Facility: OCONEE Date of Exam: DECEMBER 2014

Tier	Group	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G*	Total	SRO A2	SRO G*	SRO Total
1. Emergency & Abnormal Plant Evolutions	1	3	3	3	N/A			3	3	N/A		3	18	3	3	6
	2	2	2	1	N/A			1	2	N/A		1	9	2	2	4
	Tier Totals	5	5	4				4	5			4	27	5	5	10
2. Plant Systems	1	3	2	3	3	2	3	2	3	3	2	2	28	3	2	5
	2	1	1	1	1	1	0	1	1	1	1	1	10	1 / 1	1	3
	Tier Totals	4	3	4	4	3	3	3	4	4	3	3	38	5	3	8

3. Generic Knowledge and Abilities Categories	1	2	3	4	Total	SRO 1	SRO 2	SRO 3	SRO 4	SRO Total
	3	3	2	2	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:
008AK3.04	Pressurizer Vapor Space Accident / 3	4.2	4.6	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	RCP tripping requirements
009EA2.23	Small Break LOCA / 3	2.8	3.3	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	RCP operating parameters and limits
011EA2.06	Large Break LOCA / 3	3.7	4	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	That fan is in slow speed and dampers are in accident mode during LOCA
015AK1.04	RCP Malfunctions / 4	2.9	3.1	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	Basic steady state thermodynamic relationship between RCS loops and S/Gs resulting from unbalanced RCS flow
022AK1.01	Loss of Rx Coolant Makeup / 2	2.8	3.2	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	Consequences of thermal shock to RCP seals
025AK2.02	Loss of RHR System / 4	3.2	3.2	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	LPI or Decay Heat Removal/RHR pumps
026AG2.2.42	Loss of Component Cooling Water / 8	3.9	4.6	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Ability to recognize system parameters that are entry-level conditions for Technical Specifications
027AA1.01	Pressurizer Pressure Control System Malfunction / 3	4	3.9	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐	PZR heaters, sprays, and PORVs
029EA1.11	ATWS / 1	3.9	4.1	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐	Manual opening of the CRDS breakers
038EK1.04	Steam Gen. Tube Rupture / 3	3.1	3.3	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	Reflux boiling
055EK3.02	Station Blackout / 6	4.3	4.6	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	Actions contained in EOP for loss of offsite and onsite power

KA	NAME / SAFETY FUNCTION:	IR RO	IR SRO	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
056AG2.4.18	Loss of Off-site Power / 6	3.3	4.0	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of the specific bases for EOPs.
057AA1.05	Loss of Vital AC Inst. Bus / 6	3.2	3.4	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐	Backup instrument indications
058AK3.01	Loss of DC Power / 6	3.4	3.7	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	Use of dc control power by D/Gs
065AG2.4.34	Loss of Instrument Air / 8	4.2	4.1	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of RO tasks performed outside the main control room during an emergency and the resultant operational effects
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.
BE05EK2.1	Steam Line Rupture - Excessive Heat Transfer / 4	3.8	4	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	Components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.
BE10EA2.2	Reactor Trip - Stabilization - Recovery / 1	3.5	4	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	Adherence to appropriate procedures and operation within the limitations in the facility s license and amendments.

KA	NAME / SAFETY FUNCTION:	IR RO	IR SRO	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
005AK1.06	Inoperable/Stuck Control Rod / 1	2.9	3.8	☑											Bases for power limit for rod misalignment
032AK2.01	Loss of Source Range NI / 7	2.7	3.1		☑										Power supplies, including proper switch positions
051AA2.02	Loss of Condenser Vacuum / 4	3.9	4.1								☑				Conditions requiring reactor and/or turbine trip
061AK2.01	ARM System Alarms / 7	2.5	2.6		☑										Detectors at each ARM system location
076AA1.04	High Reactor Coolant Activity / 9	3.2	3.4							☑					Failed fuel-monitoring equipment
BA02AK3.2	Loss of NNI-X / 7	3.7	4			☑									Normal, abnormal and emergency operating procedures associated with (Loss of NNI-X).
BA07AK1.3	Flooding / 8	3.3	3.5	☑											Annunciators and conditions indicating signals, and remedial actions associated with the (Flooding).
BE03EA2.1	Inadequate Subcooling Margin / 4	3	4								☑				Facility conditions and selection of appropriate procedures during abnormal and emergency operations.
BE09EG2.4.31	Natural Circ. / 4	4.2	4.1											☑	Knowledge of annunciators alarms, indications or response procedures

KA	NAME / SAFETY FUNCTION:	IR RO	IR SRO	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
003A3.04	Reactor Coolant Pump	3.6	3.6	☐	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	RCS flow
003K4.03	Reactor Coolant Pump	2.5	2.8	☐	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	Adequate lubrication of the RCP
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
006K6.02	Emergency Core Cooling	3.4	3.9	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐	☐	Core flood tanks (accumulators)
006K6.19	Emergency Core Cooling	3.7	3.9	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐	☐	HPI/LPI systems (mode change)
007A1.01	Pressurizer Relief/Quench Tank	2.9	3.1	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐	Maintaining quench tank water level within limits
008A2.08	Component Cooling Water	2.5	2.7	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	Effects of shutting (automatically or otherwise) the isolation valves of the letdown cooler
008K1.02	Component Cooling Water	3.3	3.4	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	Loads cooled by CCWS
010K3.03	Pressurizer Pressure Control	4.0	4.2	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	ESFAS
012K5.01	Reactor Protection	3.3	3.8	☐	☐	☐	☐	☑	☐	☐	☐	☐	☐	☐	DNB

KA	NAME / SAFETY FUNCTION:	IR RO	IR SRO	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
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
026K1.01	Containment Spray	4.2	4.2	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	ECCS
026K3.02	Containment Spray	4.2	4.3	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	Recirculation spray system
039A4.01	Main and Reheat Steam	2.9	2.8	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	☐	Main steam supply. valves
059A2.06	Main Feedwater	2.7	2.9	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	Loss of steam flow to MFW system
061A3.03	Auxiliary/Emergency Feedwater	3.9	3.9	☐	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	AFW S/G level control on automatic start
061K2.02	Auxiliary/Emergency Feedwater	3.7	3.7	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	AFW electric drive pumps
062K1.04	AC Electrical Distribution	3.7	4.2	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	Off-site power sources
063G2.4.47	DC Electrical Distribution	4.2	4.2	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Ability to diagnose and recognize trends in an accurate and timely manner utilizing the appropriate control room reference material.
064K3.02	Emergency Diesel Generator	4.2	4.4	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	ESFAS controlled or actuated systems

KA	NAME / SAFETY FUNCTION:	IR RO	IR SRO	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
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.
078G2.1.20	Instrument Air	4.6	4.6	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Ability to execute procedure steps.
078K4.01	Instrument Air	2.7	2.9	☐	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	Manual/automatic transfers of control
103A2.04	Containment	3.5	3.6	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	Containment evacuation (including recognition of the alarm)
103A4.01	Containment	3.2	3.3	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	☐	Flow control, pressure control and temperature control valves, including pneumatic valve controller

KA	NAME / SAFETY FUNCTION:	IR RO	IR SRO	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
001K5.18	Control Rod Drive	4.2	4.3	☐	☐	☐	☐	☑	☐	☐	☐	☐	☐	☐	Anticipation of criticality at any time when adding positive reactivity during startup
002A2.04	Reactor Coolant	4.3	4.6	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	Loss of heat sinks
015K3.01	Nuclear Instrumentation	3.9	4.3	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	RPS
016K1.12	Non-nuclear Instrumentation	3.5	3.5	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	S/G
033A1.01	Spent Fuel Pool Cooling	2.7	3.3	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐	Spent fuel pool water level
041K2.01	Steam Dump/Turbine Bypass Control	2.8	2.9	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	ICS, normal and alternate power supply
056G2.4.2	Condensate	4.5	4.6	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of system set points, interlocks and automatic actions associated with EOP entry conditions.
071A3.03	Waste Gas Disposal	3.6	3.8	☐	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	Radiation monitoring system alarm and actuating signals
072A4.03	Area Radiation Monitoring	3.1	3.1	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	☐	Check source for operability demonstration
079K4.01	Station Air	2.9	3.2	☐	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	Cross-connect with IAS

KA	NAME / SAFETY FUNCTION:	IR RO	IR SRO	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
G2.1.17	Conduct of operations	3.9	4.0	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Ability to make accurate, clear and concise verbal reports.
G2.1.31	Conduct of operations	4.6	4.3	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Ability to locate control room switches, controls and indications and to determine that they are correctly reflecting the desired plant lineup.
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.
G2.2.1	Equipment Control	4.5	4.4	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Ability to perform pre-startup procedures for the facility, including operating those controls associated with plant equipment that could affect reactivity.
G2.2.14	Equipment Control	3.9	4.3	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of the process for controlling equipment configuration or status
G2.2.44	Equipment Control	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
G2.3.12	Radiation Control	3.2	3.7	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of radiological safety principles pertaining to licensed operator duties
G2.3.15	Radiation Control	2.9	3.1	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of radiation monitoring systems
G2.4.12	Emergency Procedures/Plans	4.0	4.3	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of general operating crew responsibilities during emergency operations.
G2.4.9	Emergency Procedures/Plans	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:
022AG2.1.32	Loss of Rx Coolant Makeup / 2	3.8	4.0	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Ability to explain and apply all system limits and precautions.
027AA2.18	Pressurizer Pressure Control System Malfunction / 3	3.4	3.5	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	Operable control channel
038EA2.10	Steam Gen. Tube Rupture / 3	3.1	3.3	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	Flowpath for charging and letdown flows
057AG2.2.36	Loss of Vital AC Inst. Bus / 6	3.1	4.2	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Ability to analyze the effect of maintenance activities, such as degraded power sources, on the status of limiting conditions of operations
065AG2.4.8	Loss of Instrument Air / 8	3.8	4.5	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of how abnormal operating procedures are used in conjunction with EOPs.
077AA2.03	Generator Voltage and Electric Grid Disturbances / 6	3.5	3.6	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	Generator current outside the generator capability curve

KA	NAME / SAFETY FUNCTION:	IR RO	IR SRO	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
003AG2.1.7	Dropped Control Rod / 1	4.4	4.7	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Ability to evaluate plant performance and make operational judgments based on operating characteristics, reactor behavior and instrument interpretation.
005AA2.04	Inoperable/Stuck Control Rod / 1	2.3	3.4	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	Interpretation of computer in-core TC map for dropped rod location
024AA2.06	Emergency Boration / 1	3.6	3.7	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	When boron dilution is taking place
BA05AG2.4.46	Emergency Diesel Actuation / 6	4.2	4.2	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Ability to verify that the alarms are consistent with the plant conditions.

