enclosure 5.1 (ES Actuation)Rev 40

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
1. __ Determine all ES channels that should have actuated based on RCS pressure and RB pressure: (see table below)	
2. __ Verify all ES channels associated with actuation setpoints have actuated.	**NOTE** Voter OVERRIDE extinguishes the TRIPPED light on the associated channels that have auto actuated. Pressing TRIP on channels previously actuated will reposition components that may have been throttled or secured by this Enclosure. __ Depress TRIP on affected ES logic channels that have **NOT** previously been actuated.
3. __ **IAAT** additional ES actuation setpoints are exceeded, **THEN** perform Steps 1 - 2.	
4. __ Place Diverse HPI in BYPASS.	__ Place Diverse HPI in OVERRIDE.
5. Perform both: __ Place ES CH 1 in MANUAL. __ Place ES CH 2 in MANUAL.	**NOTE** • Voter OVERRIDE affects all channels of the affected ODD and/or EVEN channels. • In OVERRIDE, all components on the affected ODD and/or EVEN channels can be manually operated from the component switch. 1.__ **IF** ES CH 1 fails to go to MANUAL, **THEN** place ODD voter in OVERRIDE. 2.__ **IF** ES CH 2 fails to go to MANUAL, **THEN** place EVEN voter in OVERRIDE.

✓	Actuation Setpoint (psig)	Associated ES Channel
	1600 (RCS)	1 & 2
	550(RCS)	3 & 4
	3(RB)	1, 2, 3, 4, 5, & 6
	10(RB)	7 & 8

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
6. __ **IAAT** all exist: __ Voter associated with ES channel is in OVERRIDE __ An ES channel is manually actuated __ Components on that channel require manipulation **THEN** depress RESET on the required channel.	
7. __ Verify Rule 2 in progress or complete.	__ **GOTO** Step 73.
8. __ Verify any RCP operating.	__ **GOTO** Step 10.
9. Open: __ 1HP-20 __ 1HP-21	
10. __ **IAAT** any RCP is operating, **AND** ES Channels 5 and 6 actuate, **THEN** perform Steps 11 - 14.	__ **GOTO** Step 15.
11. Perform all: __ Place ES CH 5 in MANUAL. __ Place ES CH 6 in MANUAL.	**NOTE** • Voter OVERRIDE affects all channels of the affected ODD and/or EVEN channels. • In OVERRIDE, all components on the affected ODD and/or EVEN channels can be manually operated from the component switch. 1. __ **IF** ES CH 5 fails to go to MANUAL, **THEN** place ODD voter in OVERRIDE. 2. __ **IF** ES CH 6 fails to go to MANUAL, **THEN** place EVEN voter in OVERRIDE.
12. Open: __ 1CC-7 __ 1CC-8 __ 1LPSW-15 __ 1LPSW-6	
13. __ Ensure only one CC pump operating.	
14. __ Ensure Standby CC pump in AUTO.	

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
15. __ IAAT ES Channels 3 & 4 are actuated, THEN GO TO Step 16.	__ **GO TO** Step 53.
16. __ Place Diverse LPI in BYPASS.	__ Place Diverse LPI in OVERRIDE.
17. Perform <u>both</u>: __ Place ES CH 3 in MANUAL. __ Place ES CH 4 in MANUAL.	**<u>NOTE</u>** • Voter OVERRIDE affects all channels of the <u>affected</u> ODD and/or EVEN channels. • In OVERRIDE, all components on the <u>affected</u> ODD and/or EVEN channels can be manually operated from the component switch. 1.__ **IF** ES CH 3 fails to go to MANUAL, **THEN** place ODD voter in OVERRIDE. 2.__ **IF** ES CH 4 fails to go to MANUAL, **THEN** place EVEN voter in OVERRIDE.

<u>CAUTION</u>

LPI pump damage may occur if operated in excess of 30 minutes against a shutoff head. {6}

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
18. __ **IAAT** <u>any</u> LPI pump is operating against a shutoff head, **THEN** at the CR SRO's discretion, stop <u>affected</u> LPI pumps. {6, 22}	
19. __ **IAAT** RCS pressure is < LPI pump shutoff head, **THEN** perform Steps 20 - 21.	__ **GOTO** Step 22.
20. Perform the following: __ Open 1LP-17. __ Start 1A LPI PUMP.	1.__ Stop 1A LPI PUMP. 2.__ Close 1LP-17.
21. Perform the following: __ Open 1LP-18. __ Start 1B LPI PUMP.	1.__ Stop 1B LPI PUMP. 2.__ Close 1LP-18.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
22. __ **IAAT** 1A <u>and</u> 1B LPI PUMPs are off / tripped, **AND** <u>all</u> exist: __ RCS pressure < LPI pump shutoff head __ 1LP-19 closed __ 1LP-20 closed **THEN** perform Steps 23 - 24.	__ **GO TO** Step 25.
23. Open: __ 1LP-9 __ 1LP-10 __ 1LP-6 __ 1LP-7 __ 1LP-17 __ 1LP-18 __ 1LP-21 __ 1LP-22	
24. __ Start 1C LPI PUMP.	
25. __ **IAAT** 1A LPI PUMP fails while operating, **AND** 1B LPI PUMP is operating, **THEN** close 1LP-17.	
26. __ **IAAT** 1B LPI PUMP fails while operating, **AND** 1A LPI PUMP is operating, **THEN** close 1LP-18.	
27. Start: __ A OUTSIDE AIR BOOSTER FAN __ B OUTSIDE AIR BOOSTER FAN	
28. Notify Unit 3 to start: __ 3A OUTSIDE AIR BOOSTER FAN __ 3B OUTSIDE AIR BOOSTER FAN	

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
29. Verify open: __ 1CF-1 __ 1CF-2	__ **IF** CR SRO desires 1CF-1 and 1CF-2 open, **THEN** open: __ 1CF-1 __ 1CF-2
30. __ Verify 1HP-410 closed.	1. __ Place 1HP-120 in HAND. 2. __ Close 1HP-120.
31. __ Secure makeup to the LDST.	
32. __ Verify all ES channel 1 - 4 components are in the ES position.	1. __ **IF** 1HP-3 fails to close, **THEN** close 1HP-1. 2. __ **IF** 1HP-4 fails to close, **THEN** close 1HP-2. 3. __ **IF** 1HP-20 fails to close, **AND NO** RCPs operating, **THEN** close: __ 1HP-228 __ 1HP-226 __ 1HP-232 __ 1HP-230 4. __ Notify SRO to evaluate components **NOT** in ES position and initiate action to place in ES position if desired.
33. __ Verify Unit 2 turbine tripped.	__ **GOTO** Step 36.
34. __ Close 2LPSW-139.	
35. __ Verify total LPSW flow to Unit 2 LPI coolers $\leq$ 6000 gpm.	__ Reduce LPSW to Unit 2 LPI coolers to obtain total LPSW flow $\leq$ 6000 gpm.
36. __ Close 1LPSW-139.	
37. Place in FAIL OPEN: __ 1LPSW-251 FAIL SWITCH __ 1LPSW-252 FAIL SWITCH	
38. __ Start all available LPSW pumps.	

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
39. Verify <u>either</u>: __ Three LPSW pumps operating __ Two LPSW pumps operating when Tech Specs only requires two operable	__ **GOTO** Step 41.
40. Open: __ 1LPSW-4 __ 1LPSW-5	__ **IF** <u>both</u> are closed: __ 1LPSW-4 __ 1LPSW-5 **THEN** notify SRO to initiate action to open <u>at least one</u> valve prior to BWST level ≤ 19'.
41. __ **IAAT** BWST level ≤ 19', **THEN** initiate Encl 5.12 (ECCS Suction Swap to RBES).	1. __ Display BWST level using OAC Turn-on Code "SHOWDIG O1P1600". 2. __ Notify crew of BWST level IAAT step.
42. __ Dispatch an operator to perform Encl 5.2 (Placing RB Hydrogen Analyzers In Service). (**PS**)	
43. __ Select DECAY HEAT LOW FLOW ALARM SELECT switch to ON.	
44. __ **IAAT** ES channels 5 & 6 have actuated, **THEN** perform Step 45.	__ **GOTO** Step 46.

<u>NOTE</u>

RBCU transfer to low speed will **NOT** occur until 3 minute time delay is satisfied.

45. __ Verify <u>all</u> ES channel 5 & 6 components are in the ES position.	__ Notify SRO to evaluate components **NOT** in ES position <u>and</u> initiate action to place in ES position if desired.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
46. __ **IAAT** ES channels 7 & 8 have actuated, **THEN** perform Steps 47 - 48.	__ **GOTO** Step 49.
47. Perform <u>all</u>: __ Place ES CH 7 in MANUAL. __ Place ES CH 8 in MANUAL.	**<u>NOTE</u>** • Voter OVERRIDE affects all channels of the <u>affected</u> ODD and/or EVEN channels. • In OVERRIDE, all components on the <u>affected</u> ODD and/or EVEN channels can be manually operated from the component switch. 1. __ **IF** ES CH 7 fails to go to MANUAL, **THEN** place ODD voter in OVERRIDE. 2. __ **IF** ES CH 8 fails to go to MANUAL, **THEN** place EVEN voter in OVERRIDE.
48. __ Verify <u>all</u> ES channel 7 & 8 components are in the ES position.	__ Notify SRO to evaluate components **NOT** in ES position <u>and</u> initiate action to place in ES position if desired.
49. __ Notify U2 CR SRO that SSF is inoperable due to OTS1-1 open.	
50. __ Ensure <u>any</u> turnover sheet compensatory measures for ES actuation are complete as necessary.	
51. __ **IAAT** conditions causing ES actuation have cleared, **THEN** initiate Encl 5.41 (ES Recovery).	
52. __ **WHEN** CR SRO approves, **THEN EXIT**.	

••• END •••

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
Unit Status ES Channels 3 & 4 have **NOT** actuated.	
53. Start: __ A OUTSIDE AIR BOOSTER FAN __ B OUTSIDE AIR BOOSTER FAN	
54. Notify Unit 3 to start: __ 3A OUTSIDE AIR BOOSTER FAN __ 3B OUTSIDE AIR BOOSTER FAN	
55. Verify open: __ 1CF-1 __ 1CF-2	__ **IF** CR SRO desires 1CF-1 and 1CF-2 open, **THEN** open: __ 1CF-1 __ 1CF-2
56. __ Verify 1HP-410 closed.	1. __ Place 1HP-120 in HAND. 2. __ Close 1HP-120.
57. __ Secure makeup to the LDST.	
58. __ Verify all ES channel 1 & 2 components are in the ES position.	1. __ **IF** 1HP-3 fails to close, **THEN** close 1HP-1. 2. __ **IF** 1HP-4 fails to close, **THEN** close 1HP-2. 3. __ **IF** 1HP-20 fails to close, **AND NO** RCPs operating, **THEN** close: __ 1HP-228 __ 1HP-226 __ 1HP-232 __ 1HP-230 4. __ Notify SRO to evaluate components **NOT** in ES position <u>and</u> initiate action to place in ES position if desired.
59. __ Verify Unit <u>2</u> turbine tripped.	__ **GOTO** Step 62.
60. __ Close <u>2</u>LPSW-139.	
61. __ Verify <u>total</u> LPSW flow to Unit <u>2</u> LPI coolers $\leq$ 6000 gpm.	__ Reduce LPSW to Unit <u>2</u> LPI coolers to obtain <u>total</u> LPSW flow $\leq$ 6000 gpm.
62. __ Close 1LPSW-139.	

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
63. Place in FAIL OPEN: __ 1LPSW-251 FAIL SWITCH __ 1LPSW-252 FAIL SWITCH	
64. __ Start all available LPSW pumps.	
65. Verify either: __ Three LPSW pumps operating __ Two LPSW pumps operating when Tech Specs only requires two operable	__ **GOTO** Step 67.
66. Open: __ 1LPSW-4 __ 1LPSW-5	__ **IF** both are closed: __ 1LPSW-4 __ 1LPSW-5 **THEN** notify SRO to initiate action to open at least one valve prior to BWST level ≤ 19'.
67. __ **IAAT** BWST level ≤ 19', **THEN** initiate Encl 5.12 (ECCS Suction Swap to RBES).	1. __ Display BWST level using OAC Turn-on Code "SHOWDIG O1P1600". 2. __ Notify crew of BWST level IAAT step.
68. __ Dispatch an operator to perform Encl 5.2 (Placing RB Hydrogen Analyzers In Service). (**PS**)	
69. __ Notify U2 CR SRO that SSF is inoperable due to OTS1-1 open.	
70. __ Ensure any turnover sheet compensatory measures for ES actuation are complete as necessary.	
71. __ **IAAT** conditions causing ES actuation have cleared, **THEN** initiate Encl 5.41 (ES Recovery).	
72. __ **WHEN** CR SRO approves, **THEN EXIT**.	

••• END •••

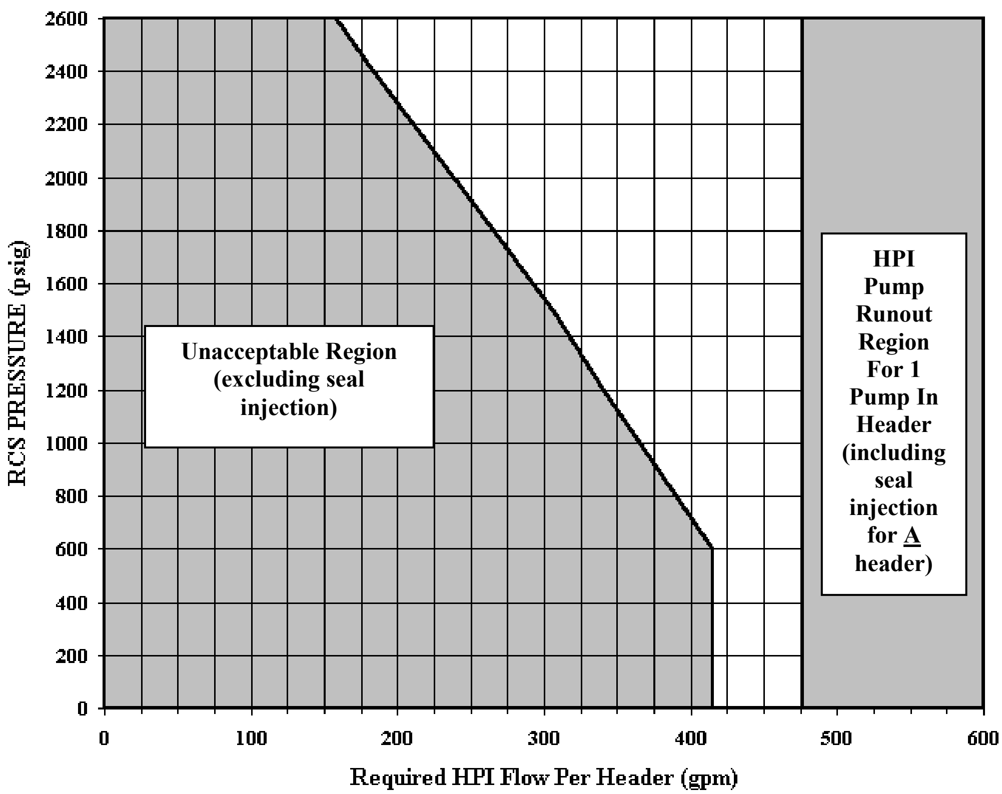
ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
73. Open: __ 1HP-24 __ 1HP-25	1. __ **IF** <u>both</u> BWST suction valves (1HP-24 and 1HP-25) are closed, **THEN**: A. __ Start 1A LPI PUMP. B. __ Start 1B LPI PUMP. C. Open: __ 1LP-15 __ 1LP-16 __ 1LP-9 __ 1LP-10 __ 1LP-6 __ 1LP-7 D. __ **IF** two LPI Pumps are running <u>only</u> to provide HPI pump suction, **THEN** secure one LPI pump. E. __ Dispatch an operator to open 1HP-363 (Letdown Line To LPI Pump Suction Block) (A-1-119, U1 LPI Hatch Rm, N end). F. __ **GOTO** Step 74. 2. __ **IF** <u>only one</u> BWST suction valve (1HP-24 or 1HP-25) is open, **THEN**: A. __ **IF** three HPI pumps are operating, **THEN** secure 1B HPI PUMP. B. __ **IF**< 2 HPI pumps are operating, **THEN** start HPI pumps to obtain two HPI pump operation, preferably in opposite headers. C. __ **GO TO** Step 75.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
74. __ Ensure <u>at least two</u> HPI pumps are operating.	
75. Verify open: __ 1HP-26 __ 1HP-27	1. __ **IF** HPI has been intentionally throttled, **THEN GOTO** Step 76. 2. Open: __ 1HP-26 __ 1HP-27

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
76. __ **IAAT** at least two HPI pumps are operating, **AND** HPI flow in <u>any</u> header that has **NOT** been <u>intentionally</u> throttled is in the Unacceptable Region of Figure 1, **THEN** open the following in the <u>affected</u> header:	

✓	1A Header	✓	1B Header
	1HP-410		1HP-409

Figure 1
Required HPI Flow Per Header



ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
77. __ Verify <u>any</u> RCP operating.	__ **GOTO** Step 79.
78. Open: __ 1HP-20 __ 1HP-21	
79. __ **IAAT** <u>any</u> RCP is operating, **AND** ES Channels 5 and 6 actuate, **THEN** perform Steps 800 - 83.	__ **GOTO** Step 84.
80. Perform <u>all</u>: __ Place ES CH 5 in MANUAL. __ Place ES CH 6 in MANUAL.	**<u>NOTE</u>** • Voter OVERRIDE affects all channels of the <u>affected</u> ODD and/or EVEN channels. • In OVERRIDE, all components on the <u>affected</u> ODD and/or EVEN channels can be manually operated from the component switch. 1. __ **IF** ES CH 5 fails to go to MANUAL, **THEN** place ODD voter in OVERRIDE. 2. __ **IF** ES CH 6 fails to go to MANUAL, **THEN** place EVEN voter in OVERRIDE.
81. Open: __ 1CC-7 __ 1CC-8 __ 1LPSW-15 __ 1LPSW-6	
82. __ Ensure <u>only one</u> CC pump operating.	
83. __ Ensure Standby CC pump in AUTO.	

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
84. __ **IAAT** ES Channels 3 & 4 are actuated, **THEN GO TO** Step 855.	__ **GO TO** Step 122.
85. __ Place Diverse LPI in BYPASS.	__ Place Diverse LPI in OVERRIDE.
86. Perform both: __ Place ES CH 3 in MANUAL. __ Place ES CH 4 in MANUAL.	**NOTE** • Voter OVERRIDE affects all channels of the affected ODD and/or EVEN channels. • In OVERRIDE, all components on the affected ODD and/or EVEN channels can be manually operated from the component switch. 1. __ **IF** ES CH 3 fails to go to MANUAL, **THEN** place ODD voter in OVERRIDE. 2. __ **IF** ES CH 4 fails to go to MANUAL, **THEN** place EVEN voter in OVERRIDE.

CAUTION

LPI pump damage may occur if operated in excess of 30 minutes against a shutoff head. {6}

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
87. __ **IAAT** any LPI pump is operating against a shutoff head, **THEN** at the CR SRO's discretion, stop affected LPI pumps. {6, 22}	

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
88. __ **IAAT** RCS pressure is < LPI pump shutoff head, **THEN** perform Steps 89 - 90.	__ **GOTO** Step 91.
89. Perform the following: __ Open 1LP-17. __ Start 1A LPI PUMP.	1. __ Stop 1A LPI PUMP. 2. __ Close 1LP-17.
90. Perform the following: __ Open 1LP-18. __ Start 1B LPI PUMP.	1. __ Stop 1B LPI PUMP. 2. __ Close 1LP-18.
91. __ **IAAT** 1A and 1B LPI PUMPs are off / tripped, **AND** all exist: __ RCS pressure < LPI pump shutoff head __ 1LP-19 closed __ 1LP-20 closed **THEN** perform Steps 92 -93.	__ **GO TO** Step 94.
92. Open: __ 1LP-9 __ 1LP-10 __ 1LP-6 __ 1LP-7 __ 1LP-17 __ 1LP-18 __ 1LP-21 __ 1LP-22	
93. __ Start 1C LPI PUMP.	
94. __ **IAAT** 1A LPI PUMP fails while operating, **AND** 1B LPI PUMP is operating, **THEN** close 1LP-17.	
95. __ **IAAT** 1B LPI PUMP fails while operating, **AND** 1A LPI PUMP is operating, **THEN** close 1LP-18.	

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
96. Start: __ A OUTSIDE AIR BOOSTER FAN __ B OUTSIDE AIR BOOSTER FAN	
97. Notify Unit 3 to start: __ 3A OUTSIDE AIR BOOSTER FAN __ 3B OUTSIDE AIR BOOSTER FAN	
98. Verify open: __ 1CF-1 __ 1CF-2	__ **IF** CR SRO desires 1CF-1 and 1CF-2 open, **THEN** open: __ 1CF-1 __ 1CF-2
99. __ Verify 1HP-410 closed.	1. __ Place 1HP-120 in HAND. 2. __ Close 1HP-120.
100. __ Secure makeup to the LDST.	
101. __ Verify <u>all</u> ES channel 1 - 4 components are in the ES position.	1. __ **IF** 1HP-3 fails to close, **THEN** close 1HP-1. 2. __ **IF** 1HP-4 fails to close, **THEN** close 1HP-2. 3. __ **IF** 1HP-20 fails to close, **AND NO** RCPs operating, **THEN** close: __ 1HP-228 __ 1HP-226 __ 1HP-232 __ 1HP-230 4. __ Notify SRO to evaluate components **NOT** in ES position <u>and</u> initiate action to place in ES position if desired.
102. __ Verify Unit <u>2</u> turbine tripped.	__ **GOTO** Step 105.
103. __ Close <u>2</u>LPSW-139.	
104. __ Verify <u>total</u> LPSW flow to Unit <u>2</u> LPI coolers ≤ 6000 gpm.	__ Reduce LPSW to Unit <u>2</u> LPI coolers to obtain <u>total</u> LPSW flow ≤ 6000 gpm.
105. __ Close 1LPSW-139.	

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
106. Place in FAIL OPEN: __ 1LPSW-251 FAIL SWITCH __ 1LPSW-252 FAIL SWITCH	
107. __ Start all available LPSW pumps.	
108. Verify either: __ Three LPSW pumps operating __ Two LPSW pumps operating when Tech Specs only requires two operable	__ **GOTO** Step 110.
109. Open: __ 1LPSW-4 __ 1LPSW-5	__ **IF** both are closed: __ 1LPSW-4 __ 1LPSW-5 **THEN** notify SRO to initiate action to open at least one valve prior to BWST level ≤ 19'.
110. __ **IAAT** BWST level ≤ 19', **THEN** initiate Encl 5.12 (ECCS Suction Swap to RBES).	1. __ Display BWST level using OAC Turn-on Code "SHOWDIG O1P1600". 2. __ Notify crew of BWST level IAAT step.
111. __ Dispatch an operator to perform Encl 5.2 (Placing RB Hydrogen Analyzers In Service). (**PS**)	
112. __ Select DECAY HEAT LOW FLOW ALARM SELECT switch to ON.	
113. __ **IAAT** ES channels 5 & 6 have actuated, **THEN** perform Step 114.	__ **GOTO** Step 115.