KA	NAME / SAFETY FUNCTION:	IR RO	IR SRO	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
005A2.02	Residual Heat Removal	3.5	3.7	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	Pressure transient protection during cold shutdown
012A2.05	Reactor Protection	3.1	3.2	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	Faulty or erratic operation of detectors and function generators
013G2.2.22	Engineered Safety Features Actuation	4.0	4.7	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of limiting conditions for operations and safety limits.
026A2.04	Containment Spray	3.9	4.2	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	Failure of spray pump
103G2.4.50	Containment	4.2	4.0	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Ability to verify system alarm setpoints and operate controls identified in the alarm response manual.

KA	NAME / SAFETY FUNCTION:	IR RO	IR SRO	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
015A2.01	Nuclear Instrumentation	3.5	3.9	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	Power supply loss or erratic operation
034K6.01	Fuel Handling Equipment	2.1	3.0	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	Fuel handling equipment
056G2.1.23	Condensate	4.3	4.4	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Ability to perform specific system and integrated plant procedures during all modes of plant operation.

KA	NAME / SAFETY FUNCTION:	IR RO	IR SRO	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	TOPIC:
G2.1.29	Conduct of operations	4.1	4.0	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of how to conduct system lineups, such as valves, breakers, switches, etc.
G2.1.43	Conduct of operations	4.1	4.3	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Ability to use procedures to determine the effects on reactivity of plant changes
G2.2.2	Equipment Control	4.6	4.1	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Ability to manipulate the console controls as required to operate the facility between shutdown and designated power levels.
G2.3.12	Radiation Control	3.2	3.7	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of radiological safety principles pertaining to licensed operator duties
G2.3.6	Radiation Control	2.0	3.8	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Ability to aprove release permits
G2.4.35	Emergency Procedures/Plans	3.8	4.0	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of local auxiliary operator tasks during emergency and the resultant operational effects
G2.4.41	Emergency Procedures/Plans	2.9	4.6	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	Knowledge of the emergency action level thresholds and classifications.

ILT46

Facility: **Oconee** Date of Examination: **12/08/2014**

Examination Level: RO ☒ SRO ☐ Operating Test Number: **1**

Administrative Topic (see Note)	Type Code*	Describe activity to be performed
Conduct of Operations G2.1.43 (4.1/4.3)	M, R	**Admin-146, Manually Calculate Shutdown Margin** (RO only) (20 min)
Conduct of Operations KA G2.1.25 (3.9/4.2)	D, R	**Admin-142, Determine Time for SFP to reach 180ºF** (BOTH) (15 min)
Equipment Control G2.2.12 (3.7/4.1)	N, R	**Admin-245, Compare Measured Incore Axial Imbalance To Excore Axial Imbalance** (RO Only) (22 min)
Radiological Control G2.3.4 (3.2/3.7)	D, R	**Admin-306, Determine the Maximum Permissible Stay Time Within Emergency Dose Limits (EDLs)** (BOTH) (20 min)
Emergency Plan		**N/A**

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

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

ILT46

Facility: **Oconee** Date of Examination: **12/08/2014**

Examination Level: RO ☐ SRO ☒ Operating Test Number: **1**

Administrative Topic (see Note)	Type Code*	Describe activity to be performed
Conduct of Operations G2.1.43 (4.1/4.3)	M, R	**Admin-147, Manually Calculate Shutdown Margin and Determine any Required Actions** (SRO only) (25 min)
Conduct of Operations KA G2.1.25 (3.9/4.2)	D, R	**Admin-142, Determine Time for SFP to reach 180ºF** (BOTH) (15 min)
Equipment Control G2.2.40 (3.4/4.7`)	N, R	**Admin-246, Determine ALL Tech Spec and SLC LCO's that are NOT met** (SRO Only) (20 min)
Radiological Control G2.3.4 (3.2/3.7)	D, R	**Admin-306, Determine the Maximum Permissible Stay Time Within Emergency Dose Limits (EDLs)** (BOTH) (20 min)
Emergency Plan G2.4.38 (2.4/4.4)	M,R	**Admin-431, Determine Emergency Classification and Protective Action Recommendations** (SRO Only) (25 min)

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

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

Facility: **Oconee**	Date of Examination: **12/08/14**
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. **CRO-113 Perform Control Rod Movement PT for Group 1** PT/1/A/0600/015 Enclosure 13.2 (Control Rod Movement at Power) [KA: 001 G2.2.2 (4.6/4.1)] (10 min)	N, S	**1**
b. **CRO-306 Align HPI/LPI Piggyback Mode** EOP Enclosure 5.12 (ECCS Suction Swap to RBES) [KA: EPE 009 EK3.21 (4.2/4.5)] (20 min)	D, A, S, L EN	**3**
c. **CRO-608 Synchronization With The Grid Following A Load Rejection** AP/1/A/1700/001 (Unit Runback) [KA: 062 A4.07 (3.1*/3.1*)] (10 min)	M, A, S	**6**
d. **CRO-226 Re-establish RCP Seal Flow Using PSW System** EOP Enclosure 5.45 (PSW RCP Seals) [KA: 004 A4.11 (3.4/3.3)] (10 min)	N, L,S	**2**
e. **CRO-415, Align MDEFDWP Suction To The Hotwell And Feed The Steam Generators** EOP Enclosure 5.9 (Extended EFDW Operation) [KA: APE054 AA1.01 (4.5/4.4)] (15 min)	D, S, L	**4S**
f. **CRO-413, Initiate HPI Forced Cooling** EOP Rule 4 (Initiate HPI Forced Cooling) [KA: EPE 074 EA1.08 (4.2/4.2)] (8 min)	D, A, L, S	**4P**
g. **CRO-804, Place Reactor Building Purge in Operation** OP/1/A/1102/014 Enclosure 4.1 (RB Purge Release) [KA: 029 A2.03 (2.7/3.1)] (15 min)	D, A, L, S	**8**
h. **CRO-500 Restore RB Auxiliary Fan Coolers Following a Loss of LPSW** OP/1/A/1104/010 Encl. 4.16 (LPSW Shutdown and Return to Service RB Aux Coolers) [KA: 022 A4.04 (3.1*/3.2)] (15 min)	D, S	**5**

In-Plant Systems@ (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)		
i. **AO-428 Unit 2 Plant Operator Actions for Extensive Damage Mitigation** AP/0/A/1700/046 (Extensive Damage Mitigation) Enclosure 5.2 (Plant Operator Actions for Extensive Damage Mitigation) [KA: APE054 AA1.01 (4.5/4.4)] (20 min)	N, E, L	**4S**
j. **AO-300 Swapping in Service Seal Return Coolers** AP/3/A/1700/002 (Excessive RCS Leakage) Enclosure 5.7 (Swapping in Service Seal Return Coolers) [KA: 002 A2.01 (4.3/4.4)] (19 min)	D, R, E	**2**
k. **AO-801 HPSW and LPSW AB Flood Isolation** AP/3/A/1700/030 (Auxiliary Building Flooding) Enclosure 5.1 (HPSW AB Flood Isolation) and 5.2 (LPSW AB Flood Isolation) [KA: BWA07 AA2.2 (3.3/3.7)] (16 min)	D, A, 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: **12/08/14**

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. **CRO-113 Perform Control Rod Movement PT for Group 1** PT/1/A/0600/015 Enclosure 13.2 (Control Rod Movement at Power) [KA: 001 G2.2.2 (4.6/4.1)] (10 min)	N, S	**1**
b. **CRO-306 Align HPI/LPI Piggyback Mode** EOP Enclosure 5.12 (ECCS Suction Swap to RBES) [KA: EPE 009 EK3.21 (4.2/4.5)] (20 min)	D, A, S, L EN	**3**
c. **CRO-608 Synchronization With The Grid Following A Load Rejection** AP/1/A/1700/001 (Unit Runback) [KA: 062 A4.07 (3.1*/3.1*)] (10 min)	M, A, S	**6**
d. **CRO-226 Re-establish RCP Seal Flow Using PSW System** EOP Enclosure 5.45 (PSW RCP Seals) [KA: 004 A4.11 (3.4/3.3)] (10 min)	N, L,S	**2**
e. **CRO-415, Align MDEFDWP Suction To The Hotwell And Feed The Steam Generators** EOP Enclosure 5.9 (Extended EFDW Operation) [KA: APE054 AA1.01 (4.5/4.4)] (15 min)	D, S, L	**4S**
f. **CRO-413, Initiate HPI Forced Cooling** EOP Rule 4 (Initiate HPI Forced Cooling) [KA: EPE 074 EA1.08 (4.2/4.2)] (8 min)	D, A, L, S	**4P**
g. **CRO-804, Place Reactor Building Purge in Operation** OP/1/A/1102/014 Enclosure 4.1 (RB Purge Release) [KA: 029 A2.03 (2.7/3.1)] (15 min)	D, A, L, S	**8**
h. **N/A**	D, S	**5**

In-Plant Systems@ (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)		
i. **AO-428 Unit 2 Plant Operator Actions for Extensive Damage Mitigation** AP/0/A/1700/046 (Extensive Damage Mitigation) Enclosure 5.2 (Plant Operator Actions for Extensive Damage Mitigation) [KA: APE054 AA1.01 (4.5/4.4)] (20 min)	N, E, L	**4S**
j. **AO-300 Swapping in Service Seal Return Coolers** AP/3/A/1700/002 (Excessive RCS Leakage) Enclosure 5.7 (Swapping in Service Seal Return Coolers) [KA: 002 A2.01 (4.3/4.4)] (19 min)	D, R, E	**2**
k. **AO-801 HPSW and LPSW AB Flood Isolation** AP/3/A/1700/030 (Auxiliary Building Flooding) Enclosure 5.1 (HPSW AB Flood Isolation) and 5.2 (LPSW AB Flood Isolation) [KA: BWA07 AA2.2 (3.3/3.7)] 16 min)	D, A, 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: **12/08/14**
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. **CRO-113 Perform Control Rod Movement PT for Group 1** PT/1/A/0600/015 Enclosure 13.2 (Control Rod Movement at Power) [KA: 001 G2.2.2 (4.6/4.1)] (10 min)	N, S	**1**
b. **CRO-306 Align HPI/LPI Piggyback Mode** EOP Enclosure 5.12 (ECCS Suction Swap to RBES) [KA: EPE 009 EK3.21 (4.2/4.5)] (20 min)	D, A, S, L EN	**3**
c. **CRO-608 Synchronization With The Grid Following A Load Rejection** AP/1/A/1700/001 (Unit Runback) [KA: 062 A4.07 (3.1*/3.1*)] (10 min)	M, A, S	**6**
d. **N/A**		
e. **N/A**		
f. **N/A**		
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-300 Swapping in Service Seal Return Coolers** AP/3/A/1700/002 (Excessive RCS Leakage) Enclosure 5.7 (Swapping in Service Seal Return Coolers) [KA: 002 A2.01 (4.3/4.4)] (19 min)	D, R, E	**2**
k. **AO-801 HPSW and LPSW AB Flood Isolation** AP/3/A/1700/030 (Auxiliary Building Flooding) Enclosure 5.1 (HPSW AB Flood Isolation) and 5.2 (LPSW AB Flood Isolation) [KA: BWA07 AA2.2 (3.3/3.7)] 16 min)	D, A, 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	

APE008 AK3.04 - Pressurizer (PZR) Vapor Space Accident (Relief Valve Stuck Open)
Knowledge of the reasons for the following responses as they apply to the Pressurizer Vapor Space Accident: (CFR 41.5,41.10 / 45.6 / 45.13)
RCP tripping requirements ....

Given the following Unit 2 conditions:
Initial conditions:

- Time = 1200:00
- Reactor power = 100%
- Both MFDW Pumps tripped
- RCS Pressure is peaking at 2475 psig
- 1RC-66 (PORV) is OPEN

Current conditions:

- Time = 1200:30
- RCS Pressure= 2135 psig decreasing
- 1RC-66 OPEN
- Core SCM = 18°F decreasing

1) In accordance with Rule 2 (Loss of SCM), all RCP's must be secured if __(1)__ SCM(s) reach(s) zero.

2) A reason RCP's are secured per the above requirement is to __(2)__.

Which ONE of the following completes the statements above?

A. 1. ANY
2. prevent pump damage that occurs from pumping a steam/water mixture

B. 1. ANY
2. ensure RCP's are secured before the RCS can evolve to a void fraction of > 70%

C. 1. core ONLY
2. prevent pump damage that occurs from pumping a steam/water mixture

D. 1. core ONLY
2. ensure RCP's are secured before the RCS can evolve to a void fraction of > 70%

ILT46 ONS SRO NRC Examination QUESTION 1 | 1 | **B**

General Discussion

MFDW is an approved acronym for Main Feedwater per Chapter F of the EOP/AP Writer's Guide

RCS is an approved acronym for Reactor Coolant System per Chapter F of the EOP/AP Writer's Guide

SCM is an approved acronym for Subcooling Margin per Chapter F of the EOP/AP Writer's Guide

RCP is an approved acronym for Reactor Coolant Pump per Chapter F of the EOP/AP Writer's Guide

Answer A Discussion

Incorrect: First part is correct. Second part is plausible because it is a desireable result of securing RCP's however it is not the reason.

Answer B Discussion

CORRECT: IAW Rule 2, RCP's are secured when any SCM reaches zero. RCP's are secured within 2 minutes to ensure void fractions of >70% do not exist when RCP's are secured or lost as void fractions of that magnitude will result in uncovering the core whe the phase separation occurs. Page 52 of EAP-LOSCM

Answer C Discussion

Incorrect. First part is plausble since there are EOP actions that occur based solely on Core SCM indication (ex: transfer to ICC when Core SCM indicates superheat). Second part is plausible because it is a desireable result of securing RCP's however it is not the reason.

Answer D Discussion

Incorrect. First part is plausble since there are EOP actions that occur based solely on Core SCM indication (ex: transfer to ICC when Core SCM indicates superheat). Second part is correct.

Basis for meeting the K

Requires knowing the reason for securing RCP when a PZR RV failure results in a loss of SCM..

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	NEW	

Development References	Student References Provided
EAP-LOSCM (Obj. 14 & 15) Pg 52 Rule 2	

APE008 AK3.04 - Pressurizer (PZR) Vapor Space Accident (Relief Valve Stuck Open)

Knowledge of the reasons for the following responses as they apply to the Pressurizer Vapor Space Accident: (CFR 41.5,41.10 / 45.6 / 45.13)

RCP tripping requirements ....

401-9 Comments:	Remarks/Status

EPE009 EA2.23 - Small Break LOCA

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

RCP operating parameters and limits ....

Given the following Unit 1 conditions:

- Reactor Power = 100%
- RCS Pressure = 2100 psig decreasing
- RBNS level increasing
- Reactor Building RIA's are in alarm

1) In accordance with Rule 2 (Loss of SCM), ANY RCP that remains running two minutes after its operating limit is reached is __(1)__.

2) If ANY RCP cannot be secured by the associated RCP Breaker switch on 1UB2, Rule 2 directs de-energizing __(2)__ 6900KV bus(es).

Which ONE of the following completes the statements above?

A. 1. left running
2. ONLY the associated

B. 1. left running
2. BOTH

C. 1. secured ONLY if its amps are stable
2. ONLY the associated

D. 1. secured ONLY if its amps are stable
2. BOTH

General Discussion

RCS is an approved acronym for Reactor Coolant System per Chapter F of the EOP/AP Writer's Guide

RBNS is an approved acronym for Reactor Building Normal Sump per Chapter F of the EOP/AP Writer's Guide

RIA is the official name of the Radiation Monitors

RCP is an approved acronym for Reactor Coolant Pump per Chapter F of the EOP/AP Writer's Guide

Answer A Discussion

Incorrect. First part is correct. Second part is plausible since De-energizing only the associated 6900kv bus would accomplish the desired results of securing the RCP that would not stop by its switch.

Answer B Discussion

Correct. Any RCP that remains running 2 minutes after SCM reaches zero is left running IAW Rule 2. If any RCP cannot be secured by its switch Rule 2 directs de-energizing both 6900 kv buses.

Answer C Discussion

Incorrect. First part is plausible since the concern is the amount of voiding that exist in the RCS and RCP vibration and amp readings are indirect indications of voiding in the RCS. Additionally, until recently (< 2 yrs) this was the guidance. Second part is plausible since De-energizing only the associated 6900kv bus would accomplish the desired results of securing the RCP that would not stop by its switch.

Answer D Discussion

Incorrect. First part is plausible since the concern is the amount of voiding that exist in the RCS and RCP vibration and amp readings are indirect indications of voiding in the RCS. Additionally, until recently (< 2 yrs) this was the guidance. Second part is correct.

Basis for meeting the K

Requires the ability to interpret RCP operating limits to determine the correct course of action during a SBLOCA.

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Memory	NEW	

Development References

Obj EAP-LOSCM (Obj: 14, 15) Pg 52/53
EOP Rule 2

Student References Provided

EPE009 EA2.23 - Small Break LOCA
Ability to determine or interpret the following as they apply to a small break LOCA: (CFR 43.5 / 45.13)
RCP operating parameters and limits ....

401-9 Comments:

Remarks/Status

EPE011 EA2.06 - Large Break LOCA
Ability to determine or interpret the following as they apply to a Large Break LOCA: (CFR 43.5 / 45.13)
That fan is in slow speed and dampers are in accident mode during LOCA .

Given the following Unit 1 conditions:
Initial conditions:

- Time = 0400
- Reactor Power = 100%
- RCS pressure 2100 psig rapidly decreasing
- RB Pressure 0.3 psig rapidly increasing
- Multiple RB RIA alarms

Current conditions:

- Time = 0402:30
- RCS pressure = 104 psig slowly decreasing
- RB pressure = 16.2 psig slowly increasing

Which ONE of the following describes the lights that will be ILLUMINATED in the picture below?

A. Damper RED light and RBCU GREEN light

B. Damper RED light and RBCU AMBER light

C. Damper GREEN light and RBCU GREEN light

D. Damper GREEN light and RBCU RED light

General Discussion

RCS is an approved acronym for Reactor Coolant System per Chapter F of the EOP/AP Writer's Guide

RB is an approved acronym for Reactor Building per Chapter F of the EOP/AP Writer's Guide

RBCU is an approved acronym for Reactor Building Cooling Unit per Chapter F of the EOP/AP Writer's Guide

Answer A Discussion

Damper Red light is incorrect but plausible based on the assumption that the dampers are motor operated. While there is a time delay associated with the RBCU's it is specific to the starting of the RBCU's themselves therefore under the misconception that the dampers are motor operated, the dampers would already be open on ES actuation due to high building pressure. RBCU Green is correct.

Answer B Discussion

Damper Red light is incorrect but plausible based on the assumption that the dampers are motor operated. While there is a time delay associated with the RBCU's it is specific to the starting of the RBCU's themselves therefore under the misconception that the dampers are motor operated, the dampers would already be open on ES actuation due to high building pressure. RBCU Amber is correct since it will be correct once the 3 minute timer times out. On ES actuation, the RBCU's all turn off and then start in Low speed after a 3 minute timer expires,

Answer C Discussion

Correct. The dampers are manual dampers that operate on RBCU discharge pressure and counterweights therefore since the RBCU is off the dampers would be closed. When ES channel 6 actuates at 3 psig RB pressure all RBCU's will automatically stop and then after a 3 minute timer it will start in Low speed (Amber light). Since the 3 minutes has not yet elapsed the RBCU will be off (Green light).