NOTE

RBCU transfer to low speed will **NOT** occur until 3 minute time delay is satisfied.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
114. __ Verify all ES channel 5 & 6 components are in the ES position.	__ Notify SRO to evaluate components **NOT** in ES position and initiate action to place in ES position if desired.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
115.__ **IAAT** ES channels 7 & 8 have actuated, **THEN** perform Step 116 - 117.	__ **GOTO** Step 118.
116. Perform all: __ Place ES CH 7 in MANUAL. __ Place ES CH 8 in MANUAL.	**NOTE** • Voter OVERRIDE affects all channels of the affected ODD and/or EVEN channels. • In OVERRIDE, all components on the affected ODD and/or EVEN channels can be manually operated from the component switch. 1.__ **IF** ES CH 7 fails to go to MANUAL, **THEN** place ODD voter in OVERRIDE. 2.__ **IF** ES CH 8 fails to go to MANUAL, **THEN** place EVEN voter in OVERRIDE.
117.__ Verify all ES channel 7 & 8 components are in the ES position.	__ Notify SRO to evaluate components **NOT** in ES position and initiate action to place in ES position if desired.
118.__ Notify U2 CR SRO that SSF is inoperable due to OTS1-1 open.	
119.__ Ensure any turnover sheet compensatory measures for ES actuation are complete as necessary.	
120.__ **IAAT** conditions causing ES actuation have cleared, **THEN** initiate Encl 5.41 (ES Recovery).	
121.__ **WHEN** CR SRO approves, **THEN EXIT**.	

Unit Status

ES Channels 3 & 4 have **NOT** actuated.

122. Start: __ A OUTSIDE AIR BOOSTER FAN __ B OUTSIDE AIR BOOSTER FAN	
123. Notify Unit 3 to start: __ 3A OUTSIDE AIR BOOSTER FAN __ 3B OUTSIDE AIR BOOSTER FAN	
124. Verify open: __ 1CF-1 __ 1CF-2	__ **IF** CR SRO desires 1CF-1 and 1CF-2 open, **THEN** open: __ 1CF-1 __ 1CF-2
125. __ Verify 1HP-410 closed.	1. __ Place 1HP-120 in HAND. 2. __ Close 1HP-120.
126. __ Secure makeup to the LDST.	
127. __ Verify all ES channel 1 & 2 components are in the ES position.	1. __ **IF** 1HP-3 fails to close, **THEN** close 1HP-1. 2. __ **IF** 1HP-4 fails to close, **THEN** close 1HP-2. 3. __ **IF** 1HP-20 fails to close, **AND NO** RCPs operating, **THEN** close: __ 1HP-228 __ 1HP-226 __ 1HP-232 __ 1HP-230 4. __ Notify SRO to evaluate components **NOT** in ES position <u>and</u> initiate action to place in ES position if desired.
128. __ Verify Unit <u>2</u> turbine tripped.	__ **GOTO** Step 131.
129. __ Close <u>2</u>LPSW-139.	
130. __ Verify <u>total</u> LPSW flow to Unit <u>2</u> LPI coolers $\leq$ 6000 gpm.	__ Reduce LPSW to Unit <u>2</u> LPI coolers to obtain <u>total</u> LPSW flow $\leq$ 6000 gpm.
131. __ Close 1LPSW-139.	

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
132. Place in FAIL OPEN: __ 1LPSW-251 FAIL SWITCH __ 1LPSW-252 FAIL SWITCH	
133. __ Start all available LPSW pumps.	
134. Verify either: __ Three LPSW pumps operating __ Two LPSW pumps operating when Tech Specs only requires two operable	__ **GOTO** Step 136.
135. Open: __ 1LPSW-4 __ 1LPSW-5	__ **IF** both are closed: __ 1LPSW-4 __ 1LPSW-5 **THEN** notify SRO to initiate action to open at least one valve prior to BWST level ≤ 19'.
136. __ **IAAT** BWST level ≤ 19', **THEN** initiate Encl 5.12 (ECCS Suction Swap to RBES).	1. __ Display BWST level using OAC Turn-on Code "SHOWDIG O1P1600". 2. __ Notify crew of BWST level IAAT step.
137. __ Dispatch an operator to perform Encl 5.2 (Placing RB Hydrogen Analyzers In Service). (**PS**)	
138. __ Notify U2 CR SRO that SSF is inoperable due to OTS1-1 open.	
139. __ Ensure any turnover sheet compensatory measures for ES actuation are complete as necessary.	
140. __ **IAAT** conditions causing ES actuation have cleared, **THEN** initiate Encl 5.41 (ES Recovery).	
141. __ **WHEN** CR SRO approves, **THEN EXIT**.	

••• END •••

Subsequent Actions EP/1/A/1800/001

Parallel Actions Page 1 of 1

CONDITION	ACTIONS	
1. PR NIs ≥ 5% FP **OR** NIs **NOT** decreasing	**GO TO** UNPP tab.	**UNPP**
2. All 4160V SWGR de-energized {13}	**GO TO** Blackout tab.	**BLACKOUT**
3. Core SCM indicates superheat	**GO TO** ICC tab.	**ICC**
4. Any SCM = 0°F	**GO TO** LOSCM tab.	**LOSCM**
5. Both SGs intentionally isolated to stop excessive heat transfer	**GO TO** EHT tab.	**LOHT**
6. Loss of heat transfer (including loss of all Main and Emergency FDW)	**GO TO** LOHT tab.	
7. Heat transfer is or has been excessive	**GO TO** EHT tab.	**EHT**
8. Indications of SGTR ≥ 25 gpm	**GO TO** SGTR tab.	**SGTR**
9. Turbine Building flooding **NOT** caused by rainfall event	**GO TO** TBF tab.	**TBF**
10. Inadvertent ES actuation occurred	Initiate AP/1/A/1700/042 (Inadvertent ES Actuation).	**ES**
11. Valid ES actuation has occurred or should have occurred	Initiate Encl 5.1 (ES Actuation).	**ES**
12. Power lost to all 4160V SWGR and any 4160V SWGR re-energized	• Initiate AP/11 (Recovery from Loss of Power). • **IF** Encl 5.1 (ES Actuation) has been initiated, **THEN** reinitiate Encl 5.1.	**ROP**
13. RCS leakage > 160 gpm with letdown isolated	Notify plant staff that Emergency Dose Limits are in affect using PA system.	**EDL**
14. Individual available to make notifications	• Announce plant conditions using PA system. • Notify OSM to reference the Emergency Plan and NSD 202 (Reportability).	**NOTIFY**

EHT
Parallel Actions

EP/1/A/1800/001
Page 1 of 1

CONDITION	ACTIONS	
1. PR NIs ≥ 5% FP **OR** NIs **NOT** decreasing	**GO TO** UNPP tab.	**UNPP**
2. All 4160V SWGR de-energized	**GO TO** Blackout tab.	**BLACKOUT**
3. Core SCM indicates superheat	**GO TO** ICC tab.	**ICC**
4. Any SCM = 0°F AND HPI forced cooling NOT in progress	**IF** LOSCM tab has **NOT** been entered due to current EHT event **THEN GO TO** LOSCM tab.	**LOSCM**
5. Both SGs intentionally isolated to stop excessive heat transfer after EHT tab initiated	**RETURN TO** beginning of EHT tab.	**LOHT**
6. Loss of heat transfer **AND** at least one SG **NOT** isolated	**GO TO** LOHT tab.	
7. Indications of excessive heat transfer in another SG after EHT tab initiated	**RETURN TO** beginning of EHT tab.	**EHT**
8. Inadvertent ES actuation occurred	Initiate AP/1/A/1700/042 (Inadvertent ES Actuation).	**ES**
9. Valid ES actuation has occurred or should have occurred	Initiate Encl 5.1 (ES Actuation).	**ES**
10. Power lost to all 4160V SWGR and any 4160V SWGR re-energized	• Initiate AP/11 (Recovery from Loss of Power). • **IF** Encl 5.1 (ES Actuation) has been initiated, **THEN** reinitiate Encl 5.1.	**ROP**
11. RCS leakage > 160 gpm with letdown isolated OR SGTR .> 25 gpm	Notify plant staff that Emergency Dose Limits are in affect using PA system.	**EDL**
12. Individual available to make notifications	• Announce plant conditions using PA system. • Notify OSM to reference the Emergency Plan and AD-LS-ALL-0006 (Notification /Reportability Evaluation).	**NOTIFY**

CRITICAL TASKS

CT-1 The PORV must be isolated to isolate the source of RCS leakage and prevent a reactor trip.

CT-2 The TD EFDW pump must be started in order to supply feedwater to the intact SG for heat removal.

SAFETY: Take a Minute			
UNIT 0 (OSM)			
SSF Operable: Yes	KHU's Operable: U1 - OH, U2 - UG	LCTs Operable: 2	Fuel Handling: No

UNIT STATUS (CR SRO)

Unit 1 Simulator	**Other Units**	
Mode: 2	**Unit 2**	**Unit 3**
Reactor Power: Below POAH	Mode: 1	Mode: 1
Gross MWE: 0	100% Power	100% Power
RCS Leakage: 0.01 gpm No WCAP Action	EFDW Backup: Yes	EFDW Backup: Yes
RBNS Rate: 0.01 gpm		

Technical Specifications/SLC Items (CR SRO)

Component/Train	OOS Date/Time	Restoration Required Date/Time	TS/SLC #
SSF	2 days ago / 0400	5 days / 0400	3.10.1 A,B,C,D,E

Shift Turnover Items (CR SRO)

Primary

- Due to unanalyzed condition, the SSF should be considered INOP for Unit 1 if power levels are reduced below 85%. Evaluations must be performed prior to declaring the SSF operable following a return to power (after going below 85%).
- 1RIA-3 and 5 removed from RB.
- Pressurize LDST with H2 per OP/1/A/1106/017 Encl. 4.5.
- Increase Reactor power to ~7% per OP/1/A/1102/001 Encl. 4.7 beginning at step 3.36.

Secondary

- 1SSH-1, 1SSH-3, 1SD-2, 1SD-5, 1SD-140, 1SD-303, 1SD-355, 1SD-356 and 1SD-358 are closed with power supply breakers open per the Startup Procedure for SSF Overcooling Event.
- Temporary OAC alarms set on FDW Loop A and B Composite Valve Demand @ 9.8% per OP/1/A/1102/001 Encl. 4.7.

Reactivity Management (CR SRO)

RCS Boron 1778 ppmB	Gp 7 Rod Position: 5% Withdrawn	Batch additions as required for volume control.

Human Performance Emphasis (SM)

Procedure Use and Adherence

REGION II
JOB PERFORMANCE MEASURE

RO-102

RESPOND TO A BORON DILUTION EVENT

Alternate Path: No

Alt Path Failure: ______________________________

Time Critical: No

Time Critical Criteria: ______________________________

Prepared By: ______________________________ Date:

EP Review By: ______________________________ Date:

Reviewed By: ______________________________ Date:

Approved By: ______________________________ Date:

REGION II
JOB PERFORMANCE MEASURE

Task Title : Respond to a Boron Dilution Event

Task Number : N/A

Alternate Path: No

Time Critical: No

Validation Time: 15 min

K/A Rating(s):

System: APE 024
K/A: AA1.04
Rating: 3.6*/3.7

Task Standard:

The applicant shall borate the RCS In Accordance With AP/1/A/1700/003 (Boron Dilution)

References:

AP/1/A/1700/003 (Boron Dilution) Rev 14

Tools/Equipment/Procedures Needed:

AP/1/A/1700/003 (Boron Dilution)

==

Candidate: ______________________________ Time Start: _____________

NAME Time Finish: ____________

Performance Rating: SAT ______ UNSAT ______ Performance Time: _________

Examiner: __________________________ ______________________________/_________

NAME SIGNATURE DATE

==

Comments

SIMULATOR OPERATOR JPM SETUP INSTRUCTIONS

1. **RECALL IC or SNAP: RECALL SNAP 206**
2. **Give Directions: Import JPM RO-102 Simumlator Files**
3. **GO TO RUN**

READ TO OPERATOR

DIRECTIONS TO STUDENT

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIAL CONDITIONS

Unit 1 startup in progress following a 28 day refueling outage

Reactor Power = 70%

Control Rods have been inserting due to RCS temperature increasing

The Control Room SRO has determined that a boron dilution event is occurring

INITIATING CUE

The Control Room SRO has directed you to perform AP/3 (Boron Dilution)

START TIME: _______

SEQ STEP	PROC STEP	DESCRIPTION	
1	4.1	Verify one of the following: __ All control rods inserted. __ RV head removed. **<u>STANDARD</u>:** Candidate determines that neither condition applies. Continues to Step 4.1 RNO **<u>COMMENTS</u>:**	___ SAT ___ UNSAT
2	4.1 RNO	**IF** ICS is in Auto, **THEN** ensure the following: __ Rx power < 100% __ Control rods responding as necessary **<u>STANDARD</u>:** Candidate determines that reactor power is approximately 70% and control rods are inserting due to RCS temperature increasing. Continues to step 4.2 **<u>COMMENTS</u>:**	___ SAT ___ UNSAT
3	4.2	Make the following notifications: __ PA announcement of the event including required RB evacuation __ Notify OSM to reference the following: • RP/0/A/1000/001 (Emergency Classification) • NSD-202 (Reportability) • OMP 1-14 (Notifications) **<u>STANDARD:</u>** Candidate makes PA announcement and notifies the OSM to reference procedures. Continues to step 4.3 **<u>COMMENTS</u>:**	___ SAT ___ UNSAT

4	**4.3**	Verify HPI in operation. **STANDARD**: Candidate verifies that the A HPIP is in operation. Continues to step 4.4 **COMMENTS**:	___ SAT ___ UNSAT
5	**4.4**	Verify Rx at power. **STANDARD**: Candidate verifies that reactor power is ≈ 70%. Continues to step 4.5 **COMMENTS**:	___ SAT ___ UNSAT
6	**4.5**	Notify Chemistry to sample the following for boron concentration: • RCS • LDST **STANDARD**: Candidate notifies Chemistry to sample RCS & LDST boron concentration. Continues to step 4.6 **COMMENTS**:	___ SAT ___ UNSAT
7	**4.6**	Verify both RC bleed transfer pumps stopped. **STANDARD**: Candidate verifies that 1A and 1B Bleed Transfer Pumps are off on 1AB1: *Green lights lit and Red lights off.* Continues to step 4.7 **COMMENTS**:	___ SAT ___ UNSAT

8	4.7	Place 1HP-14 in NORMAL. **STANDARD:** 1HP-14 (LDST BYPASS) should already be in NORMAL: *Red light lit, Green light off.* Continues to step 4.8 **COMMENTS:**	___ SAT ___ UNSAT
9	4.8	Close 1HP-16. **STANDARD:** 1HP-16 (LDST MAKEUP ISOLATION) should already be closed: *Green light lit, Red light off.* Continues to step 4.9 **COMMENTS:**	___ SAT ___ UNSAT
10	4.9	Verify all demineralizers out of service. **STANDARD:** Candidate determines that a demineralizer IS in service. Continues to Step 4.9 RNO. **COMMENTS:**	___ SAT ___ UNSAT

11	**4.9** **RNO**	*1. __ **IF** any purification IX is in service, **THEN** perform the following: A. __ Open 1HP-13. B. __ Close 1HP-8. C. __ Close 1HP-9 & 11. 2. __ **IF** any deborating IX is in service, **[NONE IN SERVICE]** **THEN** perform the following: A. __ Close 1CS-27. B. __ Close 1CS-32 & 37. C. __ Open 1CS-26. **STANDARD**: Candidate determines that a purification IX IS in service and: Opens 1HP-13 (PURIFICATION IX BYPASS). *Red light lit, Green light off.* Closes 1HP-8 (PURIFICATION IX INLET). *Red light off, Green light lit.* Closes 1HP-9 & 11 (SPARE PURIF IX INOUT & OUTLET). *Red light off, Green light lit.* Continues to step 4.10. **COMMENTS**:	***CRITICAL STEP** ___ SAT ___ UNSAT
12	**4.10**	Verify control rods are within allowable limits of the COLR. **STANDARD**: Candidate references the COLR and determines that Group 7 control rods are in the “Restricted Operation” region of the COLR. Continues to step 4.12 **COMMENTS**:	___ SAT ___ UNSAT

13	**4.12**	Open one of the following valves to borate from the BWST: __ 1HP-24 __ 1HP-25 **STANDARD:** *Candidate opens **either** 1HP-24 (1A HPI BWST SUCTION) **or** 1HP-25 (1B HPI BWST SUCTION) *Red light lit, Green light off for the valve chosen.* Continues to step 4.13 **COMMENTS:**	***CRITICAL STEP** ___ SAT ___ UNSAT
14	**4.13**	Align letdown to 1A BHUT: __ Open 1CS-26. __ Open 1CS-41. __ Place 1HP-14 in BLEED. **STANDARD:** Candidate: Opens 1CS-26 (LETDOWN TO RC BHUT) *Red light lit, Green light off.* Opens 1CS-41 (1A RC BHUT INLET) *Red light lit, Green light off.* Places 1HP-14 in BLEED *Green light lit, Red light off.* Continues to step 4.14 **COMMENTS:**	___ SAT ___ UNSAT
15	**4.14**	Start the standby CC pump. **STANDARD:** Candidate rotates the standby CC pump to the START position and verifies red light lit and green light off. Continues to step 4.15 **COMMENTS:**	___ SAT ___ UNSAT

16	4.15	Throttle 1HP-7 to maximize letdown. **STANDARD**: Candidate will adjust 1HP-7 (LETDOWN CONTROL) to increase letdown flow from 78 gpm to ≈ 100 to 120 gpm Continues to step 4.16 **COMMENTS**:	___ SAT ___ UNSAT
17	4.16	Throttle the following as required to maintain PZR level 200" – 260": __ 1HP-120 __ 1HP-26 **STANDARD**: Candidate will throttle 1HP-120 (RC Volume Control) or 1HP-26 (1A HP INJECTION) as needed to maintain Pzr level 200" – 260". **COMMENTS**: **END TASK**	___ SAT ___ UNSAT

TIME STOP: ________

CRITICAL STEP EXPLANATIONS

SEQ STEP #	Explanation
11	This step removes the source of De-Boration (a demineralizer that was not boron saturated).
13	This step injects borated water (BWST) to the RCS to stop control rod insertion.

CANDIDATE CUE SHEET

(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

INITIAL CONDITIONS

Unit 1 startup in progress following a 28 day refueling outage

Reactor Power = 70%

Control Rods have been inserting due to RCS temperature increasing

The Control Room SRO has determined that a boron dilution event is occurring

INITIATING CUE

The Control Room SRO has directed you to perform AP/3 (Boron Dilution)

REGION II
JOB PERFORMANCE MEASURE

RO-202

REMOVE 1A LETDOWN COOLER FROM SERVICE

Alternate Path: No

Alt Path Failure: ______________________________

Time Critical: No

Time Critical Criteria: ______________________________

Prepared By: ______________________	Date: __________
EP Review By: ______________________	Date: __________
Reviewed By: ______________________	Date: __________
Approved By: ______________________	Date: __________

REGION II
JOB PERFORMANCE MEASURE

Task Title : Remove 1A Letdown Cooler From Service

Task Number : N/A

Alternate Path: No

Time Critical: No

Validation Time: 15 minutes

K/A Rating(s):

System: 004
K/A: Generic 2.2.2
Rating: 4.6/4.1

Task Standard:

Remove 1A Letdown Cooler from service and completely isolate the cooler utilizing OP/1/A/1104/002 (HPI System) Enclosure 4.5 (Operation of Letdown Coolers)

References:

OP/1/A/1104/002 (HPI System) Rev 167

Tools/Equipment/Procedures Needed:

OP/1/A/1104/002 (HPI System) Enclosure 4.5 (Operation of Letdown Coolers)
OP/1/A/1104/002 (HPI System) Limits and Precautions

==

Candidate: ______________________________ Time Start: ____________

NAME Time Finish: ____________

Performance Rating: SAT ______ UNSAT ______ Performance Time: __________

Examiner: ___________________________ ______________________________/__________

NAME SIGNATURE DATE

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Comments

SIMULATOR OPERATOR JPM SETUP INSTRUCTIONS

1. **RECALL SNAP 207**
2. **IMPORT FILES** for RO-202
3. **UPDATE** status board to show RCS boron at 89 ppm
4. **PROVIDE** a copy of the following:
   - OP/1/A/1104/002 Encl 4.5 beginning at Step 3.5 with steps 3.1 through 3.4 signed off.
   - OP/1/A/1104/002 Limits & Precautions.
5. Place a clean copy of OMP 2-02 Attachment G in the Component Boron Concentration Log and ensure previous copy used for this JPM is removed.
6. Go to RUN and wait for 1RIA-50 to alarm and acknowledge before allowing the student to enter the simulator.

READ TO OPERATOR

DIRECTIONS TO STUDENT

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIAL CONDITIONS

Unit 1 is at 100%

The 1A Letdown Cooler has developed a 0.5 gpm leak

Unit 1 CC Surge Tank level is increasing at ≈ 4 inches per hour

It is NOT desired to valve in the spare CC Cooler

It is NOT desired to place a Purification IX in service

OP/1/A/1104/002 Enclosure 4.5 is complete up to Step 3.5

INITIATING CUE

The Control Room SRO directs you to completely isolate the 1A Letdown Cooler per OP/1/A/1104/002 Enclosure 4.5 beginning at Step 3.5

START TIME: _______

SEQ STEP	PROC STEP	DESCRIPTION	
1	3.5	**WHILE** removing the 1A Letdown Cooler from service, monitor the following: • Letdown Cooler CC outlet temperature • Letdown temperature • Letdown flow **STANDARD**: Monitor Letdown Cooler CC outlet temperature by referencing OAC graphic display. Monitor Letdown temperature by referencing Letdown temperature gauge located on 1UB1 or OAC graphic display. Monitor Letdown flow by referencing Letdown flow gauge located on 1UB1 or OAC graphic display. Candidate continues to Step 3.6 **COMMENTS**:	___ SAT ___ UNSAT
2	3.6	**NOTE:** • Throttling 1HP-7 does **NOT** affect reactivity management since IXs are **NOT** in service. (R.M.) • Changing Letdown Flow < 10 gpm / minute minimizes Letdown Cooler leaks: **IF** 1HP-1/CC-1 are open, reduce Letdown flow to minimum by throttling closed 1HP-7 (LETDOWN CONTROL). **STANDARD**: Determine that 1HP-1/1CC-1 are open by observing red open light illuminated and green closed light OFF. Reduce Letdown flow by rotating 1HP-7 setpoint dial located on 1UB1 counterclockwise until the valve is closed. Candidate continues to Step 3.7. **COMMENTS**:	___ SAT ___ UNSAT

3	3.7	Verify Letdown Flow < 87 gpm. **STANDARD:** Verifies letdown flow on 1UB1 is < 87 gpm Candidate continues to Step 3.8. **COMMENTS:**	___ SAT ___ UNSAT
4	3.8	Ensure closed 1HP-1/1CC-1 (1A LETDOWN COOLER INLET). **STANDARD:** Locate 1HP-1/1CC-1 switch on 1UB1 and rotates control switch clockwise to the closed position. Verify 1HP-1 closes by observing the red open light OFF and green closed light illuminated. Verify 1CC-1 closes by observing the red open light OFF and green closed light illuminated. Candidate continues to Step 3.9. **COMMENTS:**	**CRITICAL STEP** ___ SAT ___ UNSAT
5	3.9	Record date/time 1HP-1/1CC-1 closed: _______/_______ **STANDARD:** *R*ecord today's date/time. Candidate continues to Step 3.10. **COMMENTS:**	___ SAT ___ UNSAT

6	3.10	**NOTE:** • Maximum Letdown Flow is 87 gpm with one Letdown Cooler in service. • Changing Letdown Flow < 10 gpm / minute minimizes Letdown Cooler leaks. • Letdown temperature should **<u>NOT</u>** exceed 120°F for extended periods of time. • Step 3.10 may be performed as many times as required. **<u>IF</u>** required, slowly adjust 1HP-7 (Letdown Control) as required to perform the following: (**Continue**) • To provide normal letdown flow of 68-80 gpm. • To maintain Letdown Cooler CC outlet temperature < 225°F. **<u>STANDARD</u>**: *A*djust 1HP-7 as necessary to maintain letdown flow 68-80 gpm and maintain Letdown Cooler CC outlet temperature < 225°F. Adhere to the Note above and limits letdown flow < 125 gpm and prevent letdown temperature from exceeding 120°F for extended periods of time. Candidate continues to Step 3.11. **<u>COMMENTS</u>:**	___ SAT ___ UNSAT
7	3.11	**<u>IF</u>** required, valve in spare CC Cooler to maintain Letdown Cooler CC outlet temperature < 225°F per OP/1/A/1104/008 (Component Cooling System). **<u>STANDARD</u>**: Recognize from the Initial Conditions that it is <u>NOT</u> desired to place the spare CC Cooler in service. Candidate continues to Step 3.12. ***Examiner Cue:*** ***If the candidate asks, inform him/her that it is <u>NOT</u> desired to place the spare CC Cooler in service.*** **<u>COMMENTS</u>:**	___ SAT ___ UNSAT

8	**3.12**	Record boron in Component Boron Concentration Log for 1A Letdown Cooler. (R.M.) (**Continue**) **<u>STANDARD</u>**: Record current RCS boron concentration, Date, Time, and Initials in the Component Boron Concentration Log (OMP 2-02 Attachment G) for the 1A Letdown Cooler. Candidate continues to Step 3.13. **<u>COMMENTS</u>:**	___ SAT ___ UNSAT
9	**3.13**	**<u>IF</u>** desired, place a Purification IX in service per OP/1/A/1103/004 B (Purification IXs). (R.M.) **<u>STANDARD</u>**: Recognize from the Initial Conditions that it is <u>NOT</u> desired to place a Purification IX in service. Candidate continues to Step 3.14. ***Examiner Cue:*** ***If the candidate asks, inform him/her that it is <u>NOT</u> desired to place a Purification IX in service.*** **<u>COMMENTS</u>:**	___ SAT ___ UNSAT

10	**3.14**	**<u>IF</u>** complete cooler isolation required, perform **<u>one</u>** of the following: 3.14.1 **<u>IF</u>** CC Surge Tank level rate of increase is ≥ 3”/hour, close 1HP-3 (1A LETDOWN COOLER OUTLET). 3.14.2 **<u>IF</u>** CC Surge Tank level rate of increase is < 3”/hour, perform the following: **NOTE:** 24 hours prevents forming a vacuum in cooler as piping cools down. A. Verify 1HP-1/1CC-1 (1A LETDOWN COOLER INLET) closed for ≥ 24 hours. B. Close 1HP-3 (1A LETDOWN COOLER OUTLET). **<u>STANDARD</u>**: Recognize from the Initial Conditions that CC Surge Tank level rate of increase is ≥ 3”/hour and locates 1HP-3 control switch on 1UB1 and rotates switch in the clockwise (closed) direction. Verify 1HP-3 green closed light illuminates and red open light extinguishes. ***Examiner Cue:*** ***If the candidate asks, inform him/her that the CC leak rate remains unchanged.*** ***Examiner Cue:*** ***Inform the candidate that another operator will complete this procedure.*** **<u>COMMENTS</u>:** **END TASK**	**CRITICAL STEP** ___ SAT ___ UNSAT

TIME STOP: ________

CRITICAL STEP EXPLANATIONS

SEQ STEP #	Explanation
4	Step 3 is required to isolate the 1A CC Cooler from the RCS to prevent in-leakage.
10	Step 9 is required to fully isolate the 1A CC Cooler due to leakage being greater than 3" per hour

CANDIDATE CUE SHEET

(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

INITIAL CONDITIONS

Unit 1 is at 100%.

The 1A Letdown Cooler has developed a 0.5 gpm leak.

Unit 1 CC Surge Tank level is increasing at ≈ 4 inches per hour.

It is NOT desired to valve in the spare CC Cooler.

It is NOT desired to place a Purification IX in service.

OP/1/A/1104/002 Enclosure 4.5 is complete up to Step 3.5

INITIATING CUE

The Control Room SRO directs you to completely isolate the 1A Letdown Cooler per OP/1/A/1104/002 Enclosure 4.5 beginning at Step 3.5

REGION II
JOB PERFORMANCE MEASURE

RO-304a

PERFORM RULE 2 FOLLOWING A LOSCM

Alternate Path: Yes

Alt Path Failure: ES Channel 2 Fails to go to MANUAL

Time Critical: Yes

Time Critical Criteria: Secure RCPs within 2 minutes of losing SCM

Prepared By: Date:

EP Review By: Date:

Reviewed By: Date:

Approved By: Date:

REGION II
JOB PERFORMANCE MEASURE

Task Title: Perform Rule 2 following a LOSCM

Task Number: N/A

Alternate Path: Yes

Time Critical: Yes

Validation Time: 10 minutes

K/A Rating(s):

System: E/APE 011
K/A: EA2.11
Rating: 3.9/4.3

Task Standard:

Perform a symptom check and initiate Rule 2. Trip RCPs within 2 minutes. Place EVEN Voters in Override and throttle HPI flow to within limits. .

References:

EP/1/A/1800/001 (Emergency Operating Procedure) Rev 40C

Tools/Equipment/Procedures Needed:

EP/1/A/1800/001 (Emergency Operating Procedure) Rule 2 (Loss of SCM)

==

Candidate: ________________________________ Time Start: ______________

NAME Time Finish: ______________

Performance Rating: SAT ______ UNSAT ______ Performance Time: _________

Examiner: ____________________________ ________________________________/_________

NAME SIGNATURE DATE

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Comments

SIMULATOR OPERATOR JPM SETUP INSTRUCTIONS

1. **RECALL SNAP 208**
2. **IMPORT FILES** for RO-304
3. Go to **RUN** when directed by the Lead Examiner

READ TO OPERATOR

DIRECTIONS TO STUDENT

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIAL CONDITIONS

The Reactor was operating at 100% power

The Reactor has just tripped

You are the BOP Reactor Operator

INITIATING CUE

As the BOP, perform a Symptoms Check

START TIME: _______

SEQ STEP	PROC STEP	DESCRIPTION	
1		Perform a Symptoms Check **STANDARD**: Candidate performs a Symptoms Check and determines that a Loss of SCM has occurred due to any SCM ≤ 0°F and initiates Rule 2 in accordance with OMP 1-18 Attachment C. ***Examiner Cue: As the SRO, if asked, concur with performing Rule 2*** **COMMENTS**:	**CRITICAL STEP** ___ SAT ___ UNSAT
2	1	**IAAT** all exist: __ Any SCM ≤ 0°F __ Rx power ≤ 1% __ ≤ 2 minutes elapsed since loss of SCM **THEN** perform Steps 2 and 3. **STANDARD**: Candidate determines that SCM is 0°F by observing the indications on the ICCM plasma display and/or standout SCM displays both located on 1UB1. Candidate verifies Rx power is ≤ 1% by observing the Power Range and/or Wide Range NIs located on 1UB1. Candidate determines that ≤ 2 minutes has elapsed since the loss of SCM. Candidate continues to step 2. **COMMENTS**:	___ SAT ___ UNSAT

3	2	Stop all RCPs. **STANDARD:** Stop all RCPs by locating the RCP switches located on 1AB1 and rotate the switches to the TRIP position. Verify that the green stop light is LIT and pump amps go to zero. Candidate continues to step 3. **COMMENTS:**	**CRITICAL STEP** ___ SAT ___ UNSAT
4	3	Notify CRS of RCP status. **STANDARD**: Notify CRS that all RCPs have been secured. ***Examiner Cue: As the SRO, acknowledge the report of RCP status.*** Candidate continues to step 4. **COMMENTS:**	___ SAT ___ UNSAT
5	4	Verify Blackout exists. **STANDARD**: Determine that a blackout does not exist by observing power available on the Main Feeder Bus volt meters located on 1AB1. Candidate continues to the RNO column and determine the correct procedure path is to **GO TO** Step 6. **COMMENTS:**	___ SAT ___ UNSAT

6	**6**	Open: __ 1HP-24 __ 1HP-25 **STANDARD**: Verify that the above valves are open by observing their red open light LIT and green light off on 1UB1. **Note: These valves will already be open due to ES actuation.** Candidate continues to step 7. **COMMENTS:**	___ SAT ___ UNSAT
7	**7**	Start all available HPI pumps. **STANDARD**: Verify that all three HPI pumps are operating by observing their red lights lit and green lights off . **Note: All HPI pumps will be operating due to ES actuation.** Candidate continues to step 8. **COMMENTS:**	___ SAT ___ UNSAT
8	**8**	**GO TO** Step 13 **STANDARD**: Proceed to Step 13 **COMMENTS:**	___ SAT ___ UNSAT
9	**13**	Open: __ 1HP-26 __ 1HP-27 **STANDARD**: Verify that the above valves are open by observing their red open light LIT on 1UB1. **Note: These valves will already be open due to ES actuation.** Candidate continues to step 14. **COMMENTS:**	___ SAT ___ UNSAT

<table>
<tr><td>10</td><td>14</td><td>Verify <u>at least two</u> HPI pumps are operating using two diverse indications

<u>STANDARD</u>: All 3 HPIPs will be operating due to ES actuation.

Candidate continues to step 15.

<u>COMMENTS</u>:</td><td>___ SAT

___ UNSAT</td></tr>
<tr><td>11</td><td>15</td><td>IAAT ≥ 2 HPI pumps operating, AND HPI flow in any header is in the Unacceptable Region of Figure 1 THEN perform Steps 16 - 21.

<u>STANDARD</u>: Determine that HPI flow is NOT in the unacceptable region per Figure 1.

Candidate goes the RNO step and continues to step 17.

<u>COMMENTS</u>:</td><td>___ SAT

___ UNSAT</td></tr>
<tr><td>12</td><td>17</td><td>IAAT flow limits are exceeded,
<table><tr><th>Pump Operation</th><th>Limit</th></tr><tr><td>1 HPI pump/hdr</td><td>475 gpm (incl. seal injection for A hdr)</td></tr><tr><td>1A & 1B HPI pumps operating with 1HP-409 open</td><td>Total flow of 950 gpm (incl. seal injection)</td></tr></table>
THEN perform Steps 18 - 20.

<u>STANDARD</u>: Determine that 1B HPI Header flow is > 475 gpm by observing the 1B HPI Header Flow gauge located on 1UB1.

Candidate continues to step 18.

<u>COMMENTS</u>:</td><td>CRITICAL STEP

___ SAT

___ UNSAT</td></tr>
</table>

13	**18**	Place Diverse HPI in BYPASS. **STANDARD:** Depresses the DIVERSE HPI BYPASS “BYPASS” pushbutton on 1UB1. Candidate continues to step 19. **COMMENTS:**	___ SAT ___ UNSAT
14	**19**	**[ALTERNATE PATH]** Perform both: __ Place ES CH 1 in MANUAL. __ Place ES CH 2 in MANUAL. **STANDARD:** Places ES CH 1 in MANUAL and recognizes that ES CH 2 fails to go to MANUAL. Candidate continues to step 19 RNO. **COMMENTS:**	___ SAT ___ UNSAT
15	**19 RNO**	1. __ **IF** ES CH 1 fails to go to MANUAL, **THEN** place ODD voter in OVERRIDE. *2. __ **IF** ES CH 2 fails to go to MANUAL, **THEN** place EVEN voter in OVERRIDE. **STANDARD:** Places the EVEN Voter in OVERRIDE. Candidate continues to step 20. **COMMENTS:**	***CRITICAL STEP** ___ SAT ___ UNSAT
16	**20**	Throttle HPI to maximize flow ≤ flow limit. **STANDARD:** Throttles HP-27 to maximize HPI flow to less than 475 gpm. Candidate continues to step 21. **COMMENTS:**	**CRITICAL STEP** ___ SAT ___ UNSAT

17	**21**	Notify CRS of HPI status. **STANDARD:** Candidate notifies SRO that 1HP-27 has been throttled. Candidate continues to step 22. **COMMENTS:**	___ SAT ___ UNSAT
18	**22**	Verify RCS pressure > 550 psig. **STANDARD:** Determines that RCS pressure is < 550 psig. Candidate continues to **RNO**. **COMMENTS:**	___ SAT ___ UNSAT
19	**22** **RNO**	Ensure ES Channels 3 and 4 actuated. **STANDARD:** ES Channels 3 and 4 actuated when the LOCA occurred. Candidate continues to step 23. **COMMENTS:**	___ SAT ___ UNSAT
20	**23**	**IAAT** either exists: __ LPI FLOW TRAIN A plus LPI FLOW TRAIN B ≥ 3400 gpm __ Only one LPI header in operation with header flow ≥ 2900 gpm **THEN GO TO** Step 24. **STANDARD:** Determines that total LPI flow exceeds 3400 gpm. Candidate continues to step 24. **COMMENTS:**	___ SAT ___ UNSAT

21	**24**	Perform the following: __ Place 1FDW-315 in MANUAL and close. __ Place 1FDW-316 in MANUAL and close. __ Place 1FDW-35 in HAND and close. __ Place 1FDW-44 in HAND and close. **STANDARD:** Places the above controllers in MANUAL/HAND and closes their respective valves. **COMMENTS**: **END TASK**	___ SAT ___ UNSAT

TIME STOP: ________

CRITICAL STEP EXPLANATIONS

SEQ STEP #	Explanation
1	Rule 2 should be selected based on the symptoms.
3	RCPs are required to be stopped within 2 minutes of a loss of SCM.
12	1B HPI Header flow must be reduced ≤ 475 gpm for pump runout.
15	Must place Even Voter in override to be able to throttle 1HP-27.
16	Must throttle 1HP-27 to prevent damage due to runout.

CANDIDATE CUE SHEET

(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

INITIAL CONDITIONS

The Reactor was operating at 100% power.

The Reactor has just tripped.

You are the BOP Reactor Operator.

INITIATING CUE

As the BOP, perform a Symptoms Check.

REGION II
JOB PERFORMANCE MEASURE

RO-503

PUMP THE QUENCH TANK

Alternate Path: No

Alt Path Failure: ______________________________

Time Critical: No

Time Critical Criteria: ______________________________

Prepared By: ______________________________ Date:

EP Review By: ______________________________ Date:

Reviewed By: ______________________________ Date:

Approved By: ______________________________ Date:

REGION II
JOB PERFORMANCE MEASURE

Task Title: Pump the Quench Tank

Task Number: N/A

Alternate Path: No

Time Critical: No

Validation Time: 10 minutes

K/A Rating(s):

System: 007
K/A: A1.01
Rating: 2.9/3.1

Task Standard:

Utilize OP/1/A/1104/017 Enclosure 4.1 to lower Quench Tank level to 75 inches and isolate the flowpath to 1A Bleed Holdup Tank.

References:

OP/1/A/1104/017 (Quench Tank Operation) Rev 48

Tools/Equipment/Procedures Needed:

OP/1/A/1104/017 Limits & Precautions
OP/1/A/1104/017 Enclosure 4.1 (Pumping QT)

==

Candidate: ______________________________ Time Start: ____________

NAME Time Finish: ____________

Performance Rating: SAT ______ UNSAT ______ Performance Time: __________

Examiner: ____________________________ ______________________________/__________

NAME SIGNATURE DATE

==

Comments

SIMULATOR OPERATOR JPM SETUP INSTRUCTIONS

1. **RECALL SNAP 210**

2. Place T/O sheet tags on QT Drain Pump and Component Drain Pump

3. Update Boron Status board to show:
    - Last 1A BHUT boron sample as being > 24 hours old
    - 1A BHUT Boron = 2553 ppm
    - RCS Boron = 2414 ppm

4. Provide a copy of OP/1/A/1104/017 Enclosure 4.1 with the following:
    - Limits & Precautions
    - Steps 1.1 through 1.4 signed off

5. Go to **RUN** when directed by the Lead Examiner

READ TO OPERATOR

DIRECTIONS TO STUDENT

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIAL CONDITIONS

Unit 1 is Shutdown

Unit 1 Quench Tank level is ≈ 86 inches

Quench Tank is aligned to 1A BHUT

Enclosure 4.1 (Pumping QT) of OP/1/A/1104/017 (Quench Tank Operation) is in progress and complete up to Step 2.1

INITIATING CUE

The CRS directs you to use the COMPONENT DRAIN PUMP and the QUENCH TANK DRAIN PUMP to pump the Quench Tank to 1A BHUT beginning at Step 2.1 of Enclosure 4.1 of OP/1/A/1104/017

Secure pumping the Quench Tank at ≈ 75 inches

START TIME: _______

<table>
<tr><th>SEQ STEP</th><th>PROC STEP</th><th>DESCRIPTION</th><th></th></tr>
<tr><td>1</td><td>2.1</td><td>Ensure open:
__ 1CS-5 (COMPONENT DRN PUMP SUCTION)
__ 1CS-6 (COMPONENT DRN PUMP SUCTION)

<u>STANDARD</u>: Ensure 1CS-5 and 1CS-6 are open by taking the control switches located on 1AB1 to the open position and verifying red open light illuminated and green closed light OFF.

Candidate continues to Step 2.2.

<u>COMMENTS</u>:</td><td>CRITICAL STEP

___ SAT

___ UNSAT</td></tr>
<tr><td>2</td><td>2.2</td><td><u>IF</u> QT level will be maintained in normal operating band:
2.2.1 <u>IF</u> desired, start COMPONENT DRAIN PUMP.
2.2.2 <u>IF</u> desired, start QUENCH TANK DRAIN PUMP.
2.2.3 At desired level, perform the following:
• Ensure stopped COMPONENT DRAIN PUMP
• Ensure stopped QUENCH TANK DRAIN PUMP
2.2.4 <u>IF</u> pump(s) automatically stop, ensure QT level ≈ 80 inches.

<u>STANDARD</u>: Recognize from the Initial Conditions that this step is not applicable due to pumping the QT below 80 inches. Marks this step as Not Applicable (N/A).

Candidate continues to Step 2.3

<u>COMMENTS</u>:</td><td>___ SAT

___ UNSAT</td></tr>
</table>

<table>
<tr>
<td>3</td>
<td>2.3</td>
<td>
<u>IF</u> QT level is to be reduced below low level setpoint of 80 inches, perform the following:
2.3.1 Ensure RCS pressure < 45 psig.
2.3.2 *<u>IF</u> desired, place COMPNENT DRAIN PUMP to BYPASS
2.3.3 *<u>IF</u> desired, place QUENCH TANK DRAIN PUMP to BYPASS
2.3.4 *At desired level (≈ 75”), perform the following:
Ensure stopped COMPONENT DRAIN PUMP
Ensure stopped QUENCH TANK DRAIN PUMP
<u>STANDARD:</u> Determine from the Initial Conditions that QT level will be reduced below 80 inches
Locate RCS pressure from the Low Range Cooldown Pressure indication on 1UB2 and ensures that RCS pressure is < 45 psig.
*Place the COMPONENT DRAIN PUMP switch in the BYPASS position AND Pull the switch up.
*Place the QUENCH TANK DRAIN PUMP switch in the BYPASS position AND Pull the switch up.
*Stop the COMPONENT DRAIN PUMP and the QUENCH TANK DRAIN PUMP by rotating the switch to STOP when QT level reaches 75 inches.
Note: The low level cut-off for the Component Drain Pump and Quench Tank Drain Pump will trip the pumps at ≈ 80 inches if the pump switches are not taken to BYPASS and pulled up (similar to a PTL position).
Note: The candidate must start <u>either</u> the COMPONENT DRAIN PUMP or the QUENCH TANK DRAIN PUMP in the bypass position to complete the task. The candidate’s instructions were to use both pumps.
Candidate continues to Step 2.4
<u>COMMENTS</u>:
</td>
<td>
*CRITICAL STEP
___ SAT
___ UNSAT
</td>
</tr>
</table>

4	**2.4**	Perform the following: __ *Close 1CS-5 (COMPONENT DRN PUMP SUCTION) __ *Close 1CS-6 (COMPONENT DRN PUMP SUCTION) **STANDARD**: Close 1CS-5 and 1CS-6 by placing each control switch in the closed position. The green closed light illuminates and the red open light extinguishes. Candidate continues to Step 2.5 ***Note: Closing EITHER 1CS-5 or 1CS-6 satisfies the Critical Step.*** **COMMENTS**:	***CRITICAL STEP** ___ SAT ___ UNSAT
5	**2.5**	**IF** 1A BHUT boron sample > 24 hours old **AND** QT pumped to 1A BHUT, perform the following: 2.5.1 Verify closed 1CS-46 (1A RC BLEED XFER PUMP DISCHARGE). 2.5.2 Dispatch NEO to observe 1A Bleed Transfer Pump discharge pressure.(1CS-PG-0084) 2.5.3 Start 1A BLEED TRANSFER PUMP. ***Booth Cue: When called, report as AO: "I am standing by to read 1A BTP discharge pressure at 1CS-PG-0084".*** **STANDARD**: Verifies 1CS-46 (1A RC BLEED XFER PUMP DISCHARGE) is closed by observing green closed light illuminated and red open light off. Candidate dispatches a AO to observe 1A Bleed Transfer Pump discharge pressure.(1CS-PG-0084). Candidate starts 1A BLEED TRANSFER PUMP and observes red light illuminated and green light off. ***Examiner Cue: When 1A BLEED TRANSFER PUMP is started inform the candidate that another operator will continue this procedure.*** **COMMENTS**: **END TASK**	___ SAT ___ UNSAT

TIME STOP: ________

CRITICAL STEP EXPLANATIONS

SEQ STEP #	Explanation
1	Step is required to align the flow path from the QT to 1A BHUT.
3	This step is required to begin the level decrease in the Quench Tank. Placing the switch in the BYPASS position is required to decrease QT level below 80 inches. Ensuring both pumps are secured is required to prevent pumping the QT below 75 inches.
4	This step isolates the flow path from the QT to 1A BHUT

CANDIDATE CUE SHEET

(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

INITIAL CONDITIONS

Unit 1 is Shutdown

Unit 1 Quench Tank level is ≈ 86 inches

Quench Tank is aligned to 1A BHUT

Enclosure 4.1 (Pumping QT) of OP/1/A/1104/017 (Quench Tank Operation) is in progress and complete up to Step 2.1

INITIATING CUE

The CRS directs you to use the COMPONENT DRAIN PUMP and the QUENCH TANK DRAIN PUMP to pump the Quench Tank to 1A BHUT beginning at Step 2.1 of Enclosure 4.1 of OP/1/A/1104/017

Secure pumping the Quench Tank at ≈ 75 inches

REGION II
JOB PERFORMANCE MEASURE

RO-602

RESTORE SECONDARY LOADS AFTER LOSS OF OFFSITE POWER

Alternate Path: No

Alt Path Failure: ____________________

Time Critical: No

Time Critical Criteria: ____________________

Prepared By: ____________________ Date:

EP Review By: ____________________ Date:

Reviewed By: ____________________ Date:

Approved By: ____________________ Date:

REGION II
JOB PERFORMANCE MEASURE

Task Title: Restore Secondary Loads After Loss of Offsite Power

Task Number: N/A

Alternate Path: No

Time Critical: No

Validation Time: 15 minutes

K/A Rating(s):

System: 062
K/A: A4.01
Rating: 3.3/3.1

Task Standard:

Properly align secondary loads following a loss of offsite power by procedure.