Answer D Discussion

Damper Green is correct. RBCU Red is incorrect but plausible since the switch is in the High position. The Red light is illuminated when the RBCU is running in HIGH speed. Additionally plausible since there is a 3 minute timer associated with the RBCU going to Low speed. This means that since the 3 minutes has not yet elapsed it is plausible to believe that the RBCU would still be in High speed.

Basis for meeting the K

Requires the ability to determine the correct RBCU fan speed and damper position at a specific time following a LBLOCA.

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	NEW	

Development References	Student References Provided
PNS-RBC (Obj: R5,R7,R9) Pg 16 PNS-RBC	

EPE011 EA2.06 - Large Break LOCA

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

That fan is in slow speed and dampers are in accident mode during LOCA .

401-9 Comments:	Remarks/Status

APE015/017 AK1.04 - Reactor Coolant Pump (RCP) Malfunctions

Knowledge of the operational implications of the following concepts as they apply to Reactor Coolant Pump Malfunctions (Loss of RC Flow): (CFR 41.8 / 41.10 / 45.3)

Basic steady state thermodynamic relationship between RCS loops and S/Gs resulting from unbalanced RCS flow ....

Given the following Unit 1 conditions:
Initial conditions:

- Reactor power = 80%
- 1A Feedwater Flow = 4.4 x 10^6 LB/HR
- 1B Feedwater Flow = 4.4 x 10^6 LB/HR

Current conditions:

- 1B1 RCP trips

1) Reactor power will AUTOMATICALLY be reduced to a MAXIMUM of __ (1) __% Core Thermal Power.

2) When the MAXIMUM power level is reached, a MFDW flow of __ (2) __10^6 LB/HR will be established to the 1A Steam Generator.

Which ONE of the following completes the statements above?

A. 1. 65
2. 5.4

B. 1. 74
2. 5.4

C. 1. 65
2. 6.1

D. 1. 74
2. 6.1

ILT46 ONS SRO NRC Examination QUESTION 4

4

B

General Discussion

RCP is an approved acronym for Reactor Coolant Pump per Chapter F of the EOP/AP Writer's Guide

MFDW is an approved acronym for Main Feedwater per Chapter F of the EOP/AP Writer's Guide

Answer A Discussion

Incorrect.
First part is incorrect and plausible. Per AP/1 65% is the power level the plant would be limited to for a loss of a Main FDW pump. The student must be able to determine the correct final power level for the given plant condition.
Second part is correct..

Answer B Discussion

Correct. The AP requires a plant runback/power reduction to ~74%.
Second part is correct.. With a loss of 1 RCP power must be reduced to less than or equal to 74% CTP. Total FDW flow at this power level is ~8.1 MLB/HR. A Main FDW flow re-ratio will result in 2/3 flow in the loop with two RCPs (A) and 1/3 flow in the loop with the single RCP (B). Total Main FDW flow at 74% will be ~8.14 MLB/HR resulting in ~5.4 MLB/HR in the A loop.

Answer C Discussion

Incorrect.
First part is incorrect and plausible. Per AP/1 65% is the power level the plant would be limited to for a loss of a Main FDW pump. The student must be able to determine the correct final power level for the given plant condition.
Second part is incorrect and plausible. The 6.1 LMB/HR flow rate is the number that is obtained when 8.1 MLB/HR (total Main FDW flow at 74%) is multiplied by .75 (3/4 flow) rather than .666 (2/3 flow). The student may incorrectly assume a 3/4 and 1/4 re-ratio of feedwater.

Answer D Discussion

Incorrect.
First part is correct. The AP requires a plant runback/power reduction to ~74%.
Second part is incorrect and plausible. The 6.1 LMB/HR flow rate is the number that is obtained when 8.1 MLB/HR (total Main FDW flow at 74%) is multiplied by .75 (3/4 flow) rather than .666 (2/3 flow). The student may incorrectly assume a 3/4 and 1/4 re-ratio of feedwater.

Basis for meeting the K

Requires the applicant to understand the relationship between RCS flows and SG levels following a RCP malfunction and apply that undertanding to determine the operational implication associated with this event.

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	BANK	ILT39 Q5

Development References

EAP-APG R8
AP/1
EAP-APG-AP/16

Student References Provided

APE015/017 AK1.04 - Reactor Coolant Pump (RCP) Malfunctions

Knowledge of the operational implications of the following concepts as they apply to Reactor Coolant Pump Malfunctions (Loss of RC Flow): (CFR 41.8 / 41.10 / 45.3)

Basic steady state thermodynamic relationship between RCS loops and S/Gs resulting from unbalanced RCS flow ....

401-9 Comments:

Remarks/Status

APE022 AK1.01 - Loss of Reactor Coolant Makeup

Knowledge of the operational implications of the following concepts as they apply to Loss of Reactor Coolant Makeup: (CFR 41.8 / 41.10 / 45.3)

Consequences of thermal shock to RCP seals . . . .

Given the following Unit 1 conditions:
Initial conditions:

- Time = 1200
- Reactor power = 100%
- 1HP-31 failed CLOSED
- AP/14 (Loss of Normal HPI Makeup and/or RCP Seal Injection) initiated

Current conditions:

- Time = 1300
- 1HP-31 has been repaired
- Seal injection flow is being re-established to the RCP seals

1) In accordance with AP/14, at Time = 1200 all four RCP's __(1)__.

2) RCP seal injection flow is re-established slowly to prevent thermal shock and possible damage to the RCP __ (1) __.

Which ONE of the following completes the statements above?

A. 1. must be secured
2. seals

B. 1. must be secured
2. thermal barrier

C. 1. can continue to operate
2. seals

D. 1. can continue to operate
2. thermal barrier

General Discussion

RCP is an approved acronym for Reactor Coolant Pump per Chapter F of the EOP/AP Writer's Guide

Answer A Discussion

Incorrect. First part is plausible since it would be correct if Component Cooling were not available. Second part is correct.

Answer B Discussion

Incorrect. First part is plausible since it would be correct if Component Cooling were not available. Second part is plausible because the thermal barrier is used to cool the RCS during a loss of seal injection. The candidate could have the misconception that re-establishing flow could damage the thermal barrier.

Answer C Discussion

Correct. Per AP14 step 4,22 Note, continued operation is permitted provided component cooling is functioning normally and RCP limits are not exceeded. At 1200, RCP parameters will not have had time to approach any limits therefore the pumps can continue to operate. Per a Caution for Step 4.70, re-establishing injection flow too fast may cause thermal shock which could damage the RCP or RCP seal.

Answer D Discussion

Incorrect. First part is correct. Second part is plausible because the thermal barrier is used to cool the RCS during a loss of seal injection. The candidate could have the misconception that re-establishing flow could damage the thermal barrier.

Basis for meeting the K

Question requires knowledge of the operational implications of re-establishing seal injection flow to the RCPs including thermal shock and possible damage.

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	MODIFIED	

Development References
EAP-AP14 Obj R9 AP/14

Student References Provided

APE022 AK1.01 - Loss of Reactor Coolant Makeup

Knowledge of the operational implications of the following concepts as they apply to Loss of Reactor Coolant Makeup: (CFR 41.8 / 41.10 / 45.3)

Consequences of thermal shock to RCP seals . . . .

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 2 conditions:

- RCS cooldown in progress
- LPI aligned in the Series Mode

1) The reason Series Mode was developed for Unit 2 was to provide __(1)__.

2) A loss of the __(2)__ LPI Pumps would result in a total loss of Decay Heat Removal.

A. 1. a backup to the Switchover mode of LPI
   2. 2A and 2C

B. 1. a backup to the Switchover mode of LPI
   2. 2B and 2C

C. 1. additional cooling capacity during 2/0 pump ops
   2. 2A and 2C

D. 1. additional cooling capacity during 2/0 pump ops
   2. 2B and 2C

ILT46 ONS SRO NRC Examination QUESTION 6

6

C

General Discussion

RCS is an approved acronym for Reactor Coolant System per Chapter F of the EOP/AP Writer's Guide

LPI is an approved acronym for Low Pressure Injection per Chapter F of the EOP/AP Writer's Guide

Answer A Discussion

Incorrect. First part is plausible since it is the reason that the High Pressure Mode was added to Unit 2 LPI system. Second part is correct.

Answer B Discussion

Incorrect. First part is plausible since it is the reason that the High Pressure Mode was added to Unit 2 LPI system. Second part is plausible since the 2C LPI pump is one of the two pumps and the flowpath for the LPI fluid goes through the 2B LPI cooler first making it plausible that the 2B LPI pump would be used.

Answer C Discussion

Correct. During cooldowns in the 2/0 RCP configuration on Units 1 and 2, it was noticed that, due to the heat added by the second RCP, it was impossible to cooldown at or near the procedural cooldown rate. A need for additional cooling capacity was thus determined. A way that was devised to provide the additional cooling needed was the LPI Series Mode. The flowpath for the LPI Series Mode is from the Decay Heat Drop Line through LP-68, through the "B" LPI Cooler, through LP-73, LP-74 and LP-75 to the suction of the "A" and "C" LPI Pumps. The LPI Pump discharge is to the "A" LPI Cooler and then to the vessel through both headers via LPI cross-over.

Answer D Discussion

Incorrect. First part is correct. Second part is plausible since the 2C LPI pump is one of the two pumps and the flowpath for the LPI fluid goes through the 2B LPI cooler first making it plausible that the 2B LPI pump would be used

Basis for meeting the K

Requires knowledge of the relationship between a Loss of DHR and LPI pump availability when in the Series Mode of DHR alignment with LPI.

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	NEW	

Development References	Student References Provided
Obj. PNS-LPI 9, 19, 20 PNS-LPI	

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

APE026 2.2.42 - Loss of Component Cooling Water (CCW)
APE026 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 3 conditions:
Initial conditions:

- Time = 1200
- Reactor power = 100%
- 3A CC pump trips
- 3B CC pump fails to start

Current conditions:

- Time = 1203
- 3HP-5 has closed
- 3B CC pump has been manually started
- Pressurizer level = 235” increasing

Which ONE of the following states the:

1) Letdown temperature setpoint that resulted in 3HP-5 closing?