References:

AP/1/A/1700/011 (Recovery From Loss of Power) Rev 55

Tools/Equipment/Procedures Needed:

AP/1/A/1700/011 (Recovery From Loss of Power)

==

Candidate: ______________________________ Time Start: ____________

NAME Time Finish: ____________

Performance Rating: SAT ______ UNSAT ______ Performance Time: _________

Examiner: ___________________________ ______________________________/_________

NAME SIGNATURE DATE

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Comments

SIMULATOR OPERATOR JPM SETUP INSTRUCTIONS

1. **RECALL SNAP 213**
2. **IMPORT** RO-602 files
3. **PROVIDE** a copy of AP/11 signed off up to step 4.27

READ TO OPERATOR

DIRECTIONS TO STUDENT

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIAL CONDITIONS

A Switchyard Isolation has occurred from 100% power

A Load Shed has NOT occurred

All 4160 volt switchgear has been re-energized by the overhead power path from a Keowee Hydro unit

5 minutes have elapsed since the loss of offsite power

Condensate system operation is desired

AP/1/A/1700/011 (Recovery From Loss of Power) is in progress and completed up to step 4.27

INITIATING CUE

The CRS directs you to continue AP/1/A/1700/011 (Recovery From Loss of Power) beginning at step 4.27

START TIME: _______

SEQ STEP	PROC STEP	DESCRIPTION	
1	**4.27**	Verify both: __ Condensate flow has been lost for < 25 minutes __ Condensate system operation is desired **STANDARD**: Candidate recognizes from the initial conditions that Condensate flow has been lost for 5 minutes and that Condensate system operation is desired **COMMENTS**:	___ SAT ___ UNSAT
2	**4.28**	Place all HWP control switches to OFF **STANDARD**: Candidate places the 1A, 1B, and 1C HWP switches in the OFF position located on 1AB1. ***Examiner Note: It is required to place the HWP switch in the OFF position for the pump that will be started later in the JPM to satisfy the critical step. Placing the switch in the OFF position resets the breaker logic in order to start a HWP.*** **COMMENTS**:	**CRITICAL STEP** ___ SAT ___ UNSAT
3	**4.29**	Place all CBP control switches to OFF **STANDARD:** Candidate places the 1A and 1C CBP switches in the OFF position located on 1AB1. **COMMENTS**:	___ SAT ___ UNSAT

4	**4.30**	Place in MANUAL <u>and</u> close: __ 1FDW-53 __ 1FDW-65 **<u>STANDARD</u>**: Candidate places the 1FDW-53 and 1FDW-65 Moore controllers in MANUAL and ensures the valves are closed located on 1VB3. **<u>COMMENTS</u>:**	___ SAT ___ UNSAT
5	**4.31**	Place 1C-10 FAIL SWITCH in MANUAL **<u>STANDARD</u>**: Candidate places the 1C-10 FAIL SWITCH in MANUAL located on 1VB1. **<u>COMMENTS</u>:**	___ SAT ___ UNSAT
6	**4.32**	Close 1C-10 **<u>STANDARD</u>**: Candidate places the 1C-10 Moore controller in MANUAL and ensures the valves is closed located on 1VB1. **<u>COMMENTS</u>:**	___ SAT ___ UNSAT
7	**4.33**	Make plant page to clear basement and third floor of non-essential personnel **<u>STANDARD</u>**: Candidate makes a PA announcement to clear the turbine building basement and third floor of non-essential personnel. **<u>COMMENTS</u>:**	___ SAT ___ UNSAT

8	**4.34**	Start <u>one</u> HWP **<u>STANDARD</u>**: Candidate starts one Hotwell pump by rotating the control switch to the start positon and observing the red lit and green light off located on 1AB1. **<u>COMMENTS</u>:**	**CRITICAL STEP** ___ SAT ___ UNSAT
9	**4.35**	Verify < 25 minutes elapsed since loss of condensate **<u>STANDARD</u>**: Candidate verifies that < 25 minutes have elapsed since the loss of condensate. **<u>COMMENTS</u>:**	___ SAT ___ UNSAT
10	**4.36**	Throttle 1C-10 controller 10% open to satisfy 25 minute system restart criteria. **<u>STANDARD</u>**: Candidate throttles the 1C-10 Moore controller to ≈ 10% open. **<u>COMMENTS</u>:**	**CRITICAL STEP** ___ SAT ___ UNSAT
11	**4.37**	**WHEN** FWP SUCT HDR PRESS (1VB3) is ≥ 100 psig, **THEN** open 1C-10 **<u>STANDARD</u>**: Candidate locates FWP SUCT HDR PRESS gauge located on 1VB3 and ensures the gauge increase to ≥ 100 psig and then opens 1C-10 using the Moore controller located on 1VB1. **<u>COMMENTS</u>:**	___ SAT ___ UNSAT

12	**4.38**	Place 1C-10 Fail Open Switch in FAIL OPEN **STANDARD**: Candidate places the 1C-10 FAIL OPEN SWITCH in FAIL OPEN located on 1VB1. **COMMENTS**:	___ SAT ___ UNSAT
13	**4.39**	Maximize total recirc flow < 1200 gpm with one of the following: __ 1FDW-53 __ 1FDW-65 **STANDARD**: Candidate throttles either the 1FDW-53 or 1FDW-65 Moore controller to maximize flow to < 1200 gpm located on 1VB3. **COMMENTS**: **END TASK**	___ SAT ___ UNSAT

TIME STOP: ________

CRITICAL STEP EXPLANATIONS

SEQ STEP #	Explanation
2	This step is required to reset the breaker logic so a Hotwell pump can be started.
8	This step is required in order to restore condensate flow.
10	This step is required in order to restore condensate flow

CANDIDATE CUE SHEET

(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

INITIAL CONDITIONS

A Switchyard Isolation has occurred from 100% power

A Load Shed has NOT occurred

All 4160 volt switchgear has been re-energized by the overhead power path from a Keowee Hydro unit

5 minutes have elapsed since the loss of offsite power

Condensate system operation is desired

AP/1/A/1700/011 (Recovery From Loss of Power) is in progress and completed up to step 4.27

INITIATING CUE

The CRS directs you to continue AP/1/A/1700/011 (Recovery From Loss of Power) beginning at step 4.27

REGION II
JOB PERFORMANCE MEASURE

RO-803a

ALIGN INTAKE CANAL FOR RECIRC ON DAM FAILURE

Alternate Path: Yes

Alt Path Failure: **CCW-9 fails closed**

Time Critical: No

Time Critical Criteria: ______________________

Prepared By: ______________________ Date:

EP Review By: ______________________ Date:

Reviewed By: ______________________ Date:

Approved By: ______________________ Date:

REGION II
JOB PERFORMANCE MEASURE

Task Title: Align Intake Canal for Recirc on Dam Failure

Task Number: N/A

Alternate Path: Yes

Time Critical: No

Validation Time: 20 min

K/A Rating(s):

System: 075
K/A: G 2.1.23
Rating: 4.3/4.4

Task Standard:

Intake Canal is aligned for recirculation correctly by procedure and an AO is dispatched to manually open CCW-9.

References:

"CCW LAKE LEVEL LOW" statalarm (1SA-9, B-10)

AP/1/A/1700/13, (Dam Failure) Rev 032

Tools/Equipment/Procedures Needed:

AP/1/A/1700/13, (Dam Failure)

==

Candidate: ______________________________ Time Start: ______________

NAME Time Finish: ______________

Performance Rating: SAT ______ UNSAT ______ Performance Time: _________

Examiner: ______________________________ ______________________________/__________

NAME SIGNATURE DATE

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Comments

SIMULATOR OPERATOR JPM SETUP INSTRUCTIONS

1. **RECALL SNAP 214**
2. **IMPORT** RO-803a files
3. **PLACE** simulator in RUN and depress the Dam Failure P/B
4. **ENSURE** all CCW pumps have green flags showing
5. **PROVIDE** a copy of AP/1/A/1700/013 (Dam Failure) with steps 4.1 through 4.57 signed off

READ TO OPERATOR

DIRECTIONS TO STUDENT

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIAL CONDITIONS

The SM has confirmed Condition ‘A’ for Little River Dam

Unit 1 has been manually tripped

The Intake Canal is intact

The RCPs have been secured

AP/1/A/1700/13 (Dam Failure) has been completed up to step 4.58

The Unit 2 Control Room has directed Unit 1 to supply CCW recirculation

INITIATING CUE

Control Room Supervisor directs you to align the CCW Intake Canal for recirculation following a dam failure beginning at step 4.58 of AP/1/A/1700/013 (Dam Failure)

When directed by the AP, start the 1C CCW pump

START TIME: _______

SEQ STEP	PROC STEP	DESCRIPTION	
1	4.58	**NOTE** Unit 2 CR will decide which unit will establish CCW recirculation. Unit 1 will only supply CCW recirculation when directed by Unit 2. **IAAT** Unit 2 CR has directed Unit 1 to supply CCW recirculation, **THEN** perform Steps 4.59 – 4.74 to start one CCW Pump and establish recirculation. **STANDARD:** The candidate determines from the Initial Conditions that Unit 2 CR has directed Unit 1 to supply CCW recirculation and proceeds to Step 4.59. **COMMENTS:**	___ SAT ___ UNSAT

2	4.59	**NOTE**
		• At least one CCW Pump discharge valve is required to remain open prior to establishing forced flow.
		• The adjacent CCW Pumps discharge valve must be closed to prevent excessive torque on the starting pumps discharge valve. The 1A and 1B CCW Pumps are adjacent, and the 1C and 1D CCW Pumps are adjacent
		
		Determine which CCW Pump will be started
		
		√ | **CCW Pump**
		  | 1A
		  | 1B
		  | **1C**
		  | 1D
		
		STANDARD: The candidate determines that the 1C CCW Pump will be started and continues to Step 4.60.
		
		COMMENTS:
			___ SAT
			
			___ UNSAT

<table>
<tr><td rowspan="1">3</td><td>4.60</td><td>Place <u>all</u> CCW Pump switches in the trip position

<table><tr><th>√</th><th>CCW Pump</th></tr><tr><td></td><td>1A</td></tr><tr><td></td><td>1B</td></tr><tr><td></td><td>1C</td></tr><tr><td></td><td>1D</td></tr></table>

<u>STANDARD:</u> The candidate locates the CCW Pump controls on 1AB3 and rotates the 1A, 1B, 1C, and 1D CCW Pump control switches to the trip position.
The candidate continues to Step 4.61.

<u>COMMENTS</u>:</td><td>___ SAT

___ UNSAT</td></tr>
<tr><td>4</td><td>4.61</td><td>Verify the 1A <u>or</u> 1B CCW Pump is to be started

<u>STANDARD</u>: The candidate was cued to start the 1C CCW Pump, RNO directs the operator to GO TO Step 4.64

<u>COMMENTS</u>:</td><td>___ SAT

___ UNSAT</td></tr>
</table>

<table>
<tr>
<td>5</td>
<td>4.64</td>
<td>
Verify <u>both</u> of the following CCW pump discharge valves are closed

<table>
<tr><th>Pump</th><th>√</th><th>Valve</th></tr>
<tr><td>1C</td><td></td><td>1CCW-12</td></tr>
<tr><td>1D</td><td></td><td>1CCW-13</td></tr>
</table>

<u>STANDARD</u>: Candidate verifies that 1CCW-12 indicates open by observing the red open light illuminated and the green closed light OFF on 1AB3 <u>OR</u> by OAC indications.

Candidate verifies that 1CCW-13 is closed by observing the green closed light illuminated and red open light OFF on 1AB3 <u>OR</u> by OAC indications.

Candidate determines that both valves are <u>NOT</u> closed and proceeds to Step 4.64 RNO.

<u>COMMENTS</u>:
</td>
<td>___ SAT

___ UNSAT</td>
</tr>
<tr>
<td>6</td>
<td>4.64
RNO</td>
<td>
Locally close the discharge valves from the breaker switch (Unit 1 Equipment Rm).

<table>
<tr><th>Pump</th><th>√</th><th>Valve</th><th>Breaker</th></tr>
<tr><td>1C</td><td></td><td>1CCW-12</td><td>1XS3-2E</td></tr>
<tr><td>1D</td><td></td><td>1CCW-13</td><td>1XS1-F3C</td></tr>
</table>

<u>STANDARD</u>: The candidate dispatches an operator to Unit 1 Equipment Room to close 1CCW-12 and 1CCW-13

Simulator Operator: After the candidate has dispatched an operator to Unit 1 Equipment Room to close 1CCW-12 & 1CCW-13, <u>FIRE TIMER #1 TO CLOSE 1CCW-12</u>. 1CCW-13 is already closed.

Cue: Inform the candidate that 1CCW-12 and 1CCW-13 both indicate closed from the equipment room.

Candidate continues to Step 4.65

<u>COMMENTS</u>:
</td>
<td>___ SAT

___ UNSAT</td>
</tr>
</table>

7	4.65	**NOTE** CCW pump amps and temperatures will read higher than normal when started with this plant configuration. CCWP motor stator temperature limit is 284°F. Start the selected CCW pump **STANDARD**: The candidate locates the control switch for the 1C CCW Pump on 1AB3 and rotates the control switch to the close position. The candidate observes that the 1C CCW pump discharge valve starts to travel open and when approx 20% open, the 1C CCW pump starts as indicated by red run light illuminated and ≈ 375 motor amps indicated. **NOTE: CCWP motor stator temperatures are NOT modeled on the simulator OAC.** ***Cue: If the candidate asks, inform him/her that the selected CCW Pump motor stator temperature is ≈ 200°F and stable.*** **COMMENTS**:	**CRITICAL STEP** ___ SAT ___ UNSAT
8	4.66	Verify the started CCW pump discharge valve opened **STANDARD**: The candidate verifies the 1C CCW Pump discharge valve indicates OPEN by observing the red open light illuminated and the green closed light OFF on 1AB3. The candidate may also verify selected discharge valve open by OAC indications **COMMENTS**:	___ SAT ___ UNSAT

9	4.67	Ensure CCWP LOAD SHED DEFEAT switch is positioned to a running pump **STANDARD**: Candidate locates the CCWP LOAD SHED DEFEAT switch on VB1 and positions switch to the 1C CCW pump **COMMENTS**:	___ SAT ___ UNSAT
10	4.68	**[ALTERNATE PATH]** Verify CCW-9 is open **STANDARD**: Candidate observes CCW-9 indication on 2AB3 and determines that CCW-9 is closed by the red OPEN light OFF and the green CLOSED indication illuminated Candidate determines CCW-9 is closed and proceeds to step 4.68 **RNO** **Note: CCW-9 is failed closed** **COMMENTS**:	___ SAT ___ UNSAT

11	**4.68** **RNO**	1. *Stop the operating CCW pump. 2. Notify Security to meet an operator at Gate 23 (CCW Intake) to provide access to CCW-9. 3. Dispatch an operator to perform the following: A. Obtain the CCW-9 Gate Key from security box in Unit 3 Control Room storage area. B. Access the area between fences at Gate 23 leading to the CCW intake. C. *Open CCW-9 (EMERGENCY CCW DISCHARGE TO INTAKE) (between protected area fences). D. Notify Unit 1 CR when CCW-9 is open. 4. **WHEN** notified that CW-9 is open, **THEN GO TO** Step 4.59 to restart a CCW pump. **STANDARD**: Candidate locates the control switch for the 1C CCW Pump on 1AB2 and rotates the control switch to the trip position and observes the red ON lights OFF and the white OFF light illuminated. Candidate notifies Security to meet an operator at Gate 23 to provide access to CCW-9. Candidate dispatches an operator to obtain the CCW-9 Gate Key from the Security box in the Unit 3 Control Room storage area. The operator, along with Security, proceeds between the Protected Area fences in order to open CCW-9. **Booth cue: Fire Timer 4 to open CCW-9 and using time compression and inform the candidate that CCW-9 has been opened.** Candidate returns to step 4.59 to restart a CCW pump. **COMMENTS**:	***CRITICAL STEP** ___ SAT ___ UNSAT

<table>
<tr>
<td>12</td>
<td>4.59</td>
<td>

NOTE

- At least one CCW Pump discharge valve is required to remain open prior to establishing forced flow.
- The adjacent CCW Pumps discharge valve must be closed to prevent excessive torque on the starting pumps discharge valve. The 1A <u>and</u> 1B CCW Pumps are adjacent, and the 1C <u>and</u> 1D CCW Pumps are adjacent

Determine which CCW Pump will be started

√	CCW Pump
	1A
	1B
	1C
	1D

<u>STANDARD</u>: The candidate determines that the 1C CCW Pump will be started and continues to Step 4.60.

<u>COMMENTS</u>:

</td>
<td>___ SAT

___ UNSAT</td>
</tr>
<tr>
<td>13</td>
<td>4.60</td>
<td>

Place <u>all</u> CCW Pump switches in the trip position

√	CCW Pump
	1A
	1B
	1C
	1D

<u>STANDARD:</u> The candidate locates the CCW Pump controls on 1AB3 and rotates the 1A, 1B, 1C, and 1D CCW Pump control switches to the trip position.

The candidate continues to Step 4.61.

<u>COMMENTS</u>:

</td>
<td>___ SAT

___ UNSAT</td>
</tr>
</table>

14	**4.61**	Verify the 1A <u>or</u> 1B CCW Pump is to be started **<u>STANDARD</u>**: The candidate was cued to start the 1C CCW Pump, **RNO** directs the operator to **GO TO** Step 4.64 **<u>COMMENTS</u>:**	___ SAT ___ UNSAT
15	**4.64**	Verify <u>both</u> of the following CCW pump discharge valves are closed **Pump** | √ | **Valve** 1C | | 1CCW-12 1D | | 1CCW-13 **<u>STANDARD</u>**: Candidate verifies that 1CCW-12 indicates open by observing the red open light illuminated and the green closed light OFF on 1AB3 **<u>OR</u>** by OAC indications. Candidate verifies that 1CCW-13 is closed by observing the green closed light illuminated and red open light OFF on 1AB3 **<u>OR</u>** by OAC indications. Candidate determines that both valves are <u>NOT</u> closed and proceeds to Step 4.64 **RNO.** **<u>COMMENTS</u>:**	___ SAT ___ UNSAT

<table>
<tr>
<td>16</td>
<td>4.64
RNO</td>
<td>
Locally close the discharge valves from the breaker switch (Unit 1 Equipment Rm).

<table>
<tr><th>Pump</th><th>√</th><th>Valve</th><th>Breaker</th></tr>
<tr><td>1C</td><td></td><td>1CCW-12</td><td>1XS3-2E</td></tr>
<tr><td>1D</td><td></td><td>1CCW-13</td><td>1XS1-F3C</td></tr>
</table>

<u>STANDARD</u>: The candidate dispatches an operator to Unit 1 Equipment Room to close 1CCW-12 and 1CCW-13

Simulator Operator: After the candidate has dispatched an operator to Unit 1 Equipment Room to close 1CCW-12 & 1CCW-13, <u>FIRE TIMER 5 TO CLOSE 1CCW-12</u>. 1CCW-13 is already closed.

Cue: Inform the candidate that 1CCW-12 and 1CCW-13 both indicate closed from the equipment room.

Candidate continues to Step 4.65

<u>COMMENTS</u>:
</td>
<td>___ SAT

___ UNSAT</td>
</tr>
</table>

<table>
<tr>
<td>17</td>
<td>4.65</td>
<td>
<u>NOTE</u>
CCW pump amps and temperatures will read higher than normal when started with this plant configuration. CCWP motor stator temperature limit is 284°F.

Start the selected CCW pump

<u>STANDARD</u>: The candidate locates the control switch for the 1C CCW Pump on 1AB3 and rotates the control switch to the close position.

The candidate observes that the 1C CCW pump discharge valve starts to travel open and when approx 20% open, the 1C CCW pump starts as indicated by red run light illuminated and ≈ 375 motor amps indicated.

NOTE: CCWP motor stator temperatures are <u>NOT</u> modeled on the simulator OAC.

Cue: If the candidate asks, inform him/her that the selected CCW Pump motor stator temperature is ≈ 200°F and stable.

<u>COMMENTS</u>:

END TASK
</td>
<td>
CRITICAL STEP

___ SAT

___ UNSAT
</td>
</tr>
</table>

TIME STOP: ________

CRITICAL STEP EXPLANATIONS

SEQ STEP #	Explanation
7	Step 7 is critical to start a CCW pump.
11	Step 11 is critical to ensure the operating CCW pump is stopped and CCW-9 is opened manually to align CCW recirculation flow.
17	Step 17 is critical to start a CCW pump.

CANDIDATE CUE SHEET

(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

INITIAL CONDITIONS

The SM has confirmed Condition ‘A’ for Little River Dam

Unit 1 has been manually tripped

The Intake Canal is intact

The RCPs have been secured

AP/1/A/1700/13 (Dam Failure) has been completed up to step 4.58

The Unit 2 Control Room has directed Unit 1 to supply CCW recirculation

INITIATING CUE

Control Room Supervisor directs you to align the CCW Intake Canal for recirculation following a dam failure beginning at step 4.58 of AP/1/A/1700/013 (Dam Failure)

When directed by the AP, start the 1C CCW pump

REGION II
JOB PERFORMANCE MEASURE

RO-901a

RELEASE GWD TANK

Alternate Path: Yes

Alt Path Failure: **The "B" GWD tank pressure will decrease instead of the D GWD tank**

Time Critical: No

Time Critical Criteria: ______________________________

Prepared By: ______________________ Date: __________

EP Review By: ______________________ Date: __________

Reviewed By: ______________________ Date: __________

Approved By: ______________________ Date: __________

REGION II
JOB PERFORMANCE MEASURE

Task Title : Release GWD Tank

Task Number : N/A

Alternate Path: Yes

Time Critical: No

Validation Time: 30 min

K/A Rating(s):

System: 071
K/A: A4.26
Rating: 3.1/3.9

Task Standard:

Release a GWD tank correctly using OP/1&2/A/1104/018 Encl. 4.9 (GWD Tank Release) and terminate the release when unexpected results are noted.

References: OP/1&2/A/1104/018 Encl. 4.9 (GWD Tank Release) Rev 77
PT/0/A/230/001 (Radiation Monitor Check) Rev 167

Tools/Equipment/Procedures Needed:

OP/1&2/A/1104/018, Enclosure 4.9 (GWD Tank Release) & 4.10 (GWD Tank Sample Request)
PT/0/A/230/001 (Radiation Monitor Check)

==

Candidate: ________________________________ Time Start: _______________

NAME Time Finish: _______________

Performance Rating: SAT ______ UNSAT ______ Performance Time: _________

Examiner: ____________________________ ________________________________/__________

NAME SIGNATURE DATE

==

Comments

SIMULATOR OPERATOR JPM SETUP INSTRUCTIONS

1. **RECALL** SNAP 212
2. Go to **RUN**

READ TO OPERATOR

DIRECTIONS TO STUDENT

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIAL CONDITIONS

Release of “D” GWD tank is desired

No other GWRs in progress

OP/1&2/A/1104/018, Enclosure 4.9 (GWD Tank Release) is in progress and completed up to step 3.9

INITIATING CUES

CRS directs you to complete the release of the “D” GWD tank beginning at step 3.9 of Enclosure 4.9 (GWD Tank Release)

START TIME: _______

SEQ STEP	PROC STEP	DESCRIPTION	
1	3.9	**NOTE:** If N_2 was added to the most recently released GWD tank until 1RIA-37 indicated < 700 cpm, OR if the tanks' radioactivity was < 2.1E-05 µCi / ml when it was released, the GWD piping is considered "purged". 3.9.1 Adjust 1RIA-37 setpoints for release as follows: 3.9.2 Perform **one** of the following: A. **IF** all of the following: • Calculated setpoints are < 1E+07 CPM • 1RIA-37 operable • GWD piping purged {15} set alarms as follows: • Set 1RIA-37 Alert setpoint at _______________cpm per PT/0/A/0230/001 (Radiation Monitor Check). (from Step 3.7.1) • Set 1RIA-37 High setpoint at _______________cpm per PT/0/A/0230/001 (Radiation Monitor Check). (from Step 3.7.1) **NOTE:** If GWD piping **NOT** purged on most recent release, RP independently verifies release data and 1RIA-37 setpoint is set at zero to allow the tank to be released. {15} B. **IF** any of the following: • Calculated setpoints are > 1E+07 CPM • 1RIA-37 out-of-service • GWD piping **NOT** purged {15} perform the following: 1. Enter SLC 16.11.3, Conditions C and I 2. Override 1RIA-37 setpoints as follows: • Set 1RIA-37 Alert setpoint at zero per PT/0/A/0230/001 (Radiation Monitor Check). • Set 1RIA-37 High setpoint at zero per PT/0/A/0230/001 (Radiation Monitor Check). **<u>STANDARD</u>:** Refer to PT/0/A/0230/001 (Radiation Monitor Check) Encl. 13.6 (1RIA-37 and 1RIA-38 Setpoints) and using the RIA Screen insert the calculated 1RIA-37 setpoint of **<u>2.73 E5</u>** CPM Candidate continues to Step 3.10 **<u>COMMENTS</u>:**	**CRITICAL STEP** ___ SAT ___ UNSAT

<table>
<tr>
<td>2</td>
<td>3.10</td>
<td>Adjust 1RIA-38 setpoints for release as follows:

3.10.1 Perform one of the following:
A. IF calculated setpoints are < 1E+06 CPM AND 1RIA-38 operable, set alarms as follows:
• Set 1RIA-38 Alert setpoint at _______________cpm per PT/0/A/0230/001 (Radiation Monitor Check). (from Step 3.8)
• Set 1RIA-38 High setpoint at _______________cpm per PT/0/A/0230/001 (Radiation Monitor Check). (from Step 3.8)

NOTE: Due to type of radiation 1RIA-38 monitors, it is NOT sensitive enough to perform an adequate N2 purge.

B. IF calculated setpoints are > 1E+06 CPM OR 1RIA-38 out of service, perform the following:
1. Enter SLC 16/11/3, Conditions C and I
2. Override 1RIA-38 setpoints as follows:
• Set 1RIA-38 Alert setpoint at zero per PT/0/A/0230/001 (Radiation Monitor Check).
• Set 1RIA-38 High setpoint at zero per PT/0/A/0230/001 (Radiation Monitor Check).

<u>STANDARD</u>: Refer to PT/0/A/0230/001 (Radiation Monitor Check) Encl. 13.6 (1RIA-37 and 1RIA-38 Setpoints) and using the RIA ENABLE CONTROLs Screen insert the calculated 1RIA-38 setpoint of <u>339</u> CPM.

Candidate continues to Step 3.11

<u>COMMENTS</u>:</td>
<td>CRITICAL STEP

___ SAT

___ UNSAT</td>
</tr>
<tr>
<td>3</td>
<td>3.11</td>
<td>Ensure GWR DISCHARGE FLOW CONTROL in "HAND".

<u>STANDARD:</u> Ensure GWR DISCHARGE FLOW CONTROL in "HAND" located on 1AB3.

Candidate continues to Step 3.12

<u>COMMENTS</u>:</td>
<td>___ SAT

___ UNSAT</td>
</tr>
</table>

4	**3.12**	Verify GWR DISCHARGE FLOW CONTROL "CLOSED" **STANDARD**: Verify GWR DISCHARGE FLOW CONTROL CLOSED located on 1AB3. Candidate continues to Step 3.13 **COMMENTS**:	___ SAT ___ UNSAT
5	**3.13**	Remove "Purged / Not Purged" CR tag from GWR DISCHARGE FLOW CONTROL. **STANDARD**: Remove "Purged / Not Purged" CR tag from GWR DISCHARGE FLOW CONTROL located on 1AB3. Candidate continues to Step 3.14 **COMMENTS**:	___ SAT ___ UNSAT
6	**3.14**	Notify Unit 3 CR to perform the following: • Begin periodically monitoring all three Unit 3 GWD tanks to determine if pressure in any tank is decreasing unexpectedly. {12} • Place a note on turnover sheet "If 3RIA-45 alarms or GWD tank pressure in any tank is decreasing unexpectedly, notify Unit 1 CR to terminate GWD tank release". **STANDARD**: Notify Unit 3 CR to begin periodically monitoring all three Unit 3 GWD tanks to determine if pressure in any tank is decreasing unexpectedly Notify Unit 3 CR to place above note on the turnover sheet Candidate continues to Step 3.15 **COMMENTS**:	___ SAT ___ UNSAT

7	**3.15**	Notify Unit 2 CR to place a note on turnover sheet "If 2RIA-45 alarms, notify Unit 1 CR to terminate GWD tank release". **STANDARD:** Notify Unit 2 CR to place above note on the turnover sheet. Candidate continues to Step 3.16 **COMMENTS:**	___ SAT ___ UNSAT
8	**3.16**	Begin monitoring all four Unit 1 GWD tanks to determine if pressure in any tank is decreasing unexpectedly. **STANDARD:** Begin monitoring GWD tank pressures on chart recorder on 1VB2 or OAC. Candidate continues to Step 3.17 **COMMENTS:**	___ SAT ___ UNSAT
9	**3.17**	**NOTE:** When GWD Tank ≥ 2.1E-05 µCi / ml, RP monitors GWD piping at 1RIA-37 as N2 is added to inform CR when local readings indicate the piping is purged. **IF** 1RIA-37 **NOT** in service **AND** the tank being released is ≥ 2.1E-05 µCi/ml, notify RP to prepare to survey GWD piping at 1RIA-37. {15} ____________________ Person Notified ______ Date **STANDARD:** Determine 1RIA-37 is in service and N/A step 3.17. Candidate continues to Step 3.18 **COMMENTS:**	___ SAT ___ UNSAT

10	**3.18**	**IF AT ANY TIME** any tank is decreasing unexpectedly, perform the following: 3.18.1 Close GWR DISCHARGE FLOW CONTROL. 3.18.2 Notify RP to initiate SRPMP 8-02 (Investigation of Unusual Radiological Occurrences) due to potential unplanned radioactive effluent release. ____________________ ______ Person Notified Date 3.18.3 Go To Section 4 (GWR Termination). **STANDARD:** Determine IAAT step is not met at this time. Candidate continues to Step 3.19 **COMMENTS:**	___ SAT ___ UNSAT
11	**3.19**	**IF AT ANY TIME** desired to terminate release, perform the following: 3.19.1 Close GWR DISCHARGE FLOW CONTROL. 3.19.2 Go To Section 4 (GWR Termination). **STANDARD:** Determine IAAT step is not met at this time. Candidate continues to Step 3.20 **COMMENTS:**	___ SAT ___ UNSAT
12	**3.20**	Open GWD-100 (Decay Tanks Discharge Header Block). (A-2-209/E 13' N of Door) **STANDARD:** Dispatch AO to Open GWD-100 (Decay Tanks Discharge Header Block). Candidate continues to Step 3.21 **Booth Note: GWD-100 is OPEN.** ***Cue: Inform candidate that GWD-100 is open.*** **COMMENTS:**	**CRITICAL STEP** ___ SAT ___ UNSAT

13	**3.21** **3.22** **3.23**	**IF** releasing GWD Tank A/B/C, perform the following… **STANDARD:** Determine NOT releasing GWD Tank A, B, and C and N/A steps 3.21, 3.22, and 3.23. Candidate continues to Step 3.24 **COMMENTS:**	___ SAT ___ UNSAT
14	**3.24**	**IF** releasing GWD Tank 'D' perform the following: • Open GWD-205 (Decay Tank 1D Discharge Block) (IRW Building) • Place GWD-207 ('D' INTERIM GWD TANK DISCH) switch to "OPEN" **STANDARD:** Dispatch AO to open GWD-205 (Decay Tank 1D Discharge Block). ***Cue: Inform candidate that GWD-205 is open.*** Locate GWD-207 ("D" INTERIM GWD TANK DISCH) on 1AB3 and place switch to "OPEN" Candidate continues to Step 3.25 **COMMENTS:**	**CRITICAL STEP** ___ SAT ___ UNSAT

15	**3.25**	**NOTE:** Station Limit release rates, per SLC 16.11, will **NOT** be exceeded if recommended release rates per Enclosure 4.10 (GWD Tank Sample Request) are followed. The following approval levels are required for releases: {10}{13} <u>All Station Releases in Progress (including this one)</u> — <u>Required Level of Approval</u> 1 GWR in progress through P/A/C filter at 1/3 Station Limit (≥ 30 day holdup) — SRO 1 GWR in progress at 1/3 Station Limit (< 30 day holdup **OR** released without P/A/C filter) — OSM 1 GWR in progress at 2/3 Station Limit — OSM 2 GWRs in progress at 1/3 Station Limit each — OSM 3 GWRs in progress at 1/3 Station Limit each — OSM Circle Required Level of Approval above based on Release Conditions. **<u>STANDARD</u>:** Circle SRO on enclosure. Candidate continues to Step 3.26 **<u>COMMENTS</u>:**	___ SAT ___ UNSAT
16	**3.26**	Record approval granted for release: __________________________ __________ / _____ Approval Date Time **<u>STANDARD</u>:** Place approval name and date and time on enclosure. Candidate continues to Step 3.27 ***Cue: Inform candidate that approval is granted for release by Mitch Helms at current Date/Time.*** **<u>COMMENTS</u>:**	___ SAT ___ UNSAT

17	3.27	**NOTE:** If hold up ≥ 30 days, the limits will be checked NA by RP on GWD Tank Sample Request. **IF** tank holdup < 30 days, perform the following… **STANDARD:** Determine tank has been held up greater than 30 days and N/A steps 3.27.1 – 3.27.2. Candidate continues to Step 3.28 **COMMENTS:**	___ SAT ___ UNSAT
18	3.28	**IF** tank is released without processing through a P/A/C filter **AND** Projected 31 day average gaseous effluent organ dose > limit, perform the following… **STANDARD:** Determine tank is being released through a P/A/C filter and N/A steps 3.28.1 – 3.28.4. Candidate continues to Step 3.29 **COMMENTS:**	___ SAT ___ UNSAT
19	3.29	Record recommended Release Rate from Enclosure 4.10 (GWD Tank Sample Request): _______________ cfm **STANDARD:** Record recommended Release Rate from Enclosure 4.10 (GWD Tank Sample Request): __**4.19 E4**____ cfm Candidate continues to Step 3.30 **COMMENTS:**	___ SAT ___ UNSAT

20	**3.30**	**NOTE:** With Unit 1 PRV system shutdown, RIA-32 sample point for '1 PRV System Filter Discharge' is sampling air in piping between Unit 1 PRV discharge and Unit Vent, **NOT** the general area {2} During or just after GWD Release RIA-32 counts may increase while selected to '1 PRV System Filter Discharge' causing 1SA-8/B-9 "Process Monitor Radiation High" to alarm. Place the following note on Unit 1 Turnover sheet: "Just after or during a GWD release, 1SA-8/B-9 may alarm from RIA-32 sample point selected to '1 PRV System Filter Discharge'. **IF** 1SA-8/B-9 is due to RIA-32 - '1 PRV System Filter Discharge', it can be considered an expected alarm". **STANDARD:** Candidate should indicate that the above note will be placed on the turnover sheet. Candidate continues to Step 3.31 **COMMENTS:**	___ SAT ___ UNSAT
21	**3.31**	Adjust GWR DISCHARGE FLOW CONTROL to obtain desired release rate. **STANDARD:** Slowly adjust the manual loading knob to obtain the desired release rate. Candidate continues to Step 3.32 ***Note:*** ***Actual release rate will be much less than the maximum flow rate allowed by the release permit. Flow is monitored on VB1 recorder 1MSCCR0001*** **COMMENTS:**	**CRITICAL STEP** ___ SAT ___ UNSAT
22	**3.32**	Record "Begin GWR # _________" in Narrative Log. **STANDARD:** Candidate should indicate a Unit log entry would be made. **Note: The "B" GWD tank pressure will decrease instead of the D GWD tank. The candidate should note this while monitoring the tank pressures and then perform IAAT Step 3.18. Candidate may also perform the IAAT because he notes that a release is occurring but the "D" GWD tank pressure is not decreasing. In both cases unexpected results were noted.** **COMMENTS:**	___ SAT ___ UNSAT

23	**3.18** **IAAT**	**[ALTERNATE PATH]** **IF AT ANY TIME** any tank is decreasing unexpectedly, perform the following: 3.18.1 Close GWR DISCHARGE FLOW CONTROL. 3.18.2 Notify RP to initiate SRPMP 8-02 (Investigation of Unusual Radiological Occurrences) due to potential unplanned radioactive effluent release. ____________________ Person Notified ______ Date 3.18.3 **Go To** Section 4 (GWR Termination). **STANDARD:** Determine IAAT step is met because the "B" GWD Tank pressure is decreasing. *Close GWR DISCHARGE FLOW CONTROL. Notify RP initiate SRPMP 8-02 (Investigation of Unusual Radiological Occurrences) **Go To** Section 4 (GWR Termination). ***Cue: Another operator will complete this procedure.*** **COMMENTS:** **END TASK**	***CRITICAL STEP** ___ SAT ___ UNSAT

TIME STOP: ________

CRITICAL STEP EXPLANATIONS

SEQ STEP #	Explanation
1	Required to set RIA to prevent station release above limits.
2	Required to set RIA to prevent station release above limits.
12	Required to align release flow path.
14	Required to align release flow path.
21	Required to align release flow path.
23	Required to stop the release of the wrong tank.

CANDIDATE CUE SHEET

(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

INITIAL CONDITIONS

Release of "D" GWD tank is desired

No other GWRs in progress.

OP/1&2/A/1104/018, Enclosure 4.9 (GWD Tank Release) is in progress and completed up to step 3.9

INITIATING CUES

CRS directs you to complete the release of the "D" GWD tank beginning at step 3.9 of Enclosure 4.9 (GWD Tank Release).

REGION II
JOB PERFORMANCE MEASURE

RO-P402a

START FOURTH REACTOR COOLANT PUMP

Alternate Path: Yes

Alt Path Failure: **AC OIL Lift Pump Trips**

Time Critical: No

Time Critical Criteria: ______________________

Prepared By: ______________________ Date:

EP Review By: ______________________ Date:

Reviewed By: ______________________ Date:

Approved By: ______________________ Date:

REGION II
JOB PERFORMANCE MEASURE

Task Title: Start the fourth Reactor Coolant Pump

Task Number: N/A

Alternate Path: Yes

Time Critical: No

Validation Time: 10 minutes

K/A Rating(s):

System: 003
K/A: A4.03
Rating: 2.8/2.5

Task Standard:

1B2 RCP is started in accordance with OP/1/A/1103/006 Encl. 4.4 (Starting 1B2 RCP) and DC Oil Lift Pump secured

References:

OP/1/A/1102/001 (Controlling Procedure for Unit Startup)
OP/1/A/1103/006 (RCP Operation) Rev 86

Tools/Equipment/Procedures Needed:

OP/1/A/1103/006 Encl. 4.4 (Starting 1B2 RCP)

==

Candidate: ________________________________ Time Start: ______________

NAME Time Finish: ______________

Performance Rating: SAT ______ UNSAT ______ Performance Time: _________

Examiner: ____________________________ ________________________________/_________

NAME SIGNATURE DATE

==

Comments

SIMULATOR OPERATOR JPM SETUP INSTRUCTIONS

1. **RECALL SNAP 209**
2. **IMPORT FILES for RO-P402**
3. **ENSURE** all breaker flags are set to current plant conditions
4. **ENSURE** a marked up copy of Enclosure 4.4 is provided to Examiner for candidate
5. Go to **RUN** when directed by the Lead Examiner

READ TO OPERATOR

DIRECTIONS TO STUDENT

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIAL CONDITIONS

OP/1/A/1102/001 (Controlling Procedure for Unit Startup) Enclosure 4.6 (Unit Startup From 335°F/540 psig (MODE 3) To 532°F/2155 psig (MODE 3)) in progress and completed up to Step 6.2 which directs starting the fourth RCP

RCS Pressure = 1660 psig slowly increasing in accordance with OP/1/A/1102/001

RCS Temperature = 474°F slowly increasing in accordance with OP/1/A/1102/001

INITIATING CUE

The CRS directs you to start the 1B2 RCP per OP/1/A/1103/006 Encl. 4.4 beginning with Step 2.2.1

START TIME: _______

<table>
<tr><th>SEQ STEP</th><th>PROC STEP</th><th>DESCRIPTION</th><th></th></tr>
<tr><td>1</td><td>2.2.1</td><td>NOTE:
• No more than two RCP(s) may be operated when RCS is <300°F.
• AC and DC Oil Lift Pumps will automatically trip after 3 minutes. Oil Lift Pump may NOT start unless switch has been placed to "OFF" after last start.

Announce "Starting 1B2 RCP" via plant page.

<u>STANDARD</u>: Announces "Starting 1B2 RCP" via plant page.

Candidate continues to step 2.2.2.

<u>COMMENTS</u>:</td><td>___ SAT

___ UNSAT</td></tr>
<tr><td>2</td><td>2.2.2</td><td><u>IF AT ANY TIME</u> Oil Lift Pump low discharge pressure clears, <u>Go To</u> Step 2.2.6

<u>STANDARD</u>: Reads IAAT step and determines that it does not currently apply

Candidate continues to step 2.2.3.

<u>COMMENTS</u>:</td><td>___ SAT

___ UNSAT</td></tr>
<tr><td>3</td><td>2.2.3</td><td>NOTE: AC Oil Lift Pump may take > 2 minutes to develop adequate discharge pressure.

<u>IF</u> available, start AC Oil Lift Pump on 1B2 RCP.

<u>STANDARD</u>: Determines AC Oil Lift Pump is available and:
• Rotates AC Oil Lift Pump switch to start
• Observes red light on and green light off
• Monitors discharge pressure status on OAC

Candidate continues to step 2.2.4.

<u>COMMENTS</u>:</td><td>___ SAT

___ UNSAT</td></tr>
</table>

4	2.2.4	**NOTE**: Operating either AC or DC Oil Lift Pump is adequate to start RCP. **IF** AC Oil Lift Pump is unavailable, start DC Oil Lift Pump **STANDARD**: Determines AC Oil Lift Pump is available and N/A's this step Candidate continues to step 2.2.5. **COMMENTS**:	___ SAT ___ UNSAT
5	2.2.5	**[ALTERNATE PATH]** **IF** AC Oil Lift Pump automatically trips prior to Oil Lift Pump low discharge pressure clearing, start DC Oil Lift Pump. **STANDARD**: Determines the AC Oil Lift Pump has tripped and starts the DC Oil Lift Pump by performing the following: • *Rotates DC Oil Lift Pump switch to start • Observes red light on and green light off • Monitors discharge pressure status on OAC **Time DC OLP started: ________** Candidate continues to step 2.2.6. **COMMENTS**:	***CRITICAL STEP** ___ SAT ___ UNSAT
6	2.2.6	**WHEN** Oil Lift Pump low discharge pressure clears **AND** > 60 seconds has elapsed since starting oil lift pumps, start 1B2 RCP. **STANDARD**: Once the DC Oil Lift Pump low discharge pressure has cleared, start the 1B2 RCP as follows: • *Rotate 1B2 RCP switch to START • Verify red lights on and green light off • Verify starting current • Verify OAC indications support pump start Candidate continues to step 2.2.7. **COMMENTS**:	***CRITICAL STEP** ___ SAT ___ UNSAT

<table>
<tr>
<td>7</td>
<td>2.2.7</td>
<td>After RCP is at full speed, perform the following:

A. Ensure the following stopped:
• AC Oil Lift Pump
• DC Oil Lift Pump

B. <u>IF</u> AC Oil Lift Pump was operated, position AC Oil Lift Pump switch to “OFF”.

C. <u>IF</u> DC Oil Lift Pump was operated, position DC Oil Lift Pump switch to “OFF”

<u>STANDARD</u>: Once 1B2 RCP is at rated speed,
• Rotates AC Oil Lift Pump switch to OFF
• Rotates the DC Oil Lift Pump Switch to OFF

Examiner Cue: Inform the candidate that another operator will complete the procedure.

<u>COMMENTS</u>:

END TASK</td>
<td>___ SAT

___ UNSAT</td>
</tr>
</table>

TIME STOP: ________

CRITICAL STEP EXPLANATIONS

SEQ STEP #	Explanation
5	This step is required to be able to start the 1B2 RCP.
6	This step is required to actually start the 1B2 RCP.

CANDIDATE CUE SHEET

(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

INITIAL CONDITIONS

OP/1/A/1102/001 (Controlling Procedure for Unit Startup) Enclosure 4.6 (Unit Startup From 335°F/540 psig (MODE 3) To 532°F/2155 psig (MODE 3)) in progress and completed up to Step 6.2 which directs starting the fourth RCP

RCS Pressure = 1660 psig slowly increasing in accordance with OP/1/A/1102/001

RCS Temperature = 474°F slowly increasing in accordance with OP/1/A/1102/001

INITIATING CUE

The CRS directs you to start the 1B2 RCP per OP/1/A/1103/006 Encl. 4.4 beginning with Step 2.2.1

REGION II
JOB PERFORMANCE MEASURE

AO-101

SWAP CRD FILTERS

Alternate Path: No

Alt Path Failure: ______________________________

Time Critical: No

Time Critical Criteria: ______________________________

Prepared By: ______________________________ Date:

EP Review By: ______________________________ Date:

Reviewed By: ______________________________ Date:

Approved By: ______________________________ Date:

REGION II
JOB PERFORMANCE MEASURE

Task Title : Swap CRD Filters

Task Number : N/A

Alternate Path: No

Time Critical: No

Validation Time: 20 Min

K/A Rating(s):

System: 001
K/A: G 2.3.13
Rating: 3.4/3.8

Task Standard:

Place standby CRD filter in service and remove other CRD filter from service.