2) MINIMUM indicated Pressurizer level that will require declaring Tech Spec 3.4.9 (Pressurizer) LCO NOT met in accordance with PT/3/A/0600/001 (Periodic Instrument Surveillance)?

A. 1. 130°F
2. 260 inches

B. 1. 135°F
2. 260 inches

C. 1. 130°F
2. 285 inches

D. 1. 135°F
2. 285 inches

ILT46 ONS SRO NRC Examination QUESTION 7

7

B

General Discussion

CC is an approved acronym for Component Cooling System per Chapter F of the EOP/AP Writer's Guide

Answer A Discussion

Incorrect. First part is incorrect but plausible since 130 degrees is the setpoint for the High Letdown Temperature alarm. Second part is correct.

Answer B Discussion

Correct. At 135 degrees letdown temperature, 1HP-5 will automatically close to isolate letdown. Although the LCO for TS 3.4.9 states the maximum Pzr level to be 285", that is an analytical value that is instrument corrected in the surveillance performed in PT/600/01 which sets indicated level of 260" as the threshold for TS entry conditions.

Answer C Discussion

Incorrect. First part is incorrect but plausible since 130 degrees is the setpoint for the High Letdown Temperature alarm. Second part is plausible since 285" is the value stated in the LCO of TS 3.4.9.

Answer D Discussion

Incorrect. First part is correct, Second part is plausible since 285" is the value stated in the LCO of TS 3.4.9.

Basis for meeting the K

Requires the ability to recognize TS entery conditions (Pzr level) that are a result of a loss of component cooling.

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Memory	NEW	

Development References

Obj. ADM-ITS R8, PNS-HPI-06
PNS-HPI
TS 3.4.9
PT/3/A/0600/001

Student References Provided

APE026 2.2.42 - Loss of Component Cooling Water (CCW)

APE026 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

APE027 AA1.01 - Pressurizer Pressure Control System (PZR PCS) Malfunction

Ability to operate and / or monitor the following as they apply to the Pressurizer Pressure Control Malfunctions: (CFR 41.7 / 45.5 / 45.6)
PZR heaters, sprays, and PORVs ....

Given the following Unit 1 conditions:
Initial conditions:

- Reactor power = 90%
- 1B MFDW pump trips

Current conditions:

- Reactor power = 62% stable
- RCS pressure = 2185 psig slowly decreasing
- Pressurizer level = 229 inches slowly decreasing
- Pressurizer temperature = 648°F slowly increasing
- Pressurizer Heater Bank 1 switch is ON
- Pressurizer Heater Bank 2 (Groups B & D) are in AUTO and off
- Pressurizer Heater Banks 3 and 4 are in AUTO and off

1) The pressurizer is __ (1) __.

2) The pressurizer saturation circuit __ (2) __ responding as expected.

Which ONE of the following completes the statements above?

A. 1. subcooled
2. is

B. 1. subcooled
2. is NOT

C. 1. saturated
2. is

D. 1. saturated
2. is NOT

ILT46 ONS SRO NRC Examination QUESTION 8 | 8 | B

General Discussion

MFDW is an approved acronym for Main Feedwater per Chapter F of the EOP/AP Writer's Guide

Answer A Discussion

1st part is correct. Using the steam tables, 2185 psig = 2200 psia. Tsat for 2200 psia is 649.5 degrees. This makes the Pzr subcooled by 1.5 degrees.

2nd part is incorrect because the Pzr saturation circuit should have energized Htr Bank 2. It is plausible because based on the Pzr Press setpoints, it would be correct.

Answer B Discussion

Correct.
1st part is correct. Using the steam tables, 2185 psig = 2200 psia. Tsat for 2200 psia is 649.5 degrees. This makes the Pzr subcooled by 1.5 degrees.

2nd part is correct. Heater Bank 2 (Bp B&D) should be ON. They are off which means that the circuit has failed.

Answer C Discussion

1st part is incorrect because the Pzr is subcooled. It is plausible because 2185 psig should be converted to psia before calculating Tsat. This should be 2000 psia (649.5 degrees). It the applicant calculates Tsat using 2185 psi (does not convert to psia), Tsat is ~648 degrees which would be saturated.

2nd part is incorrect but plausible (see A).

Answer D Discussion

1st part is incorrect but plausible (see C).

2nd part is correct (see B).

Basis for meeting the K

Requires the ability to monitor Pzr pressure control system (specifically Pzr heaters) and determine that the Pzr saturation circuit has malfunctioned.

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	MODIFIED	ILT39 Q7

Development References
PNS-PZR (Obj: 4, 13) pg: 10, 19 and 72 ONS ILT39 Q7

Student References Provided

APE027 AA1.01 - Pressurizer Pressure Control System (PZR PCS) Malfunction

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

PZR heaters, sprays, and PORVs ....

401-9 Comments:	Remarks/Status

EPE029 EA1.11 - Anticipated Transient Without Scram (ATWS)
Ability to operate and monitor the following as they apply to a ATWS: (CFR 41.7 / 45.5 / 45.6)
Manual opening of the CRDS breakers ....

Given the following Unit 1 conditions:
Initial conditions:

- Reactor power = 100%
- BOTH MFDW pumps trip

Current conditions:

- Reactor power = 57% slowly decreasing

1) In accordance with Rule 1 (ATWS), the CRD breakers are opened __(1)__ aligning HPI injection from the BWST.

2) The direction given to the operator opening the CRD breaker is to __(2)__ Arc Flash PPE.

Which ONE of the following completes the statements above?

A. 1. prior to
2. wear

B. 1. prior to
2. NOT wear

C. 1. after
2. wear

D. 1. after
2. NOT wear

ILT46 ONS SRO NRC Examination QUESTION 9

9

D

General Discussion

The RO will give specific direction to the outside operators for aligning HPI and tripping of the CRD breakers per Rule 1. The normal safety practice when opening a 600V breaker is to wear Arc Flash PPE. The seriousness of an ATWS event necessitates a timely response. It is important that the outside operator be directed NOT to wear PPE as this would be different from what he/she would normally do.

MFDW is an approved acronym for Main Feedwater per Chapter F of the EOP/AP Writer's Guide

CRD is an approved acronym for Control Rod Drive per Chapter F of the EOP/AP Writer's Guide

BWST is an approved acronym for Borated Water Storage Tank per Chapter F of the EOP/AP Writer's Guide

HPI is an approved acronym for High Pressure Injection per Chapter F of the EOP/AP Writer's Guide

Answer A Discussion

Incorrect.
First part is incorrect and plausible. Opening the CRD breakers is an action directed by Rule 1 with the intent of remotely tripping the reactor. It is reasonable for the candidate to conclude the highest priority is to accomplish the reactor trip. Since opening the CRD breakers is done outside the control room and takes several minutes to accomplish it would be consistant with getting the reacotr tipped to go ahead and get someone dispatched to open the breakers prior to aligning HPI injection..
Second part is incorrect and plausible. The normal expectation is to wear Arc Flash PPE when operating a 600V breaker. Without the specific direction NOT to wear the PPE the outside operator may take unnecessary time to don this PPE.

Answer B Discussion

Incorrect.
First part is incorrect and plausible. Opening the CRD breakers is an action directed by Rule 1 with the intent of remotely tripping the reactor. It is reasonable for the candidate to conclude the highest priority is to accomplish the reactor trip. Since opening the CRD breakers is done outside the control room and takes several minutes to accomplish it would be consistant with getting the reacotr tipped to go ahead and get someone dispatched to open the breakers prior to aligning HPI injection.
Second part is correct.

Answer C Discussion

Incorrect.
First part is correct.
Second part is incorrect and plausible. The normal expectation is to wear Arc Flash PPE when operating a 600V breaker. Without the specific direction NOT to wear the PPE the outside operator may take unnecessary time to don this PPE.

Answer D Discussion

Correct.
First part is correct. HPI is aligned prior to dispatching an operator to open the CRD breakers.
Second part is correct. Rule 1 does have the control room operator direct the outside operator NOT to wear Arc Flash PPE.

Basis for meeting the K

Requires the ability to manually operate the CRD breakers during an ATWS

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Memory	BANK	ILT39 Q67

Development References
EAP-UNPP (Obj: R3) Rule 1

Student References Provided

EPE029 EA1.11 - Anticipated Transient Without Scram (ATWS)
Ability to operate and monitor the following as they apply to a ATWS: (CFR 41.7 / 45.5 / 45.6)
Manual opening of the CRDS breakers   ....

401-9 Comments:	Remarks/Status

ILT46 ONS SRO NRC Examination QUESTION 10 10 **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 1 conditions:

- Loss of Heat Transfer has occurred
- Unit 1 TDEFWP is now available to feed the Steam Generators
- 1A SG level = 8” slowly decreasing
- 1A SG pressure = 412 psig slowly decreasing
- 1B SG level = 5” slowly decreasing
- 1B SG pressure = 385 psig slowly decreasing

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

Which ONE of the following completes the statement above?

A. 1. 100
2. damage to the Steam Generators

B. 1. 100
2. an RCS overcooling event

C. 1. 50
2. damage to the Steam Generators

D. 1. 50
2. an RCS overcooling event

ILT46 ONS SRO NRC Examination QUESTION 10 10 **A**

General Discussion

TDEFWP is an approved acronym for Turbine Driven Emergency Feedwater Pump per Chapter F of the EOP/AP Writer's Guide

SG is an approved acronym for Steam Generator per Chapter F of the EOP/AP Writer's Guide

Answer A Discussion

Correct. Rule 7 limits flow to each affected Steam Generator to 100 gpm if the SG is dry and does NOT have heat transfer established. With levels < 15" AND steam generator pressures decreasing, there are no signs of heat transfer in the SG. The limit is there to protect the SG from damage.

Answer B Discussion

Incorrect. First part is correct. Second part is plausible since quickly establishing a level in a dry steam generator can often result in an overcooling event and is a serious concern and would therefore be a plausible reason to limit flow to the SG since the amount of flow established correlates to the cooldown that results.

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. 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. Second part is plausible since quickly establishing a level in a dry steam generator can often result in an overcooling event and is a serious concern and would therefore be a plausible reason to limit flow to the SG since the amount of flow established correlates to the cooldown that results.

Basis for meeting the K

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

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	NEW	

Development References	Student References Provided
EAP-LOHT Obj 27 EAP-LOHT Att 3	

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 EK3.02 - Loss of Offsite and Onsite Power (Station Blackout)
Knowledge of the reasons for the following responses as the apply to the Station Blackout : (CFR 41.5 / 41.10 / 45.6 / 45.13)
Actions contained in EOP for loss of offsite and onsite power ....

Oconee plant conditions:

- Station blackout has occurred
- The EOP Blackout tab has been in progress for three hours
- 1CA voltage = 104 VDC

Which ONE of the following describes why the Blackout tab directs the crew to FAIL 1CC-8 (CC RETURN PENT (54) OUTSIDE BLOCK) closed?

A. 1CC-8 will fail open if IA pressure decreases to < 35 psig.

B. Prevents auto restart of CC pumps once AC power is restored.

C. Prevents cooler damage from an open flowpath to coolers when flow is restored.

D. 1CC-8 will fail open when DC power is lost to the solenoid.

General Discussion

Modified stem of the question to make it a station blackout. The BO procedure does not direct you to fail 1CC-8 unless Units 2 & 3 have experianced a blackout.

EOP is an approved acronym for Emergency Operating Procedure per Chapter F of the EOP/AP Writer's Guide

CC is an approved acronym for Component Cooling System per Chapter F of the EOP/AP Writer's Guide

Answer A Discussion

Incorrect: 1CC-8 fails closed on loss of IA. Plausible because some of the air operated valves in the plant have a handwheel installed which can force (fail) the valve closed. Therefore,the applicant has to know how this valve fails.

Answer B Discussion

Incorrect:Although the statement is true as the pumps will auto start. But, this is not the reason/bases for the step. "D" is the actual reason/bases behind failing the valve closed.

Answer C Discussion

Incorrect: Plausible since this essentially the reason that HP-31 is closed on a loss of seal injection (prevent seal damage from an open flowpath when HPI pump is restarted) therefore it is plausible to apply that same concern to restoring CC flow..

Answer D Discussion

Correct: Ensures positive control over containment since the valve will fail open on loss of DC to the solenoid.

Basis for meeting the K

K/A MATCH ANALYSIS
Question requires knowledge of bases for a step in the BO tab of the EOP.

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Memory	BANK	2007 RO Q#13

Development References

EAP-BO (Obj: 11) pg 21/41
EOP Encl. 5.44
2007 NRC Exam Q 13

Student References Provided

EPE055 EK3.02 - Loss of Offsite and Onsite Power (Station Blackout)

Knowledge of the reasons for the following responses as the apply to the Station Blackout : (CFR 41.5 / 41.10 / 45.6 / 45.13)

Actions contained in EOP for loss of offsite and onsite power ....

401-9 Comments:

Remarks/Status

APE056 2.4.18 - Loss of Offsite Power
APE056 GENERIC
Knowledge of the specific bases for EOPs. (CFR: 41.10 / 43.1 / 45.13)

Given the following Unit 1 conditions:
Initial conditions:

- Reactor trip from 100% power due to a loss of offsite power (Switchyard Isolation)
- CT-1 lockout

Current conditions:

- AP/11 (Recovery from Loss of Power) initiated
- $S1_1$ (STBY BUS 1 to MFB1) Breaker will NOT close
- LOAD SHED COMPLETE is NOT lit on the ES Component Status Panel

In accordance with AP/11, electrical loads are secured to _______.

Which ONE of the following completes the statement above?

A. prevent exceeding CT-4 Overload Limits

B. prevent exceeding CT-5 Overload Limits

C. ensure $S1_2$ (STBY BUS 2 to MFB2) Breaker is operated within limits

D. ensure adequate voltage to ES equipment during a subsequent LOCA

ILT46 ONS SRO NRC Examination QUESTION 12 12 **A**

General Discussion

ES is an approved acronym for Engineered Safeguards per Chapter F of the EOP/AP Writer's Guide

LOCA is an approved acronym for Loss Of Coolant Accident per Chapter F of the EOP/AP Writer's Guide

Answer A Discussion

Correct. Loads are reduced to prevent overrating CT-4 or CT-5. In this case power will be from CT-4.

Answer B Discussion

Incorrect. Plausible because it would be correct if power were coming from CT-5.

Answer C Discussion

Incorrect. Plausible because AP/11 Encl. 5.1A has limits for only one Standby Bus Breaker closed.

Answer D Discussion

Incorrect. Plausible because the LOCA Load Shed circuit ensures adequate voltage to ES equipment during non-loss of power ES actuations.

Basis for meeting the K

The EOP has no actions for a Loss of Offsite Power only a blackout. This question was written for reasons of actions contained in AP/11 (Restoration of power) which does have actions for a loss of offsite power.Requires knowledge of the basis behind steps in AP/11 following a loss of offsite power.

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Memory	BANK	ILT41 Q11

Development References

ILT41 Q11
EAP-APG-R8
EAP-APG, AP11
AP/11
EL-PSL

EAP-APG AP/11

Student References Provided

APE056 2.4.18 - Loss of Offsite Power
APE056 GENERIC
Knowledge of the specific bases for EOPs. (CFR: 41.10 / 43.1 / 45.13)

401-9 Comments:

Remarks/Status

APE057 AA1.05 - 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)
Backup instrument indications ....

Given the following Unit 1 conditions:
Initial conditions:

- Large Break LOCA occurred 1 hour ago
- RCS Pressure = 30 psig
- 1A & 1B LPI Pumps are running

Current conditions:

- 1KVIA is de-energized
- 1SA-18/A-3 RVLIS/ICCM/RG1.97 Train A Trouble actuated

Which ONE of the following describes:

1) the impact on the LPI system instrumentation?

2) what alternate indication can be used to determine the status of the LPI pumps?

A. 1. LPI HDR 1A INJ FLOW (gpm) is blank
2. 1A LPI Pump amps and breaker indicating lights

B. 1. LPI HDR 1A INJ FLOW (gpm) is blank
2. 1A LPI HDR flow computer point (OAC)

C. 1. LPI HDR 1B INJ FLOW (gpm) is blank
2. 1B LPI Pump amps and breaker indicating lights

D. 1. LPI HDR 1B INJ FLOW (gpm) is blank
2. 1B LPI HDR flow computer point (OAC)

ILT46 ONS SRO NRC Examination QUESTION 13

13

A

General Discussion

LOCA is an approved acronym for Loss of Coolant Accident per Chapter F of the EOP/AP Writer's Guide

LPI is an approved acronym for Low Pressure Injection per Chapter F of the EOP/AP Writer's Guide

OAC is an approved acronym for Operator Aid Computer per Chapter F of the EOP/AP Writer's Guide

Answer A Discussion

A.Correct: The loss of 1KVIA de-energizes Train A ICCM and results in LPI Train A Injection Flow dixon indicator failing. Pump amps and breaker indicating lights are not powered from ICCM and remain normal (approx 53-54 amps).

Answer B Discussion

B.Incorrect: First part is correct as described above. Second part is plausible if assumption is made that the OAC is not dependent on ICCM.

Answer C Discussion

Incorrect: First part is plausible as it is the indication lost if KVIB were de-energized and Oconees power supplys do not always follow the standard aligment of "A" supplies feed "A" trains. (Ex: is the A Pzr RTD feeds the B Pzr level channel). Failure to apply the correct train power supply would result in this selection. Second part would be correct if the first part were correct.

Answer D Discussion

Incorrect. First part is plausible as it is the indication lost if KVIB were de-energized and Oconees power supplys do not always follow the standard aligment of "A" supplies feed "A" trains. (Ex: is the A Pzr RTD feeds the B Pzr level channel). Failure to apply the correct train power supply would result in this selection.Second part is plausible for the first part if assumption is made that the OAC is not dependent on ICCM.

Basis for meeting the K

Requires ability to assess LPI pump operating status and correlate pump flow to operating current (amps) and Cooler ΔT following a loss of an instrument bus (KVIA). These indications would be used as a backup indication to the flow instrument if the flow instrument were lost.

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	BANK	2009 RO Q#13

Development References

OP/1/A/1105/012, L&P
IC-RCI (Obj:5) Pg 21/94 and 59/94
EL-CB Pg 44/76
2009 NRC Exam Q 13

Student References Provided

APE057 AA1.05 - 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)

Backup instrument indications ....

401-9 Comments:

Remarks/Status

APE058 AK3.01 - Loss of DC Power

Knowledge of the reasons for the following responses as they apply to the Loss of DC Power: (CFR 41.5,41.10 / 45.6 / 45.1)

Use of dc control power by D/Gs ....

Given the following plant conditions:

- KHU-1 generating to grid
- 1DA input breaker (K1-DA-1A, Batt #1 Ckt Bkr) fails OPEN
- 2SA-17/A3 (Unit 1 Alarm Lockout) actuates

1) KHU #1 __(1)__ trip.

2) The reason DC power is used for Keowee control power is that it will be available for a MINIMUM of approximately __ (2) __ hour(s) following a loss of ALL AC power.

Which ONE of the following completes the statements above?

A. 1. will NOT
2. one

B. 1. will NOT
2. four

C. 1. will
2. one

D. 1. will
2. four

ILT46 ONS SRO NRC Examination QUESTION 14

14

A

General Discussion

Answer A Discussion

Correct. Loss of DC will cause an Alarm Lockout. An Alarm lockout will NOT trip a running unit but will prevent a normal start of a non-running unit. The Keowee batteries are desigend to last about 1 hour.

Answer B Discussion

Incorrect. First part is correct. Second part is plausible because 4 hours is a common TS completion time and may be confused with how long the battery will last.

Answer C Discussion

Incorrect. First part is plausble since a Normal or Emergency lockout does trip a running KHU and it would be logical to believe that a loss of DC power to the KHU would result in loss of function that would result in the unit tripping as long as it were not running as a result of an Emergency Start (which bypasses most of the unit trips). Second part is correct.

Answer D Discussion

Incorrect. First part is plausble since a Normal or Emergency lockout does trip a running KHU and it would be logical to believe that a loss of DC power to the KHU would result in loss of function that would result in the unit tripping as long as it were not running as a result of an Emergency Start (which bypasses most of the unit trips). Second part is plausible because 4 hours is a common TS completion time and may be confused with how long the battery will last.