References:

OP/1/A/1104/008 Component Cooling System *Rev 75*

Tools/Equipment/Procedures Needed:

OP/1/A/1104/008 Component Cooling System, Encl. 4.19 Placing 1A OR 1B CRD Filter In Service

==

Candidate: ________________________________ Time Start: ______________

NAME Time Finish: ______________

Performance Rating: SAT ______ UNSAT ______ Performance Time: _________

Examiner: ____________________________ ________________________________/_________

NAME SIGNATURE DATE

==

Comments

SIMULATOR OPERATOR JPM SETUP INSTRUCTIONS

NA

READ TO OPERATOR

DIRECTIONS TO STUDENT

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIAL CONDITIONS

The 1B CRD filter ΔP is 11 psid

It has been determined that the operating CRD filters have to be swapped

INITIATING CUES

The CRS directs you to place the 1A CRD filter in service and remove the 1B CRD filter from service using OP/1/A/1104/008 Component Cooling System, Encl. 4.19 Placing 1A OR 1B CRD Filter In Service

START TIME: _______

SEQ STEP	PROC STEP	DESCRIPTION	
1	2.1	**IF** required, place 1A CRD Filter in service: **STANDARD**: Per the cue sheet, the 1A CRD Filter will be placed in service. **COMMENTS**:	___ SAT ___ UNSAT
2	2.1.1	Ensure open 1CC-72 (1A CRD Filter Inlet). **STANDARD**: Candidate opens 1CC-72 by turning the hand wheel in the counter clockwise direction until it comes to a hard stop. **COMMENTS**:	**CRITICAL STEP** ___ SAT ___ UNSAT
3	2.1.2	Open 1CC-136 (1A CRD Filter Sightglass Outlet). **STANDARD:** Candidate opens 1CC-136 by turning hand wheel in the counter clockwise direction until it comes to a hard stop. **COMMENTS**:	___ SAT ___ UNSAT
4	2.1.3	Throttle 1CC-73 (1A CRD Filter Vent) to vent 1A CRD Filter. **STANDARD**: Candidate throttles open 1CC-73 by turning the hand wheel in the counter clockwise direction until flow is noticed in the sight glass. **Examiner Cue: Several seconds after 1CC-73 is throttled open, inform the candidate that a solid stream is noticed in the sight glass.** **COMMENTS**:	___ SAT ___ UNSAT

5	**2.1.4**	**WHEN** vented, position the following: • Close 1CC-73 (1A CRD Filter Vent) • Close 1CC-136 (1A CRD Filter Sightglass Outlet) **STANDARD:** When the candidate notices a solid stream of water in the sightglass, they close1CC-73 and 1CC-136 by turning the hand wheels in the clockwise direction until they come to a hard stop. **COMMENTS:**	**CRITICAL STEP** ___ SAT ___ UNSAT
6	**2.1.5**	Open 1CC-74 (1A CRD Filter Outlet). **STANDARD:** Candidate opens 1CC-74 by turning the valve in the counter clockwise direction until the handwheel comes to a hard stop. **COMMENTS:**	**CRITICAL STEP** ___ SAT ___ UNSAT
7	**2.1.6**	**IF** desired, remove 1B CRD Filter from service: • Close 1CC-92 (1B CRD Filter Inlet) • Close 1CC-93 (1B CRD Filter Outlet) **STANDARD:** Candidate closes 1CC-92 and 1CC-93 by turning the hand wheels in the clockwise direction until they come to a hard stop. **COMMENTS:** **END TASK**	**CRITICAL STEP** ___ SAT ___ UNSAT

TIME STOP: ________

CRITICAL STEP EXPLANATIONS

SEQ STEP #	Explanation
2	This step is required to allow flow into the CRD filter.
5	This step is required to prevent draining the CC system.
6	This step is required to place the 1A CRD filter in the fluid stream.
7	This step is required to remove the 1B CRD filter from service

CANDIDATE CUE SHEET

(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

INITIAL CONDITIONS

The 1B CRD filter ΔP is 11 psid

It has been determined that the operating CRD filters have to be swapped

INITIATING CUES

The CRS directs you to place the 1A CRD filter in service and remove the 1B CRD filter from service using OP/1/A/1104/008 Component Cooling System, Encl. 4.19 Placing 1A OR 1B CRD Filter In Service

REGION II
JOB PERFORMANCE MEASURE

AO-602

STARTUP A VITAL BUS INVERTER

Alternate Path: No

Alt Path Failure: ______________________________

Time Critical: No

Time Critical Criteria: ______________________________

Prepared By:		Date:	
EP Review By:		Date:	
Reviewed By:		Date:	
Approved By:		Date:	

REGION II
JOB PERFORMANCE MEASURE

Task Title : STARTUP A VITAL BUS INVERTER

Task Number : N/A

Alternate Path: No

Time Critical: No

Validation Time: 12 min

K/A Rating(s):

System: 062
K/A: A3.04
Rating: 2.7/2.9

Task Standard: Vital Bus Inverter placed in service correctly.

References: OP/2/A/1107/04 (Operation Of Vital Bus, Computer, ICS And Auxiliary Inverters) rev. 30

Tools/Equipment/Procedures Needed: OP/2/A/1107/04 Enclosure 4.2 (Startup of Vital Bus Inverters)
Inverter Drawing

==

Candidate: ______________________________ Time Start: _______________

NAME Time Finish: _______________

Performance Rating: SAT ______ UNSAT ______ Performance Time: _________

Examiner: ______________________________ ______________________________/__________

NAME SIGNATURE DATE

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Comments

SIMULATOR OPERATOR JPM SETUP INSTRUCTIONS

NA

READ TO OPERATOR

DIRECTIONS TO STUDENT

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIAL CONDITIONS

Unit #2 is at 100% power

Earlier today the 2DIA Vital Bus Inverter on Unit 2 was shutdown for maintenance.

I&E personnel have just notified the Control Room SRO that they have completed their work on the inverter and it is ready to be returned to service.

All tags have been cleared.

The Inverter Temporary Precharge Switch is NOT installed

The affected 120VAC Vital Instrumentation Power Panelboard is being supplied by Regulated AC Panelboard 2KRA.

OP/2/A/1107/004 Enclosure 4.2 is complete through step 1.3

INITIATING CUES

The Control Room SRO directs you to startup the 2DIA Vital Bus Inverter per OP/2/A/1107/004 Enclosure 4.2.

START TIME: _______

SEQ STEP	PROC STEP	DESCRIPTION	
1	2.1	***EXAMINER CUE: Once the 2DIA inverter is located, if desired provide the included picture to establish the as-found condition of the inverter.*** **IF** DC power to inverter was isolated, close breaker #33 on associated **<u>2DIA</u>** DC panelboard (**2DIA**, 2DIB, 2DIC, 2DID). ***EXAMINER CUE: 2DIA BKR #33 is closed.*** **<u>STANDARD</u>:** Candidate continues to step 2.2 **<u>COMMENTS</u>:**	___ SAT ___ UNSAT

<table>
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<td>2.2</td>
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NOTE:
Pressing PRECHARGE SWITCH pushbutton charges the inverter input filter capacitors and will cause the PRECHARGE light to come on. When pushbutton is released capacitors will begin to discharge. Closing DC Input breaker should be performed in a timely manner before PRECHARGE light goes off and input filter capacitors discharge.

Steps 2.2 and 2.3 need to be performed prior to placekeeping/signing 2.3. This is an exception to standard placekeeping methodology.

Perform one of the following:

2.2.1 IF temporary Precharge Switch installed in Step 1.3, press PRECHARGE SWITCH pushbutton on temporary Precharge Switch and hold for 10 - 12 seconds after PRECHARGE light comes on before releasing. {2} {4} [It is NOT installed]

2.2.2 IF temporary Precharge Switch NOT installed in Step 1.3, press PRECHARGE SWITCH pushbutton and hold for 10 - 12 seconds after PRECHARGE light comes on before releasing. {2} {4}

<u>STANDARD</u>: The candidate presses the PRECHARGE SWITCH pushbutton until the PRECHARGE light comes on and keeps the button depressed for an additional 10 - 12 seconds before releasing.

EXAMINER CUE: Indicate to the candidate that the PRECHARGE light is ON. If the pushbutton is not held for an additional 10 – 12 seconds, inform the candidate that the PRECHARGE light is now OFF.

<u>COMMENTS</u>:
</td>
<td>CRITICAL STEP

___ SAT

___ UNSAT</td>
</tr>
<tr>
<td>3</td>
<td>2.3</td>
<td>
CLOSE DC INPUT circuit breaker

<u>STANDARD</u>: The DC INPUT circuit breaker is CLOSED

EXAMINER CUE: Indicate to the candidate that the DC INPUT breaker is in the ON position.

EXAMINER NOTE: If the DC INPUT breaker is not closed in a timely manner, the PRECHARGE light will go back OFF and the DC INPUT circuit breaker will trip back open.

<u>COMMENTS</u>:
</td>
<td>CRITICAL STEP

___ SAT

___ UNSAT</td>
</tr>
</table>

4	**2.4**	IF installed in Step 1.3, ensure temporary Precharge Switch removed. **STANDARD:** Candidate should mark this step NA. **COMMENTS:**	___ SAT ___ UNSAT
5	**2.5**	Verify INVERTER OUTPUT volt meter increases to ≈ 120 Volts. **STANDARD:** Candidate verifies Inverter Output volt meter indicates 120 volts. ***Examiner Cue. If this inverter is actually operating, inform the operator that volt meter reads "as you see it". If not, use pointer or other training aid to simulate 120 Volts.*** **COMMENTS:**	___ SAT ___ UNSAT
6	**2.6**	CLOSE the INVERTER OUTPUT circuit breaker. **STANDARD:** The INVERTER OUTPUT circuit breaker is CLOSED. ***EXAMINER CUE: Indicate to the candidate that the INVERTER OUTPUT breaker is in the ON position.*** **COMMENTS:**	**CRITICAL STEP** ___ SAT ___ UNSAT
7	**2.7**	VERIFY IN SYNC light is on **STANDARD:** Green IN SYNC. light is verified ON. ***EXAMINER CUE: Indicate to candidate that the IN SYNC light is ON.*** **COMMENTS:**	___ SAT ___ UNSAT

8	2.8	POSITION the MANUAL BYPASS SWITCH to the "NORMAL SOURCE" position. **<u>STANDARD</u>:** Candidate rotates the Manual Bypass Switch from the ALTERNATE SOURCE position to the NORMAL SOURCE position. ***EXAMINER CUE: Indicate to the candidate that the Manual Bypass Switch is in the NORMAL SOURCE position.*** **<u>COMMENTS</u>:**	**CRITICAL STEP** ___ SAT ___ UNSAT
9	2.9	VERIFY the following indications: • INVERTER OUTPUT volt meter ≈ 120 volts • Inverter Output frequency meter 60.6 - 60 - 59.4Hz • INVERTER OUTPUT amp meter increases and stabilizes to match SYSTEM OUTPUT amp meter. **<u>STANDARD</u>:** The following indications are verified: • INVERTER OUTPUT volts ≈ 120. • INVERTER OUTPUT frequency meter 60.6 -60 – 59.4 Hz. • INVERTER OUTPUT amp meter increases and stabilizes to match SYSTEM OUTPUT amp meter. ***EXAMINER CUE: Provide the following indications to the candidate:*** • ***INV. OUTPUT volts = 120*** • ***INV. OUTPUT freq. = 60*** • ***INV. OUTPUT amps = 30*** • ***SYS. OUTPUT amps = 30*** **<u>COMMENTS</u>:** **END TASK**	___ SAT ___ UNSAT

TIME STOP: ________

CRITICAL STEP EXPLANATIONS

SEQ STEP #	Explanation
2	Must precharge the capacitors on the DC Bus so there will not be a low voltage when the DC Breaker is closed.
3	Necessary to provide DC input voltage to the inverter.
6	Necessary to apply NORMAL SOURCE voltage up to the Manual Bypass switch.
8	Applies Inverter AC output voltage from the NORMAL SOURCE to the Vital Bus Panelboards (Loads the Inverter).

<u>CANDIDATE CUE SHEET</u>

(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

<u>INITIAL CONDITIONS</u>

Unit #2 is at 100% power

Earlier today the <u>2DIA</u> Vital Bus Inverter on Unit 2 was shutdown for maintenance.

I&E personnel have just notified the Control Room SRO that they have completed their work on the inverter and it is ready to be returned to service.

All tags have been cleared.

The Inverter Temporary Precharge Switch is NOT installed

The affected 120VAC Vital Instrumentation Power Panelboard is being supplied by Regulated AC Panelboard 2KRA.

OP/2/A/1107/004 Enclosure 4.2 is complete through step 1.3

<u>INITIATING CUES</u>

The Control Room SRO directs you to startup the 2DIA Vital Bus Inverter per OP/2/A/1107/004 Enclosure 4.2.

REGION II
JOB PERFORMANCE MEASURE

AO-802a

ISOLATE HPSW AND LPSW DURING AN AB FLOOD

Alternate Path: Yes

Alt Path Failure: HPSW-959 will not close

Time Critical: No

Time Critical Criteria: ______________________

Prepared By: ______________________ Date:

EP Review By: ______________________ Date:

Reviewed By: ______________________ Date:

Approved By: ______________________ Date:

REGION II
JOB PERFORMANCE MEASURE

Task Title : Isolate HPSW and LPSW during an AB Flood

Task Number : N/A

Alternate Path: Yes

Time Critical: No

Validation Time: 16 min

K/A Rating(s):

System: BW/A07
K/A: AA2.2
Rating: 3.3/3.7

Task Standard:

Isolate portions of the HPSW and LPSW systems during an AB Flood using AP/3/A/1700/030 AUXILIARY BUILDING FLOOD

References: AP/3/A/1700/030 Rev 18

Tools/Equipment/Procedures Needed: AP/3/A/1700/030 Encl. 5.1 (HPSW AB Flood Isolation) and Encl. 5.2 (LPSW AB Flood Isolation)

==

Candidate: ________________________________ Time Start: ______________

NAME Time Finish: ______________

Performance Rating: SAT ______ UNSAT ______ Performance Time: _________

Examiner: ____________________________ ________________________________/_________

NAME SIGNATURE DATE

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Comments

SIMULATOR OPERATOR JPM SETUP INSTRUCTIONS

NA

READ TO OPERATOR

DIRECTIONS TO STUDENT

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIAL CONDITIONS

All 3 units are at 100% power

Unit 3 Auxiliary Building flooding is occurring

The source of flood water has not yet been determined

INITIATING CUES

The Control Room Supervisor directs you to perform AP/3/A/1700/030 Encl. 5.1 (HPSW AB Flood Isolation) AND Encl. 5.2 (LPSW AB Flood Isolation)

START TIME: _______

SEQ STEP	PROC STEP	DESCRIPTION	
1		***Examiner Note: If candidate performs Enclosure 5.2 first, it begins on JPM step 7.***	
2	En.5.1 1	**IAAT** the source of flooding is isolated, **THEN** notify Control Room. **STANDARD:** The candidate notes the source of flooding is not isolated. **CUE: If asked, flooding is still occurring.** Candidate continues to step 2. **COMMENTS:**	___ SAT ___ UNSAT
3	2	**NOTE** Keys for valve locks are available in any Emergency Equipment cabinet. **[ALTERNATE PATH]** Close HPSW-959 (HPSW SUPPLY TO FLOW LIMITER BLOCK VALVE) (T-1/M-21 south, west of RCW Heat Exchangers). **STANDARD:** The candidate locates and attempts to close HPSW-959. ***Examiner Note: Operators would normally carry keys to these locks.*** ***Examiner Cue: When the candidate locates and attempts to close HPSW-959, inform candidate that HPSW-959 chain will not move.*** Candidate continues to step 2 RNO. **COMMENTS:**	___ SAT ___ UNSAT

4	2 RNO	Close HPSW-962 (HPSW SUPPLY TO AUX BLDG BLOCK VALVE) (T-1/M-21 south, west of RCW Heat Exchangers). **STANDARD**: The candidate locates and closes HPSW-962 rotating it in the clockwise direction until it stops. ***Cue: When the candidate rotates the hand wheel in the clockwise direction, inform the candidate that HPSW-962 is fully clockwise and on the hard stop.*** Candidate continues to step 3. **COMMENTS**:	**CRITICAL STEP** ___ SAT ___ UNSAT
5	3	Notify control Room HPSW isolation is complete. **STANDARD**: The candidate notifies the control Room HPSW isolation is complete. Candidate continues to step 4. **COMMENTS**:	___ SAT ___ UNSAT
6	4	**EXIT** this enclosure. **STANDARD**: Candidate EXITS enclosure 5.1 and proceeds to Enclosure 5.2 **COMMENTS**:	___ SAT ___ UNSAT

7	**En.5.2** **1**	**IAAT** the source of flooding is isolated, **THEN** notify Control Room. **STANDARD:** The candidate notes the source of flooding is not isolated. **CUE: If asked, flooding is still occurring.** Candidate continues to step 2 **COMMENTS:**	___ SAT ___ UNSAT
8	**2**	Close 3LPSW-844 (AUX BLDG AHU SUPPLY) (T-1/M-46, 6' SE). **STANDARD:** The candidate locates and closes 3LPSW-844 rotating it in the clockwise direction until it stops. ***Cue: When the candidate rotates the hand wheel in the clockwise direction, inform the candidate that the valve is fully clockwise and on the hard stop.*** Candidate continues to step 3. **COMMENTS:**	**CRITICAL STEP** ___ SAT ___ UNSAT
9	**3**	Close 3LPSW-770 (AUX BLDG AHU SUPPLY) (T-1/M-46, 8' S). **STANDARD:** The candidate locates and closes 3LPSW-770 rotating it in the clockwise direction until it stops.. ***Cue: When the candidate rotates the hand wheel in the clockwise direction, inform the candidate that the valve is fully clockwise and on the hard stop.*** Candidate continues to step 4. **COMMENTS:**	**CRITICAL STEP** ___ SAT ___ UNSAT

10	**4**	Open 3LPSW-501 (UNIT 3 AHU RETURN TO STORM DRAINS) (T-1/L-47, W 12' up). **STANDARD:** The candidate locates and opens 3LPSW-501rotating it in the counter-clockwise direction until it stops. ***Cue: When the candidate rotates the hand wheel in the counter clockwise direction, inform the candidate that the valve is on the hard stop.*** Candidate continues to step 5. **COMMENTS:**	___ SAT ___ UNSAT
11	**5**	Close 3LPSW-500 (UNIT 3 AHU RETURN TO CCW DISCHARGE) (T-1/L-47, NW 12' up). **STANDARD:** The candidate locates and closes 3LPSW-500 rotating it in the clockwise direction until it stops. ***Cue: When the candidate rotates the hand wheel in the clockwise direction, inform the candidate that the valve is fully clockwise and on the hard stop.*** Candidate continues to step 6. **COMMENTS:**	**CRITICAL STEP** ___ SAT ___ UNSAT
12	**6**	Notify Unit 3 control Room LPSW isolation is complete. **STANDARD:** The candidate notifies the control Room LPSW isolation is complete. Candidate continues to step 7. **COMMENTS:**	___ SAT ___ UNSAT

13	7	**EXIT** this enclosure. **STANDARD:** Candidate EXITS enclosure 5.2 and returns CUE Sheet to examiner. **COMMENTS:** **END TASK**	___ SAT ___ UNSAT

TIME STOP: ________

CRITICAL STEP EXPLANATIONS

SEQ STEP #	Explanation
4	Step ensures proper isolation of HPSW leak.
8	Step ensures proper isolation of LPSW leak.
9	Step ensures proper isolation of LPSW leak.
11	Step ensures proper isolation of LPSW leak.

CANDIDATE CUE SHEET

(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

INITIAL CONDITIONS

All 3 units are at 100% power

Unit 3 Auxiliary Building flooding is occurring

The source of flood water has not yet been determined

INITIATING CUES

The Control Room Supervisor directs you to perform AP/3/A/1700/030 Encl. 5.1 (HPSW AB Flood Isolation) AND Encl. 5.2 (LPSW AB Flood Isolation)

REGION II
JOB PERFORMANCE MEASURE

Admin 106

CALCULATE RUN TIME FOR DEBORATING DEMINERALIZER

Alternate Path: (No)

Alt Path Failure: ____________________

Time Critical: (No)

Time Critical Criteria: ____________________

Prepared By: ____________________ Date:

EP Review By: ____________________ Date:

Reviewed By: ____________________ Date:

Approved By: ____________________ Date:

REGION II
JOB PERFORMANCE MEASURE

Task Title: Calculate Run Time for Deborating Demineralizer

Task Number: N/A

Alternate Path: No

Time Critical: No

Validation Time: 20 Min

K/A Rating(s):

System: Gen
K/A: 2.1.37
Rating: 4.3/4.6

Task Standard: Calculate the Run Time and volume "flowed thru the IX" for the Deborating IX by procedure.

References:
OP/1/A/1103/004 (Soluble Poison Control) Rev 105
OP/1/A/1103/004 C (Deborating IXs) Rev 25

Tools/Equipment/Procedures Needed:
OP/1/A/1103/004C (Deborating IXs) Enclosure 4.2 (Unit 1 Deborating IX For RCS Deboration (Rx at power)
OP/1/A/1103/004 (Soluble Poison Control) Encl 4.1

==

Candidate: ______________________________ Time Start: _____________

NAME Time Finish: _____________

Performance Rating: SAT ______ UNSAT ______ Performance Time: _________

Examiner: ___________________________ ______________________________/_________

NAME SIGNATURE DATE

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Comments

SIMULATOR OPERATOR JPM SETUP INSTRUCTIONS

NA

READ TO OPERATOR

DIRECTIONS TO STUDENT

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIAL CONDITIONS

Unit 1 is at 100% full power

Current RCS Boron concentration is 50 ppmB

Letdown Flow is 78 gpm with BOTH Letdown Filters in service

The OAC is **NOT** available

Assume 1 ppm for IX effluent

OP/1/A/1103/004 C (Deborating IXs) Enclosure 4.2 (Unit 1 Deborating IX For RCS Deboration (Rx At Power) is in progress and has been completed through Step 1.6

INITIATING CUE

The Unit 1 CRS directs you to perform Enclosure 4.2 steps 2.1 – 2.2 to determine the volume of RCS that must be flowed through the Unit 1 Deborating IX <u>and</u> the corresponding Deborating IX run time to reduce the RCS Boron concentration to <u>45 ppmB</u>.

SHOW ALL WORK
Round calculations to three (3) decimal places.

Volume of RCS thru the IX ____________ Gallons

Deborating IX run Time ____________ Minutes

START TIME: _______

SEQ STEP	PROC STEP	DESCRIPTION	
1	2.1	Determine volume required to make desired RCS boron change: **NOTE:** Placing an idle Letdown Filter in service can affect core reactivity by adding ≈ 60 gals of water at a different boron concentration. (R.M.) 2.1.1 **IF** two Letdown Filters are available **AND NOT** already in service, perform the following: ____A. Review Component Boron Log for out-of-service Letdown Filter boron. ____B. Determine final RCS boron based on placing Letdown Filter in service. 2.1.2 Review Demineralizer Log Sheet to determine IX effluent boron or assume 1 ppm for IX effluent. 2.1.3 Determine volume required to get desired RCS boron change. *2.1.4 Volume required ____________gallons. **STANDARD**: Determine two Letdown Filters are in service and N/A Step 2.1.1 Assume 1 ppm for IX effluent Refer to OP/1/A/1103/004 (Soluble Poison Control) to determine RCS Hot Volume = 58,681 gal $B = B_o e^{-Ft/V}$ B_o = Initial Conc (ppm) B = Final Conc (ppm) F = Feed and Bleed Flow Rate (gpm) V = Total System Volume t = Time Feed and Bleed (min) $-(\ln B/B_o) \times V = t/F$ = volume passing through the IX **-(ln 45/50) 58,681 gal = 6182.660 gal** **- (-0.105) 58,681 gal = 6161.505 gal (ln 45/50 Rounded)** **<u>6182 gallons</u>. (6161 – 6183)** **Note: The order the calculations are performed is not critical.** **COMMENTS**:	***CRITICAL STEP** ___ SAT ___ UNSAT

<table>
<tr>
<td>2</td>
<td>2.2</td>
<td>
NOTE: Allowing Unit 1 Deborating IX to be in service an incorrect amount of time can change final RCS boron and cause unanticipated reactivity changes. (R.M.)

Calculate Unit 1 Deborating IX run time: (R.M.)