Basis for meeting the K

Quest requires knowledge of the reason DC power is used for Keowee Control power. At Oconee we use the Keowee Hydro units instead of D/Gs.

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Memory	MODIFIED	ILT42 Q13

Development References

ILT 42 Q13
EL-DCD Obj 2
EL-KHG Obj 9

Student References Provided

APE058 AK3.01 - Loss of DC Power

Knowledge of the reasons for the following responses as they apply to the Loss of DC Power: (CFR 41.5,41.10 / 45.6 / 45.1)

Use of dc control power by D/Gs ....

401-9 Comments:

Remarks/Status

APE065 2.4.34 - Loss of Instrument Air

APE065 GENERIC

Knowledge of RO tasks performed outside the main control room during an emergency and the resultant operational effects. (CFR: 41.10 / 43.5 / 45.13)

Given the following Unit 1 conditions:

- Reactor Power = 100%
- AP/22 (Loss of Instrument Air) in progress

1) The MINIMUM condition(s) that will result in a loss of control of 1HP-31 is a loss of __(1)__.

2) Once the above condition(s) are met, the operator sent to operate 1HP-31 manually will INITIALLY be required to throttle 1HP-31 in the __(2)__ direction.

Which ONE of the following completes the statements above?

A. 1. IA pressure ONLY
2. closed

B. 1. IA pressure ONLY
2. open

C. 1. IA AND AIA pressure
2. closed

D. 1. IA AND AIA pressure
2. open

ILT46 ONS SRO NRC Examination QUESTION 15

15

C

General Discussion

HPI is an approved acronym for High Pressure Injection per Chapter F of the EOP/AP Writer's Guide

IA is an approved acronym for Instrument Air per Chapter F of the EOP/AP Writer's Guide

AIA is an approved acronym for Auxiliary Instrument Air per Chapter F of the EOP/AP Writer's Guide

Answer A Discussion

Incorrect. First part is plausible since there are many HPI system pneumatic valves that are not backed up by the AIA system (ex. HP-8, HP-9). Second part is correct.

Answer B Discussion

Incorrect. First part is plausible since there are many HPI system pneumatic valves that are not backed up by the AIA system (ex. HP-8, HP-9). Second part is plausible since most pneumatic valves fail closed on a loss of motive force.

Answer C Discussion

Correct. Since 1HP-31 is backed up with AIA, it takes a loss of both IA and AIA to impact the operation of the valve. 1HP-31 is unique in that it fails open on loss of motive force therefore the operator will initially be directed to close the valve.

Answer D Discussion

Incorrect. First part is correct. Second part is plausible since most pneumatic valves fail closed on a loss of motive force.

Basis for meeting the K

Per discussion with chief examiner, it is acceptable to ask about a task performed by a non-licensed operator in the field that is directed to be done by the control room. This questions requires knowledge of the task of restoring seal injection flow to normal on a loss of IA and AIA. Since the valve fails open the RO must know the operational effect of the loss of IA on seal injection flow and the operational affect of dispatching an operator to restore seal injection flow to normal (32gpm).

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	NEW	

Development References

EAP-APG Obj R9
AP/22

Student References Provided

APE065 2.4.34 - Loss of Instrument Air

APE065 GENERIC

Knowledge of RO tasks performed outside the main control room during an emergency and the resultant operational effects. (CFR: 41.10 / 43.5 / 45.13)

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:

- A loss of ALL sources of Steam Generator feed has occurred
- 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

ILT46 ONS SRO NRC Examination QUESTION 16 16 **D**

General Discussion

RCS is an approved acronym for Reactor Coolant System per Chapter F of the EOP/AP Writer's Guide

SCM is an approved acronym for Subcooling Margin per Chapter F of the EOP/AP Writer's Guide

HPI is an approved acronym for High Pressure Injection per Chapter F of the EOP/AP Writer's Guide

CETC is an approved acronym for Core Exit Thermocouple per Chapter F of the EOP/AP Writer's Guide

Pzr is an approved acronym for Pressurizer per Chapter F of the EOP/AP Writer's Guide

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 if slowly decreasing pressure is used as the basis for core SCM increasing.

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 K

K/A MATCH ANALYSIS
Requires knowledge of criteria for throttling HPI during HPI Forced Cooling based on the status of core cooling provided by HPI (CETC trend and Core SCM status)

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	BANK	2009 RO Q#18

Development References

EP/1/1800/01 Rule 6
ILT 36 Q18
EAP-HPI CD (Obj: 6) Pg 10/18

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

ILT46 ONS SRO NRC Examination QUESTION 17 17 **C**

BWE05 EK2.1 - Excessive Heat Transfer

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

Components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.

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
- Turbine bypass valves in Auto
- Reactor Building pressure = 0.2 psig stable

Which ONE of the following describes:

1) the status of the TDEFWP?

2) how subsequent operation of the TDEFWP would be performed?

A. 1. Operating
2. Can be secured with TDEFWP control switch before AFIS is reset

B. 1. Operating
2. Can be secured with TDEFWP control switch ONLY after AFIS is reset

C. 1. NOT operating
2. Can be started with TDEFWP control switch before AFIS is reset

D. 1. NOT operating
2. Can be started with TDEFWP control switch ONLY after AFIS is reset

---

General Discussion

RCS is an approved acronym for Reactor Coolant System per Chapter F of the EOP/AP Writer's Guide

SG is an approved acronym for Steam Generator per Chapter F of the EOP/AP Writer's Guide

TDEFWP is an approved acronym for Turbine Driven Emergency Feedwater Pump per Chapter F of the EOP/AP Writer's Guide

AFIS is a system name

Answer A Discussion

Incorrect: 1st part is incorrect but plausible since 1FDW-315 is closed in first step of Rule 5. This makes it plausible that AFIS would not secure the TDEFWP so that it would be available to feed the B SG if needed. 2nd part is correct.

Answer B Discussion

Incorrect: 1st part is plausible since 1FDW-315 is closed in first step of Rule 5. This makes it plausible that AFIS would not secure the TDEFWP so that it would be available to feed the B SG if needed. 2 nd 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: With the switch in AUTO, MS-93 to the TDEFDWP will close when receiving an AFIS signal. Going to RUN with the TDEFWP switch overrides the AFIS signal and allows the operator to restart the TDEFWP as necessary to feed Steam Generators without resetting the AFIS signal.

Answer D Discussion

Incorrect: TDEFWP would be off. 2 nd 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 K

K/A MATCH ANALYSIS
Requires knowledge of the relationship between EHT and the manual and automatic operation of the TDEFWP.

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	BANK	2009A RO Q#18

Development References

CF-EF (Obj: 30) Pg 29-31
2009 A NRC Exam Q 18

Student References Provided

BWE05 EK2.1 - Excessive Heat Transfer

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

Components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features.

401-9 Comments:

Remarks/Status

BWE10 EA2.2 - Post-Trip Stabilization
Ability to determine and interpret the following as they apply to the (Post-Trip Stabilization)
(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:

- Reactor tripped from 100% power
- 1MS-10 (Main Steam Relief Valve) is stuck open
- Main Steam pressure is being reduced in an attempt to reseat 1MS-10

In accordance with Subsequent Actions of the EOP,

1) Main Steam pressure will be reduced in __(1)__ psig increments.

2) the MINIMUM RCS temperature allowed while reseating a MSRV without running a shutdown margin calculation is __(2)__ °F.

Which ONE of the following completes the statements above?

A. 1. 10
2. 532

B. 1. 20
2. 532

C. 1. 10
2. 525

D. 1. 20
2. 525

General Discussion

EOP is an approved acronym for Emergency Operating Procedure per Chapter F of the EOP/AP Writer's Guide

RCS is an approved acronym for Reactor Coolant System per Chapter F of the EOP/AP Writer's Guide

MSRV is an approved acronym for Main Steam Relief Valve per Chapter F of the EOP/AP Writer's Guide

Answer A Discussion

Correct:From EAP-SA lesson plan
Main Steam pressure should be reduced in approximately 10 psig increments.

INSTRUCTOR NOTE: Reducing MS pressure will result in cooling of the RCS. The RCS may be cooled down to 532°F without running a shutdown margin calculation provided all safety and regulating rods are fully inserted.

Answer B Discussion

Incorrect. First part is plausible as it is the increments on the THP setpoint knob that is used to do the MS pressure reduction and is therefore a plausible choice. Second part is correct.

Answer C Discussion

Incorrect. First part is correct. Second part is plausible since it is the RCS temperature associated with isolating a steam generator with a SGTR.

Answer D Discussion

Incorrect. First part is plausible as it is the increments on the THP setpoint knob that is used to do the MS pressure reduction and is therefore a plausible choiceSecond part is plausible since it is the RCS temperature associated with isolating a steam generator with a SGTR.

Basis for meeting the K

Requires the ability to adhere to post trip procedural guidance in Subsequent Actions that are there to ensure compliance with licensee shutdown margin requirements.

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Memory	NEW	

Development References	Student References Provided
EAP-SA Obj R1 EAP-SA pg 29	

BWE10 EA2.2 - Post-Trip Stabilization
Ability to determine and interpret the following as they apply to the (Post-Trip Stabilization)
(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

APE005 AK1.06 - 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)
Bases for power limit, for rod misalignment ....

Given the following Unit 1 conditions:

- Reactor Power = 98% decreasing
- Control Rod 4 in Group 6 = 0% withdrawn

1) ICS will automatically reduce Reactor power to __(1)__% Core Thermal Power.

2) The basis for decreasing reactor power to the above level is to ensure __(2)__.

Which ONE of the following completes the statements above?

A. 1. 65
2. Local Linear Heat Rate limits are not exceeded

B. 1. 65
2. adequate margin in preparation for resetting RPS trip set points

C. 1. 55
2. Local Linear Heat Rate limits are not exceeded

D. 1. 55
2. adequate margin in preparation for resetting RPS trip set points

---

ILT46 ONS SRO NRC Examination QUESTION 19

19

C

General Discussion

RPS is an approved acronym for Reactor Protection System per Chapter F of the EOP/AP Writer's Guide

Answer A Discussion

Incorrect, First part is plausible since it would be correct for a loss of FDWP runback. Second part is correct

Answer B Discussion

Incorrect, First part is plausible since it would be correct for a loss of FDWP runback. Second part is plausible since it it the reason given in a note in AP/1 for ensureing all NI's are less than 55% once the ICS runback is completed.