Run Time = Volume required ÷ letdown flow

_____ Run Time (minutes) = Volume _____ gal ÷ letdown flow _____ (gpm)

<u>STANDARD</u>: Determine run Time is <u>79.265 minutes.</u> (78.9 to 79.3)

<u>79.265</u> Run Time (minutes) = Volume <u>6182.660</u> gal ÷ letdown flow <u>78</u> (gpm)

$\begin{array}{c|c|l} \textit{6161 gal} & \textit{min} & = \textit{78.987 min} \\ \hline & \textit{78 gal} & \end{array}$

$\begin{array}{c|c|l} \textit{6183 gal} & \textit{min} & = \textit{79.269 min} \\ \hline & \textit{78 gal} & \end{array}$

<u>COMMENTS</u>:
</td>
<td>CRITICAL STEP

___ SAT

___ UNSAT</td>
</tr>
</table>

TIME STOP: ________

CRITICAL STEP EXPLANATIONS

SEQ STEP #	Explanation
1	This step is required to determine the volume of water thru the Demin to change the RCS Boron concentration.
2	This step is required to determine the amount of time letdown will be diverted thru the Demin.

CANDIDATE CUE SHEET

(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

INITIAL CONDITIONS

Unit 1 is at 100% full power

Current RCS Boron concentration is 50 ppmB

Letdown Flow is 78 gpm with BOTH Letdown Filters in service

The OAC is **NOT** available

Assume 1 ppm for IX effluent

OP/1/A/1103/004 C (Deborating IXs) Enclosure 4.2 (Unit 1 Deborating IX For RCS Deboration (Rx At Power) is in progress and has been completed through Step 1.6

INITIATING CUE

The Unit 1 CRS directs you to perform Enclosure 4.2 steps 2.1 – 2.2 to determine the volume of RCS that must be flowed through the Unit 1 Deborating IX and the corresponding Deborating IX run time to reduce the RCS Boron concentration to 45 ppmB.

SHOW ALL WORK

Volume of RCS thru the IX ____________ Gallons

Deborating IX run Time ____________ Minutes

REGION II
JOB PERFORMANCE MEASURE

ADMIN S106

EVALUATE ITEMS FOR ENTRY INTO CONTAINMENT

Alternate Path: (No)

Alt Path Failure: ______________________

Time Critical: (No)

Time Critical Criteria: ______________________

Prepared By: ______________________ Date:

EP Review By: ______________________ Date:

Reviewed By: ______________________ Date:

Approved By: ______________________ Date:

REGION II
JOB PERFORMANCE MEASURE

Task Title: Evaluate the list of items and determine if they can be taken into Containment while in Mode 4

Task Number: N/A

Alternate Path: No

Time Critical: No

Validation Time: (15 Min)

K/A Rating(s):

System: Gen
K/A: 2.1.13
Rating: 2.5/3.2

Task Standard: Evaluate the list of items provided to determine if they can be carried into containment.

References: SD 1.3.9 - Containment Material Control Rev 14

Tools/Equipment/Procedures Needed: SD 1.3.9 - Containment Material Control

==

Candidate: ______________________________ NAME

Time Start: _______________
Time Finish: _______________

Performance Rating: SAT ______ UNSAT ______

Performance Time: _________

Examiner: ______________________________ NAME ______________________________ SIGNATURE / _________ DATE

==

Comments

SIMULATOR OPERATOR JPM SETUP INSTRUCTIONS

NA

READ TO OPERATOR

DIRECTIONS TO STUDENT

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIAL CONDITIONS

Unit startup in progress

Reactor is in MODE 4

Startup has been delayed waiting on completion of valve repair inside Containment

Valve work is taking place outside the secondary shielding on the 2nd grating level

You are working as the WCC SRO

INITIATING CUES

The containment hatch monitor has requested you evaluate the list of items provided to determine if they can be carried into containment by the crew performing the valve repairs

Indicate on the attached list if each item is allowed to be carried into Containment to facilitate the repairs

START TIME: _______

SEQ STEP	PROC STEP	DESCRIPTION	
1		Evaluate red 1 gallon plastic bucket. **STANDARD**: Determines that the red bucket can be taken into containment per SD 1.3.9, Enclosure 7.5, 4.M.2 (Pg 24/35). **COMMENTS**:	___ SAT ___ UNSAT
2		Evaluate yellow plastic bag with wrenches. **STANDARD**: Determines that the bag with wrenches is allowed into containment per SD 1.3.9, Enclosure 7.5, 4.I.1 (Pg 22/35). **COMMENTS**:	___ SAT ___ UNSAT
3		Evaluate 25 feet of nylon rope with ends melted **STANDARD:** Determines that the nylon rope can be taken into containment per SD 1.3.9, Enclosure 7.5, 4.D (Pg 21/35). **COMMENTS**:	___ SAT ___ UNSAT
4		Evaluate roll of gray Duct Tape **STANDARD**: Determines the roll of Duct Tape can NOT be taken into Containment per SD 1.3.9, Enclosure 7.5, 4.B.3 (Pg 21/35). **COMMENTS**:	**CRITICAL STEP** ___ SAT ___ UNSAT

5		Evaluate the Electric Wrench **STANDARD:** Determines that the electric wrench can be taken into containment per SD 1.3.9, Enclosure 7.5, 4.I.1 (Pg 22/35). **COMMENTS:**	___ SAT ___ UNSAT
6		Evaluate the two sockets **STANDARD:** Determines that the sockets can be taken into containment per SD 1.3.9, Enclosure 7.5, 4.I.1 (Pg 22/35). **COMMENTS:**	___ SAT ___ UNSAT
7		Evaluate the valve wrapped in clear poly **STANDARD:** Determines that the valve wrapped in clear poly can NOT be taken into containment due to the clear poly per SD 1.3.9, Enclosure 7.5, 4.H.7 (Pg 22/35). ***CUE: If asked, no engineering evaluation has been performed to allow the clear poly to be taken into containment.*** **COMMENTS:**	**CRITICAL STEP** ___ SAT ___ UNSAT
8		Evaluate the absorptive paper **STANDARD:** Determines that the absorptive paper can be taken into containment per SD 1.3.9, Enclosure 7.5, 4.A since it is not > 25 sq. ft (Pg 20/35). **COMMENTS:**	___ SAT ___ UNSAT

9		Evaluate the hammer **STANDARD:** Determines that the hammer can be taken into containment per SD 1.3.9, Enclosure 7.5, 4.I.1 (Pg 22/35). **COMMENTS:** **END TASK**	___ SAT ___ UNSAT

TIME STOP: ________

CRITICAL STEP EXPLANATIONS

SEQ STEP #	Explanation
4	Critical to prevent Chloride and Fluoride stress corrosion on stainless steel piping inside containment
7	Critical to prevent blockage of the LPI Emergency Sump suction path during a LOCA.

CANDIDATE CUE SHEET

(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

INITIAL CONDITIONS

Unit startup in progress

Reactor is in MODE 4

Startup has been delayed waiting on completion of valve repair inside Containment

Valve work is taking place outside the secondary shielding on the 2nd grating level

You are working as the WCC SRO

INITIATING CUES

The containment hatch monitor has requested you evaluate the list of items provided to determine if they can be carried into containment by the crew performing the valve repairs

Indicate on the attached list if each item is allowed to be carried into Containment to facilitate the repairs

List of items for evaluation:

Assume all items will be documented as taken in and then removed from Containment when the crew leaves unless otherwise indicated.

1) Red 1 gallon plastic bucket. _______

2) *Yellow plastic bag that contains contaminated tools. _______

   *Per maintenance the bag contains two Stainless Steel wrenches (3/4” and 1”).

3) 25 feet of nylon rope with ends melted. ______

4) Roll of gray duct tape. ______

5) Electric wrench. ______

6) 2 sockets (3/4” and 1”). ______

7) 2” valve wrapped in clear poly. ______

   *A PIP has already been generated by Maintenance directing engineering to evaluate leaving the poly inside containment if this crew has to leave RB before repairs are completed. The evaluation is in progress.

8) 10 feet X 2 feet sheet of absorptive paper. ______

9) Hammer ______

REGION II
JOB PERFORMANCE MEASURE

ADMIN 107

DETERMINE IF RO LICENSE REQUIREMENTS ARE MET

Alternate Path: (No)

Alt Path Failure: ________________________________

Time Critical: (No)

Time Critical Criteria: ________________________________

Prepared By: ____________________ Date: __________

EP Review By: ____________________ Date: __________

Reviewed By: ____________________ Date: __________

Approved By: ____________________ Date: __________

REGION II
JOB PERFORMANCE MEASURE

Task Title: Determine if RO License requirements are met per NSD 512 for minimum On-Shift Experience

Task Number: N/A

Alternate Path: No

Time Critical: No

Validation Time: 15 Min

K/A Rating(s):

System: Gen
K/A: 2.1.4
Rating: 3.3/3.8

Task Standard: Completes Form 512-1 and determines requirements of NSD 512 are NOT met.

References: NSD 512 (Maintenance of RO/SRO NRC Licenses) Rev 7

Tools/Equipment/Procedures Needed: NSD 512 (Maintenance of RO/SRO NRC Licenses)

==

Candidate: ______________________________ Time Start: ____________

NAME Time Finish: ____________

Performance Rating: SAT ______ UNSAT ______ Performance Time: _________

Examiner: ___________________________ ______________________________/__________

NAME SIGNATURE DATE

==

Comments

SIMULATOR OPERATOR JPM SETUP INSTRUCTIONS

NA

READ TO OPERATOR

DIRECTIONS TO STUDENT

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIAL CONDITIONS

Today's date is 10/29/15. You are a Reactor Operator. Your work history for October of this year is as follows:

10/12/15	Worked 12 hours as BOP on Unit 1 (day shift). Took turnover at beginning of shift and gave turnover at end of shift.
10/13/15	Worked 8 hours as OATC on Unit 1 and 4 hours OATC doing crew JIT training on Simulator A (day shift). Took turnover at beginning and gave turnover at end of both of these assignments.
10/14/15	Worked 10 hours as BOP on Unit 1 (day shift). Took turnover at beginning of shift.
10/19/15	Worked 12 hours as BOP on Unit 1 (night shift). Took turnover at beginning of shift and gave turnover at end of shift.
10/20/15	Worked 12 hours as OATC on Unit 3 (night shift). Took turnover at beginning of shift and gave turnover at end of shift.
10/21/15	Worked 6 hours as OATC on Unit 3 and 6 hours as BOP on Unit 1 (night shift). Took turnover at beginning of shift and did NOT give turnover at end of shift.
10/27/15	Worked 12 hours as AO on Unit 3 (day shift). Took turnover at beginning of shift and gave turnover at end of shift.

INITIATING CUES

The SM directs you to review your work history for October, complete Section 3 of form NSD 512-1 based on the above work history, and determine if you meet NSD 512 requirements to maintain an active RO license for the following quarter.

START TIME: _______

SEQ STEP	PROC STEP	DESCRIPTION	
		Examiner note: Evaluating each work period is a critical step. The initiating cue is to fill out Section 3 of NSD 512. In filling out Section 3, the operator is stating which shifts DO count. So by filling in the shifts that count, the operator is in effect, stating the other shifts DO NOT count so they have addressed all 7 shifts.	
1		Evaluate 10/12/15 work period **STANDARD:** Determines that requirement is met and adds this period to Form 512-1. Required position for 12 hrs. with Turnover at beginning and end of shift. **COMMENTS:**	**CRITICAL STEP** ___ SAT ___ UNSAT
2		Evaluate 10/13/15 work period **STANDARD:** Determines that requirement is not met because Simulator time does not count toward maintain RO license requirements **COMMENTS:**	**CRITICAL STEP** ___ SAT ___ UNSAT
3		Evaluate 10/14/15 work period **STANDARD:** Determines that requirement is not met. No turnover at end of shift, <12hrs worked in position. **COMMENTS:**	**CRITICAL STEP** ___ SAT ___ UNSAT

4		Evaluate 10/19/15 work period **STANDARD**: Determines that requirement is met and adds this period to Form 512-1. Required position for 12 hrs. with Turnover at beginning and end of shift. **COMMENTS**:	**CRITICAL STEP** ___ SAT ___ UNSAT
5		Evaluate 10/20/15 work period **STANDARD**: Determines that requirement is met and adds this period to Form 512-1. Required position for 12 hrs. with Turnover at beginning and end of shift. **COMMENTS**:	**CRITICAL STEP** ___ SAT ___ UNSAT
6		Evaluate 10/21/15 work period **STANDARD**: Determines that requirement is not met. No turnover at end of shift and position not filled for entire shift. **COMMENTS**:	**CRITICAL STEP** ___ SAT ___ UNSAT
7		Evaluate 10/27/15 work period **STANDARD**: Determines that NEO is not a required position and cannot be credited toward maintenance of RO license **COMMENTS**:	**CRITICAL STEP** ___ SAT ___ UNSAT

8		Compares credited time vs minimum requirements **STANDARD:** Determines that there are only 3 12 hour shifts that can be credited and therefore his minimum fourth quarter requirements to maintain his active RO License are not met. **COMMENTS:**	**CRITICAL STEP** ___ SAT ___ UNSAT

TIME STOP: ________

CRITICAL STEP EXPLANATIONS

SEQ STEP #	Explanation
1	Required to determine if minimum On Shift Experience requirements of NSD 512 have been met
2	Required to determine if minimum On Shift Experience requirements of NSD 512 have been met.
3	Required to determine if minimum On Shift Experience requirements of NSD 512 have been met.
4	Required to determine if minimum On Shift Experience requirements of NSD 512 have been met.
5	Required to determine if minimum On Shift Experience requirements of NSD 512 have been met.
6	Required to determine if minimum On Shift Experience requirements of NSD 512 have been met.
7	Required to determine if minimum On Shift Experience requirements of NSD 512 have been met.
8	This step makes the determination regarding minimum license requirement.

CANDIDATE CUE SHEET

(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

INITIAL CONDITIONS

Today's date is 10/29/15. You are a Reactor Operator. Your work history for October of this year is as follows:

10/12/15	Worked 12 hours as BOP on Unit 1 (day shift). Took turnover at beginning of shift and gave turnover at end of shift.
10/13/15	Worked 8 hours as OATC on Unit 1 and 4 hours OATC doing crew JIT training on Simulator A (day shift). Took turnover at beginning and gave turnover at end of both of these assignments.
10/14/15	Worked 10 hours as BOP on Unit 1 (day shift). Took turnover at beginning of shift.
10/19/15	Worked 12 hours as BOP on Unit 1 (night shift). Took turnover at beginning of shift and gave turnover at end of shift.
10/20/15	Worked 12 hours as OATC on Unit 3 (night shift). Took turnover at beginning of shift and gave turnover at end of shift.
10/21/15	Worked 6 hours as OATC on Unit 3 and 6 hours as BOP on Unit 1 (night shift). Took turnover at beginning of shift and did NOT give turnover at end of shift.
10/27/15	Worked 12 hours as AO on Unit 3 (day shift). Took turnover at beginning of shift and gave turnover at end of shift.

INITIATING CUES

The SM directs you to review your work history for October, complete Section 3 of form NSD 512-1 based on the above work history, and determine if you meet NSD 512 requirements to maintain an active RO license for the following quarter.

FORMS

Form 512-1~~512-1512-1512-1 Documentation~~ Documentation of Operating Experience Maintenance for Active Licensed Operators

1. Licensee's Name ______________________ ____________________________

Employee Number

NOTE: Time as the extra RO/SRO on a Outage Unit or as a RO/SRO in the Outage Control Center can not be counted as an ACTIVE LICENSED OPERATOR position.

2. **ACTIVE LICENSED OPERATOR POSITION**
   a. Shift Manager (SRO)
   b. Control Room Supervisor (SRO)
   c. Operator at the Controls (RO)
   d. Balance of Plant Operator (RO)
3. A minimum of five 12-hour shifts per calendar quarter performing one or more of the functions listed in item 2 shall be worked and documented below to maintain active status. The position must be filled for the entire shift period including both turnovers to obtain credit.

Licensed Duty Letter (A - D)	Shift Start Date (Month/Day/Year)	Shift (day / night)
D	10/12/15	day
D	10/19/15	night
C	10/20/15	night

4. I hereby certify that the information set forth above is accurate and complete.

   Licensed Operator Signature ______________________________
5. When complete, send a copy of this form to Operations Administrative Support and keep a copy for your personal records.
6. Update /verify LOQR Initial _____ Date_____
7. Send completed form to Operations Training Group for filing with the individuals training record.

REGION II
JOB PERFORMANCE MEASURE

ADMIN 203

PERFORM NI SURVEILLANCE AND DETERMINE ANY REQUIRED ACTIONS

Alternate Path: (No)

Alt Path Failure: ____________________

Time Critical: (No)

Time Critical Criteria: ____________________

Prepared By: ____________________ Date:

EP Review By: ____________________ Date:

Reviewed By: ____________________ Date:

Approved By: ____________________ Date:

REGION II
JOB PERFORMANCE MEASURE

Task Title: Perform NI Surveillance and Determine Any Required Actions

Task Number: N/A

Alternate Path: (No)

Time Critical: (No)

Validation Time: (10 Min)

K/A Rating(s):

System: Gen
K/A: 2.2.12
Rating: 3.7/4.1

Task Standard: Perform SR 3.3.1.2 in accordance with PT/1/A/0600/001 (Periodic Instrument Surveillance) and determine that actions should be taken to correct NI calibration but a PIP is NOT required.

References:
PT/1/A/0600/001 (Periodic Instrument Surveillance) Rev 336
OP/1/A/1102/004 (Operation at Power) Rev 144

Tools/Equipment/Procedures Needed:
PT/1/A/0600/001 (Periodic Instrument Surveillance)
OP/1/A/1102/004 (Operation at Power)

===

Candidate: ______________________________ Time Start: ____________
NAME Time Finish: ____________

Performance Rating: SAT _____ UNSAT _____ Performance Time: ________

Examiner: __________________________ ______________________________/________
NAME SIGNATURE DATE

===

Comments

SIMULATOR OPERATOR JPM SETUP INSTRUCTIONS

NA

READ TO OPERATOR

DIRECTIONS TO STUDENT

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIAL CONDITIONS

Power escalation to 100% concluded at midnight last shift

Current Time is 07:30

Power history is attached

INITIATING CUES

Using the attached power history, you are to perform the Day Shift RPS Instrumentation Heat Balance Check Power Range Amplifiers Surveillance (SR 3.3.1.2) on Page 8 of 29 of PT/1/A/0600/001 (Periodic Instrument Surveillance) Enclosure 13.1 (Mode 1&2) and determine the current minimum actions required (if any) and reason at Time = 0730. Assume NO previous actions have been taken.

START TIME: _______

SEQ STEP	PROC STEP	DESCRIPTION	
1		Determine if the unit is at Steady State **NOTE:** Steady State is defined as being +2% of a steady power level for > 4 hours **STANDARD:** Using the NOTE above and the attached power history, determine that the unit is at Steady State as defined by this surveillance (+2% of a steady power level for > 4 hours). **COMMENTS:**	___ SAT ___ UNSAT
2		**IF** in Mode 1 during steady state conditions **AND** Rx Power > 90% power, verify Rx Power within applicable limits: • Refer to Limits and Precautions of OP/1/A/1102/004 (Operation At Power) for applicable limits. **STANDARD:** Candidate refers to Limits and Precautions of OP/1/A/1102/004 (Operation At Power) L&P 2.2.6.C.1 **COMMENTS:**	___ SAT ___ UNSAT
3		Determine the magnitude of NI offset. **STANDARD:** Candidate refers to the power history provided and determines: At 0700 CTP was 99.9876% and NI-5 was 97.71% and therefore NI-5 is out of calibration by 2.286% At 0730 CTP is 99.996% and NI-5 = 97.91% therefore NI-5 is out of calibration by 2.086% **COMMENTS:**	**CRITICAL STEP** ___ SAT ___ UNSAT

4		Determine if NI offset is conservative or non-conservative. **STANDARD**: Candidate refers to the Note for limit and precaution step 2.2.5 and determines that NI-5 is non-conservative since Core Thermal Power is > NI-5. **COMMENTS**:	**CRITICAL STEP** ___ SAT ___ UNSAT
5		Determine which Limit and Precaution contains guidance needed. **STANDARD**: Based on power history, 2.2.6 C applies since it is for use “During operation with Reactor > 90% CTP (power maneuvering OR steady state)” **COMMENTS**	___ SAT ___ UNSAT
6		Determine actions required by Limit and Precaution 2.2.6 C. **STANDARD**: Determine that the following is required: • Take actions to restore NI’s to allowable range (perform NI calibration) **Note: Since NI’s have been out by 2% for $\leq$ 2 hours, the actions of 2.2.6.C.1 (Stop power increase and take actions to restore NIs to allowable range) are required .** **2.2.6.C.2 (Generate PIP describing occurrence and Consult with Rx Eng) are NOT required.** **COMMENTS**	**CRITICAL STEP** ___ SAT ___ UNSAT

TIME STOP: ________

CRITICAL STEP EXPLANATIONS

SEQ STEP #	Explanation
3	Determining the magnitude of NI error is required to determine the correct NI tolerance allowed for the current plant conditions.
4	Determining that NI's are non-conservative is required to determine the correct NI tolerance allowed for the current plant conditions
6	These actions are required based on current status of NI's to ensure Safety Analysis assumptions are met

CANDIDATE CUE SHEET

(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

INITIAL CONDITIONS

Power escalation to 100% concluded at midnight last shift

Current Time is 07:30

Power history is attached

INITIATING CUES

Using the attached power history, you are to perform the Day Shift RPS Instrumentation Heat Balance Check Power Range Amplifiers Surveillance (SR 3.3.1.2) on Page 8 of 29 of PT/1/A/0600/001 (Periodic Instrument Surveillance) Enclosure 13.1 (Mode 1&2) and determine the current minimum actions required (if any) and reason at Time = 0730. Assume NO previous actions have been taken.

Unit 1 Power history is as follows:

	O1P0899 Core Thermal Power	O1E4066 NI-5	O1E4067 NI-6	O1E4068 NI-7	O1E4069 NI-8
0500	99.962%	99.79%	99.99%	99.99%	99.99%
0700	99.987%	97.71%	100.00%	99.91%	100.01%
0715	100.001%	97.88%	99.99%	99.98%	99.99%
0730	99.996%	97.91%	100.00%	100.00%	100.00%

REGION II
JOB PERFORMANCE MEASURE

ADMIN S202

Complete a Surveillance Evaluation

Alternate Path: (No)

Alt Path Failure: ______________________________

Time Critical: (No)

Time Critical Criteria: ______________________________

Prepared By: ______________________________ Date:

EP Review By: ______________________________ Date:

Reviewed By: ______________________________ Date:

Approved By: ______________________________ Date:

REGION II
JOB PERFORMANCE MEASURE

Task Title: Complete PT/1/A/0600/001 (Periodic Instrument Surveillance) Encl. 13.12 (Surveillance Evaluation

Task Number : N/A

Alternate Path: No

Time Critical: No

Validation Time: 20 Min

K/A Rating(s):

System: Gen
K/A: 2.2.12
Rating: 3.7/4.1

Task Standard: Complete PT/1/A/0600/001 (Periodic Instrument Surveillance) Encl. 13.12 (Surveillance Evaluation)

References:
PT/1/A/0600/001 (Periodic Instrument Surveillance) Encl. 13.2 (Mode 3) page 25 of 26 Rev 336
PT/1/A/0600/001 (Periodic Instrument Surveillance) Encl. 13.9 (RCP Power Supply Verification)
PT/1/A/0600/001 (Periodic Instrument Surveillance) Encl. 13.12 (Surveillance Evaluation)

Tools/Equipment/Procedures Needed:

PT/1/A/0600/001 (Periodic Instrument Surveillance) Encl. 13.2 (Mode 3) page 25 of 26
PT/1/A/0600/001 (Periodic Instrument Surveillance) Encl. 13.9 (RCP Power Supply Verification)
PT/1/A/0600/001 (Periodic Instrument Surveillance) Encl. 13.12 (Surveillance Evaluation)
Surveillance Frequency List

==

Candidate: ______________________________ Time Start: ______________

NAME Time Finish: ______________

Performance Rating: SAT ______ UNSAT ______ Performance Time: _________

Examiner: ____________________________ ______________________________/__________

NAME SIGNATURE DATE

==

Comments

SIMULATOR OPERATOR JPM SETUP INSTRUCTIONS

NA

READ TO OPERATOR

DIRECTIONS TO STUDENT

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIAL CONDITIONS

Time/Date = 0830 on Saturday, June 8.

RCS Temperature = 298°F.

1/0 RCP operation in progress (1A1 RCP in operation).

PT/1/A/0600/001 (Periodic Instrument Surveillance) Encl. 13.2 (Mode 3) in progress.

SR 3.4.5.2 on page 25 of 26 of PT/1/A/0600/001 (Periodic Instrument Surveillance) Encl. 13.2 (Mode 3) is being performed.

Step 2.2 of Encl. 13.9 (RCP Power Supply Verification) is determined to NOT be satisfied because neither the 1B1 nor the 1B2 RCP has power available.

INITIATING CUE

Based on the above conditions, complete PT/1/A/0600/001 (Periodic Instrument Surveillance) Encl. 13.12 (Surveillance Evaluation)

START TIME: _______

SEQ STEP	PROC STEP	DESCRIPTION	
1	2.1	Surveillance Description: **STANDARD:** Documents that this is a Tech Spec required verification of correct RCP breaker alignment of power available to the required pump this is not in operation **COMMENTS:**	___ SAT ___ UNSAT
2	2.2	Applicable TS(s)/SLC(s)/Site Directive(s), etc.: **STANDARD:** Determines that Tech Spec 3.4.5 (RCS Loops Mode 3) is applicable and documents in Step 2 **COMMENTS:**	**CRITICAL STEP** ___ SAT ___ UNSAT
3	2.3	Description of discrepancy/deficiency: **STANDARD:** Documents that the required RCP Breaker alignment does not exist. ***NOTE: TS 3.4.5 requires that either the 1B1 or 1B2 have power available*** **COMMENTS:**	___ SAT ___ UNSAT

4	2.4	Is surveillance applicable for present plant conditions? **STANDARD**: Marks "yes" **COMMENTS**:	**CRITICAL STEP** ___ SAT ___ UNSAT
5	2.5	If surveillance is applicable, what is the latest due date for surveillance OR applicable LCO? **STANDARD**: Documents that the latest due date is 0830 on Tuesday, June 11 (72 hours from discovery) per Condition A of TS 3.4.5 **COMMENTS**:	**CRITICAL STEP** ___ SAT ___ UNSAT
6	2.6	Is applicable TS(s)/SLC(s)/Site Directive(s), etc. satisfied with existing discrepancy/deficiency? **STANDARD**: • *Marks "no" • Explains in justification that TS 3.4.5 requires both RCS loops be Operable and with no power available to the 1B1 and 1B2 RCP's, the B RCS loop is NOT operable **COMMENTS**:	***CRITICAL STEP** ___ SAT ___ UNSAT

7	**2.7**	Support personnel/groups contacted (if any) AND information provided: **STANDARD:** Candidate may indicate requesting SPOC assistance to determine why neither of the required RCP breakers are racked in however since there is no indication of mechanical failures it would not be required. **COMMENTS:**	___ SAT ___ UNSAT
8	**2.8**	Describe corrective/compensatory actions being taken (procedure change, WR, PIP, etc.), and resolution date for those actions. **STANDARD:** Corrective/Compensatory Action: Candidate should indicate that actions will commence to establish the required breaker alignment. This could be by issuing a Work Request, writing a NCR, or dispatching personnel to determine why the breakers are open and if the breakers could be racked in. Resolution Date: This blank may be left open at this time since the investigation is just beginning however in no case should a date and time that would result in exceeding the 72 hour completion time be entered. **COMMENTS:**	___ SAT ___ UNSAT
9	**2.9**	Approval: **STANDARD:** Signs and Dates either of the blanks provided **COMMENTS:**	___ SAT ___ UNSAT

TIME STOP: ________

CRITICAL STEP EXPLANATIONS

SEQ STEP #	Explanation
2	Required to determine the applicable Tech Spec
4	Required to determine if this Tech Spec is applicable in Mode 3
5	Incorrect documentation could lead to exceeding allowed time to complete Tech Spec Required Actions.
6	Required to determine if the LCO is met

CANDIDATE CUE SHEET

(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

INITIAL CONDITIONS

Time/Date = 0830 on Saturday, June 8.

RCS Temperature = 298°F.

1/0 RCP operation in progress (1A1 RCP in operation).

PT/1/A/0600/001 (Periodic Instrument Surveillance) Encl. 13.2 (Mode 3) in progress.

SR 3.4.5.2 on page 25 of 26 of PT/1/A/0600/001 (Periodic Instrument Surveillance) Encl. 13.2 (Mode 3) is being performed.

Step 2.2 of Encl. 13.9 (RCP Power Supply Verification) is determined to NOT be satisfied because neither the 1B1 nor the 1B2 RCP has power available.

INITIATING CUE

Based on the above conditions, complete PT/1/A/0600/001 (Periodic Instrument Surveillance) Encl. 13.12 (Surveillance Evaluation)

REGION II
JOB PERFORMANCE MEASURE

ADM-303

CALCULATE MAXIMUM PERMISSIBLE STAY TIME

Alternate Path: (No)

Alt Path Failure: ______________________________

Time Critical: (No)

Time Critical Criteria: ______________________________

Prepared By: ______________________________ Date:

EP Review By: ______________________________ Date:

Reviewed By: ______________________________ Date:

Approved By: ______________________________ Date:

REGION II
JOB PERFORMANCE MEASURE

Task Title : Calculate Maximum Permissible Stay Time

Task Number : N/A

Alternate Path: No

Time Critical: No

Validation Time: 20 Min

K/A Rating(s):

System: (Gen)
K/A: (2.3.4)
Rating: (3.2/3.7)

Task Standard: Calculate the maximum permissible stay time for radiation workers.

References: PD-RP-ALL-0001, Radiation Worker Responsibilities Rev 3

Tools/Equipment/Procedures Needed: PD-RP-ALL-0001, Radiation Worker Responsibilities if requested.

==

Candidate: ___________________________________ Time Start: _______________

NAME Time Finish: ______________

Performance Rating: SAT ______ UNSAT ______ Performance Time: _________

Examiner: ______________________________ ___________________________________/_________

NAME SIGNATURE DATE

==

Comments

SIMULATOR OPERATOR JPM SETUP INSTRUCTIONS

NA

READ TO OPERATOR

DIRECTIONS TO STUDENT

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIAL CONDITIONS

Two new employees with no previous radiation exposure arrived on site on November 1 in preparation for a refueling outage.

Employee 1: 25 year old male.
Received 1200 mrem TEDE between November 1 and Dec 31 and received 300 mrem TEDE between Dec 31 and Jan 31.

Employee 2: 25 year old female.
Received 300 mrem TEDE between November 1 and Dec 31 and received 50 mrem TEDE between Dec 31 and Jan 31.
On Feb 1, makes pregnancy declaration (estimated conception date is Nov 1).

Today is Feb 1 and in order to complete the outage, a job must be completed in an area with a 100 mrem/hr radiation field.

INITIATING CUE

Determine the maximum time that each employee could spend in the area for this job while staying within station limits for allowable radiation exposure. Do NOT consider the precautionary Alert, Exclusion notifications or ED alarms as these limits are approached. Assume that **NO** permissions have been granted by Supervision / Management for any extensions /entry after any station limit has been reached.

START TIME: _______

SEQ STEP	PROC STEP	DESCRIPTION	
1	NA	Determine the dose that each employee is allowed. Then calculate the time allowed in the area. **STANDARD:** Employee 1: TEDE received so far this calendar year is 300 mrem. Duke energy administrative limit for TEDE to the whole body 2000 mrem/year. 2000-300 = 1700 mrem allowed dose. 1700 mrem / 100 mrem/hr = 17 hours Employee 2: TEDE received for the gestation period = 350 mrem. Duke Energy administrative limit for declared pregnant female = 450 mrem for the entire gestation period AND 50 mrem per month. Therefore allowed dose = 50 mrem. 50 mrem / 100 mrem/hr = 0.5 hours or 30 minutes. Per PD-RP-ALL-0001, Radiation Worker Responsibilities, 5.3.5 Dose Monitoring Warning Flags and ED Alarms: Alert Flag: Notification that individual reached 80% or greater but less than 90% of established administrative limit. Workers that receive an Alert Flag will notify his/her supervisor and must receive RP supervision approval to enter a High Radiation Area or LHRA. **COMMENTS:**	**CRITICAL STEP** ___ SAT ___ UNSAT

TIME STOP: ________

CRITICAL STEP EXPLANATIONS

SEQ STEP #	Explanation
1	This step is required to prevent exceeding Duke Energy radiation exposure administrative limits.

CANDIDATE CUE SHEET

(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

Two new employees with no previous radiation exposure arrived on site on November 1 in preparation for a refueling outage.

Employee 1: 25 year old male.
Received 1200 mrem TEDE between November 1 and Dec 31 and received 300 mrem TEDE between Dec 31 and Jan 31.

Employee 2: 25 year old female.
Received 300 mrem TEDE between November 1 and Dec 31 and received 50 mrem TEDE between Dec 31 and Jan 31.
On Feb 1, makes pregnancy declaration (estimated conception date is Nov 1).

Today is Feb 1 and in order to complete the outage, a job must be completed in an area with a 100 mrem/hr radiation field.

INITIATING CUE

Determine the maximum time that each employee could spend in the area for this job while staying within station limits for allowable radiation exposure. Do NOT consider the precautionary Alert, Exclusion notifications or ED alarms as these limits are approached. Assume that **NO** permissions have been granted by Supervision / Management for any extensions /entry after any station limit has been reached.

REGION II
JOB PERFORMANCE MEASURE

ADMIN-S403

Determine Emergency Classification And Complete The Initial Emergency Notification Form

Alternate Path: (No)

Alt Path Failure: ______________________________

Time Critical: (Yes)

Time Critical Criteria: Classification < 15 Minutes
Complete Notification Form < 15 Minutes of Classification

Prepared By: ______________________________ Date:

EP Review By: ______________________________ Date:

Reviewed By: ______________________________ Date:

Approved By: ______________________________ Date:

REGION II
JOB PERFORMANCE MEASURE

Task Title : Determine Emergency Classification and complete the initial Emergency Notification Form

Task Number : N/A

Alternate Path: No

Time Critical: Yes

Validation Time: 30 Min

K/A Rating(s):

System: Gen
K/A: 2.4.38
Rating: 2.4/4.4

Task Standard: Appropriate classification is determined and associated Emergency Notification Form is completed.

References:
RP/0/A/1000/01, Emergency Classification Rev 2
RP/0/A/1000/02, Control Room Emergency Coordinator Procedure Rev 9
RP/0/A/1000/015A, Offsite Communications From The Control Room Rev 4
BASIS Document (Volume "A", Section "D" of the Emergency Plan)

Tools/Equipment/Procedures Needed:
RP/0/A/1000/01, Emergency Classification
RP/0/A/1000/02, Control Room Emergency Coordinator Procedure

===

Candidate: ______________________________ Time Start: ______________

NAME Time Finish: ______________

Performance Rating: SAT ______ UNSAT ______ Performance Time: _________

Examiner: __________________________ ______________________________/_________

NAME SIGNATURE DATE

===

Comments

SIMULATOR OPERATOR JPM SETUP INSTRUCTIONS

NA

READ TO OPERATOR

DIRECTIONS TO STUDENT

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIAL CONDITIONS (0800)

Unit 1 experienced a Small Break LOCA

The reactor failed to automatically trip

The Reactor failed to trip in Manual

CURRENT CONDITIONS

4 Minutes later

Reactor Trip Breakers were opened locally

All full length control rods are fully inserted

RCS pressure = 1500 psig stable

Core SCM = 6°F (this is the lowest SCM during the event)

INITIATING CUE

You are to perform the required actions of the Emergency Coordinator by referring to RP/0/A/1000/001, Emergency Classification:

1. Determine Emergency Classification at present time.
2. Complete appropriate Emergency Notification Form for the current conditions.

Inform the examiner when you have made the classification.

THIS IS A TIME CRITICAL JPM

Note: Do not use Emergency Coordinator's judgment while classifying the event. When required, an operator will maintain the Emergency Coordinator's Log and assume the duties of the Control Room Offsite Communicator.

START TIME: _______

SEQ STEP	PROC STEP	DESCRIPTION	
1		Classify the Event **<u>STANDARD</u>:** Refer to RP/0/A/1000/01 (Emergency Classification) and classify the event as follows: **Encl 4.1** (Fission Product Barrier Matrix) RCS Leakrate $\geq$ 160 gpm = 4 pts **ALERT** **Encl 4.4** (Loss of Shutdown Functions) **SAE 1. FAILURE OF RPS TO COMPLETE OR INITIATE A RX SCRAM.** **SAE** The event should be classified as a Site Area Emergency (SAE) (4.4.S.1). ***TIME CRITICAL (Classification must be declared $\leq$ 15 minutes from the start of the JPM).*** **<u>COMMENTS</u>:**	**CRITICAL STEP** ___ SAT ___UNSAT

2	**1.1**	Commence the Off-Site Notification Form. **STANDARD:** Go to RP/0/A/1000/002 (Control Room Emergency Coordinator Procedure) and initiate procedure by determining symptoms for entry exist and check Step 1.1 **COMMENTS:**	___ SAT ___UNSAT
3	**2.1**	**IF** an EAL exists, Declare the appropriate Emergency Classification level. Classification ___________ (UE, Alert, SAE, GE) Time Declared: ___________ **STANDARD**: Applicant declares a SAE and records the time that the classification was made. **COMMENTS:**	**CRITICAL STEP** ___ SAT ___UNSAT
4	**2.2**	**IF** A Security event is in progress, **THEN** GO TO Step 2.4. **STANDARD**: Applicant determines that a security event is NOT in progress and proceeds to step 2.3. **COMMENTS:**	___ SAT ___UNSAT

<table>
<tr>
<td>5</td>
<td>2.3</td>
<td>
<u>IF</u> ERO has <u>NOT</u> yet been activated <u>AND</u> ERO activation is needed, perform the following:
*2.3.1: Circle the applicable initial notification code below.
<table>
<tr><td rowspan="2">EAL classification</td><td colspan="2">Notification Codes (see Enclosure 4.11 for descriptions)</td></tr>
<tr><td>DRILL</td><td>EMERGENCY</td></tr>
<tr><td>None</td><td></td><td>F1a</td></tr>
<tr><td>NOUE</td><td>D1a</td><td>E1a</td></tr>
<tr><td>Alert</td><td>D2a</td><td>E2a</td></tr>
<tr><td>SAE</td><td>D3a</td><td>E3a</td></tr>
<tr><td>GE</td><td>D4a</td><td>E4a</td></tr>
</table>
2.3.2 IF a qualified individual is available to notify the ERO, provide the circled notification code above to a qualified individual and direct them to begin Enclosure 4.10 (Activation of the Emergency Response Organization).
<u>STANDARD</u>: Applicant determines that the notification code is either D3a or E3a.
<u>COMMENTS</u>:
</td>
<td>*CRITICAL STEP
___ SAT
___UNSAT</td>
</tr>
<tr>
<td>6</td>
<td>2.4</td>
<td>
Direct Control Room Offsite Communicator(s) to perform the following:
• Record Name ____
• REFER TO RP/0/A/1000/015A (Offsite Communications From The Control Room), Immediate Actions steps 2.1 and 2.2 AND Enclosure 4.7 (Guidelines for Manually Transmitting a Message) in preparation for notifying offsite agencies.
<u>STANDARD</u>: There is no offsite communicator for this JPM.
<u>COMMENTS</u>:
</td>
<td>___ SAT
___UNSAT</td>
</tr>
</table>

7	**2.5**	**IAAT** Changing plant conditions require an emergency classification upgrade, **THEN** Notify Offsite Communicator to complete in-progress notifications per RP/0/A/1000/15A (Offsite Communications From The Control Room), **AND** Start a new clean copy of this procedure for the upgraded classification **AND** stop working on this copy, noting the time in your log that each new copy started. **STANDARD**: No upgrade will be required for this JPM. **COMMENTS:**	___ SAT ___UNSAT

8	**2.6**	Obtain the applicable Offsite Notification form in the control room and complete as follows: ___ 2.6.1 Ensure EAL # as determined by RP/0/A/1000/001 matches Line 4. ___ 2.6.2 Line 1 - Mark appropriate box "Drill" or "Actual Event" ___*2.6.3 Line 1 - Enter Message # ___ 2.6.4 Line 2 - Mark Initial ___ 2.6.5 Line 6 – A. Mark "Is Occurring" if any of the following are true: • RIAs 40, 45, or 46 are increasing or in alarm • If containment is breached • Containment pressure > 1 psig B. Mark "None" if none of the above is applicable. ___ 2.6.6 Line 7 - If Line 6 Box B or C is marked, mark Box D. Otherwise mark Box A. ___*2.6.7 Line 8 - Mark "Stable" unless an upgrade or additional PARs are anticipated within an hour. • Refer to Enclosure 4.8 (Event Prognosis Definitions) ___*2.6.8 Line 10 - Military time and date of declaration (Refer to date/time in Step 2.1) ___ 2.6.9 Line 11 - Evaluate the following for classification for all units. • Security event • Seismic event • Tornado on site • Hurricane force winds on site • SSF event • Fire affecting shared safety related equipment Mark or select ALL if event affects the emergency classification on more than one unit. If event only affects one (1) unit **OR** one (1) unit has a higher emergency class, select or mark the appropriate unit. ___*2.6.10 Line 12 - Mark unit(s) affected (reference Line 11) **AND** enter percent power for each unit affected. {14} • If affected unit is shutdown, then enter shutdown time and date. ___2.6.11 Line 13 - If the SM has no remarks, write "None" ___2.6.12 If Condition "A" exists ensure following PARs are included on Line 5. A. Evacuate: Move residents living downstream of the Keowee Hydro Project dams to higher ground. B. Other: Prohibit traffic flow across bridges identified on your inundation maps until the danger has passed. ___2.6.13 Line 17 - SM signature, CURRENT Time/Date **STANDARD**: Correctly fills out Emergency Notification Form in accordance with Key. **COMMENTS**:	***CRITICAL STEP** ___ SAT ___UNSAT

TIME STOP: ________

CRITICAL STEP EXPLANATIONS

SEQ STEP #	Explanation
1	The candidate needs to be able to utilize the procedure and determine the conditions meet a Site Area Emergency classification.
3	This is a time critical step. The candidate needs to declare the SAE within 15 minutes of beginning the JPM. (The start of the JPM is the beginning of the assessment period)
5	The candidate must select the correct notification code for a SAE.
8	The emergency notification form is accurately filled-out; identified steps from the KEY are critical items within 15 minutes from the time the EAL was declared. (Declaration time is the time recorded in JPM step 3)

CANDIDATE CUE SHEET

(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

INITIAL CONDITIONS (0800)

Unit 1 experienced a Small Break LOCA

The reactor failed to automatically trip

The Reactor failed to trip in Manual

CURRENT CONDITIONS

4 Minutes later

Reactor Trip Breakers were opened locally

All full length control rods are fully inserted

RCS pressure = 1500 psig stable

Core SCM = 6°F (this is the lowest SCM during the event)

INITIATING CUE

You are to perform the required actions of the Emergency Coordinator by referring to RP/0/A/1000/001, Emergency Classification:

1. Determine Emergency Classification at present time.
2. Complete appropriate Emergency Notification Form for the current conditions.

Inform the examiner when you have made the classification.

THIS IS A TIME CRITICAL JPM

Note: Do not use Emergency Coordinator's judgment while classifying the event. When required, an operator will maintain the Emergency Coordinator's Log and assume the duties of the Control Room Offsite Communicator.

Nuclear Power Plant Emergency Notification Form

SITE AREA EMERGENCY

Enclosure 4.2.A

1. [A] DRILL [B] ACTUAL EVENT — MESSAGE # 1

2. [A] INITIAL [B] FOLLOW-UP — NOTIFICATION: TIME__________ DATE____/____/____ AUTHENTICATION # ________

3. SITE: **Oconee Nuclear Site** — Confirmation Phone # (864) 882-7076

4. **EMERGENCY CLASSIFICATION**: [A] UNUSUAL EVENT [B] ALERT [C] SITE AREA EMERGENCY [D] GENERAL EMERGENCY

BASED ON EAL #____________ EAL DESCRIPTION: ______________________________

5. **PROTECTIVE ACTION RECOMMENDATIONS**: [A] NONE

[B] EVACUATE ______________________________

[C] SHELTER ______________________________

[D] CONSIDER THE USE OF KI (POTASSIUM IODIDE) IN ACCORDANCE WITH STATE PLANS AND POLICY.

[E] OTHER ______________________________

6. **EMERGENCY RELEASE**: [A] None [B] Is Occurring [C] Has Occurred

7. RELEASE SIGNIFICANCE: [A] Not applicable [B] Within normal operating limits [C] Above normal operating limits [D] Under evaluation

8. EVENT PROGNOSIS: [A] Improving [B] Stable [C] Degrading

9. METEOROLOGICAL DATA: Wind Direction* from ______ degrees Wind Speed* ______mph

(***Not Required for Initial Notifications**) Precipitation* ______ Stability Class* [A] [B] [C] [D] [E] [F] [G]

10. [A] DECLARATION [B] TERMINATION Time ____________ Date ____/____/____

11. AFFECTED UNIT(S): [1] [2] [3] [All]

12. UNIT STATUS: (Unaffected Unit(s) Status Not Required for Initial Notifications)

[A] U1 0 % Power Shutdown at Time __________ Date ___/____/____

[B] U2 _____% Power Shutdown at Time __________ Date ___/____/____

[C] U3 _____% Power Shutdown at Time __________ Date ___/____/____

13. REMARKS: ______________________________

Exam Key

FOLLOW-UP INFORMATION (Lines 14 through 16 Not Required for Initial Notifications)

EMERGENCY RELEASE DATA. NOT REQUIRED IF LINE 6 A IS SELECTED.

14. RELEASE CHARACTERIZATION: TYPE: [A] Elevated [B] Mixed [C] Ground UNITS: [A] Ci [B] Ci/sec [C] µCi/sec

MAGNITUDE: Noble Gases:________ Iodines:________ Particulates:________ Other: __________

FORM: [A] Airborne Start Time ________ Date ___/____/____ Stop Time ________ Date ___/____/____

[B] Liquid Start Time ________ Date ___/____/____ Stop Time ________ Date ___/____/____

15. PROJECTION PARAMETERS: Projection period: ______Hours Estimated Release Duration ______Hours

Projection performed: Time ________ Date ___/____/____

16. PROJECTED DOSE:

DISTANCE	TEDE (mrem)	Adult Thyroid CDE (mrem)
Site boundary		
2 Miles		
5 Miles		
10 Miles		

17. APPROVED BY: ____________________ Title **Emergency Coordinator** Time ________ Date___/____/____

NOTIFIED BY: ____________________ RECEIVED BY: ____________________ Time ________ Date ___/____/____