Answer C Discussion

Correct. The ICS runback is to 55%. The basis for running back to at least 60% of allowable thermal power is to ensure Local Linear Heat Rate assumptions made in the Safety Analysis are not exceeded.

Answer D Discussion

Incorrect. First part is correct. Second part is plausible since it it the reason given in a note in AP/1 for ensureing all NI's are less than 55% once the ICS runback is completed.

Basis for meeting the K

Requireds knowledge of the basis for the power limts established in AP/1 due to a dropped rod.

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	NEW	

Development References

EAP-AP-1 Obj R1, R2
AP/1 section H
TS 3.1.4 basis

Student References Provided

APE005 AK1.06 - 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)
Bases for power limit, for rod misalignment ....

401-9 Comments:

Remarks/Status

APE032 AK2.01 - Loss of Source Range Nuclear Instrumentation

Knowledge of the interrelations between the Loss of Source Range Nuclear Instrumentation and the following: (CFR 41.7 / 45.7)

Power supplies, including proper switch positions ....

Given the following Unit 1 conditions:

- Reactor in MODE 5
- 1DIC inverter DC Input breaker trips

Source Range 1NI-2 will be restored __(1)__.

Which ONE of the following completes the statement above?

A. manually by placing the Manual bypass switch to the Inverter Output position

B. manually by placing the Manual bypass switch to the AC Line position

C. automatically by way of the ASCO transfer switch

D. automatically by way of the Static Transfer Switch

ILT46 ONS SRO NRC Examination **QUESTION 20** 20 **B**

General Discussion

ASCO is a brand name.

Answer A Discussion

Incorrect. Plausible since the Manual bypass switch will be used however the Inverter Output position is the normal position.

Answer B Discussion

Correct. Placing the Manual bypass switch to the AC Line position is how power is restored.

Answer C Discussion

Incorrect and plausible. The ASCO Switch is one method that the Essential inverter output is swapped from the invertor to AC line. (Not Vital Power system inverter)

Answer D Discussion

Incorrect and plausible. The Static Transfer Switch is one method that the Essential inverter output is swapped from the invertor to AC line. (Not Vital Power system inverter)

Basis for meeting the K

Requires knowledge of the proper switch position required to restore power to a Source Range NI.

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Memory	MODIFIED	

Development References
EL-VPC 03 EL-VPC

Student References Provided

APE032 AK2.01 - Loss of Source Range Nuclear Instrumentation

Knowledge of the interrelations between the Loss of Source Range Nuclear Instrumentation and the following: (CFR 41.7 / 45.7)

Power supplies, including proper switch positions ....

401-9 Comments:

Remarks/Status

APE051 AA2.02 - Loss of Condenser Vacuum
Ability to determine and interpret the following as they apply to the Loss of Condenser Vacuum: (CFR: 43.5 / 45.13)
Conditions requiring reactor and/or turbine trip ....

Which ONE of the following is the condenser vacuum (inches Hg) SETPOINT stated in AP/27 (loss of condenser vacuum) that will require manually tripping the Reactor when in MODE 1?

A. 25

B. 22

C. 21.75

D. 19

ILT46 ONS SRO NRC Examination QUESTION 21 21 **B**

General Discussion

Answer A Discussion

Incorrect. Plausible since it is the setpoint for the low vacuum statalarm on 1SA3/A6

Answer B Discussion

Correct. Per AP/27, manually trip the Rx if Condenser vacuum reaches 22 inches Hg.

Answer C Discussion

Incorrect. Plausible since it is the low vacuum trip for the Main Turbine

Answer D Discussion

Incorrect. Plausible since it is the low vacuum trip for the Main Feedwater Pumps

Basis for meeting the K

Requires the ability to determine when a manual Rx trip is required as a result of decreasing condenser vacuum.

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Memory	NEW	

Development References

EAP-APG obj R9
AP/27
ARG for 1SA3/A6

Student References Provided

APE051 AA2.02 - Loss of Condenser Vacuum

Ability to determine and interpret the following as they apply to the Loss of Condenser Vacuum: (CFR: 43.5 / 45.13)

Conditions requiring reactor and/or turbine trip ....

401-9 Comments:

Remarks/Status

APE061 AK2.01 - Area Radiation Monitoring (ARM) System Alarms
Knowledge of the interrelations between the Area Radiation Monitoring (ARM) System Alarms and the following: (CFR 41.7 / 45.7)
Detectors at each ARM system location ....

1RIA-3, (Refueling Canal Wall Area Monitor),…

1) HIGH alarm __(1)__ cause a Reactor Building Evacuation alarm.

2) is NOT in HIGH alarm during Power Operations because the __(2)__.

Which ONE of the following completes the statements above?

A. 1. will
   2. setpoint is raised to provide for indication of RCS leakage

B. 1. will
   2. detector is removed from the Reactor Building

C. 1. will NOT
   2. setpoint is raised to provide for indication of RCS leakage

D. 1. will NOT
   2. detector is removed from the Reactor Building

General Discussion

RCS is an approved acronym for Reactor Coolant System per Chapter F of the EOP/AP Writer's Guide

Answer A Discussion

Incorrect. First part is plausible since the detector location is in close proximity to the reactor vessel and therefore would be a reasonable location for a detector meant to detect abnormal conditions on or around the reactor (such as RCS leakage in the RV area). Also plausible because it would be correct for 1RIA-4 which is located inside the RB in the area of the RB normal personnel hatch. Second part is plausible since it is correct for process monitor in the RB and RIA-4, all of which help alert the operators to increases in RCS leakage.

Answer B Discussion

Incorrect. First part is plausible since the detector location is in close proximity to the reactor vessel and therefore would be a reasonable location for a detector meant to detect abnormal conditions on or around the reactor (such as RCS leakage in the RV area). Also plausible because it would be correct for 1RIA-4 which is located inside the RB in the area of the RB normal personnel hatch. Second part is correct.

Answer C Discussion

Incorrect. First part is correct. Second part is plausible since it is correct for process monitor in the RB and RIA-4, all of which help alert the operators to increases in RCS leakage.

Answer D Discussion

Correct. 1RIA-3 does not cause a RB evacuation alarm. The detector is removed from the RB except for during fuel movement activities.

Basis for meeting the K

Requires knowledge of the relationship between an area monitor (1RIA-3), its detector location, and its relationship to ARM system alarms.

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Memory	NEW	

Development References

RAD-RIA Obj 08
RAD-RIA

Student References Provided

APE061 AK2.01 - Area Radiation Monitoring (ARM) System Alarms

Knowledge of the interrelations between the Area Radiation Monitoring (ARM) System Alarms and the following: (CFR 41.7 / 45.7)

Detectors at each ARM system location ....

401-9 Comments:

Remarks/Status

APE067 AA1.05 - Plant Fire On Site
Ability to operate and / or monitor the following as they apply to the Plant Fire on Site: (CFR 41.7 / 45.5 / 45.6)
Plant and control room ventilation systems ....

Given the following plant conditions:

- An Active Fire is taking place in Unit 2 Equipment Room
- The SRO dispatches you to the Unit 1 Equipment Room to determine Control Room Ventilation and Fire Damper positions

1) Control Room Ventilation system damper positions __(1)__ be determined by observing the linkage pointing to either the “OPEN” or “CLOSED” tag.

2) Observing that all damper blades are aligned in either the open or closed position __(2)__ the ONLY way to determine Fire Damper positions between Unit 1 and Unit 2 Equipment Rooms.

Which ONE of the following completes the statements above?

A. 1. can
2. is

B. 1. can
2. is NOT

C. 1. can NOT
2. is

D. 1. can NOT
2. is NOT

General Discussion

SRO is an approved acronym for Senior Reactor Operator per Chapter F of the EOP/AP Writer's Guide

Answer A Discussion

Correct.
Dampers associated with OP/0/A/1104/019 (Control Room Ventilation System) that the Operator will be required to verify are labeled. Position of the dampers can be determined by observing either the linkage pointing at either the "OPEN" or "CLOSED" tag on the side of the duct, the "OPEN" or CLOSED" tag on the shaft of the damper, or the scribed mark in the end of the shaft aligned with the Open/Closed tag.

To determine the position of a Fire Damper or a Control Damper, the Operator must look at the blades of the damper.
A)When the damper is CLOSED, the damper blades will be overlapping each other forming a barrier for airflow.
B)When the damper is OPEN, the damper blades will be at about a 90□ angle to the damper housing allowing unrestricted airflow.

Answer B Discussion

Incorrect.
First part is correct.

Second part is plausible since there are other damper types that positions can be determined by other methods as well.

Answer C Discussion

Incorrect. First part is plausbile since it would be correct for other type dampers.

Second part is correct.

Answer D Discussion

Incorrect. First part is plausbile since it would be correct for other type dampers.

Second part is plausible since there are other damper types that positions can be determined by other methods as well.

Basis for meeting the K

Requires the ability to monitor damper positions that are a part of the control room ventilations system during a plant fire./

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Memory	NEW	

Development References

BPS-DPR obj 01, 02
BPS-DPR

Student References Provided

APE067 AA1.05 - Plant Fire On Site
Ability to operate and / or monitor the following as they apply to the Plant Fire on Site: (CFR 41.7 / 45.5 / 45.6)
Plant and control room ventilation systems ....

401-9 Comments:

Remarks/Status

BWA02 AK3.2 - Loss of NNI-X

Knowledge of the reasons for the following responses as they apply to the (Loss of NNI-X)

(CFR: 41.5 / 41.10, 45.6, 45.13)

Normal, abnormal and emergency operating procedures associated with (Loss of NNI-X).

Given the following Unit 2 conditions:

Initial conditions:

- Reactor power = 90%
- Loop ‘A’ Controlling Thot fails HIGH
- 2SA2/B4 (RC AVERAGE TEMP HIGH/LOW) actuated

Current conditions:

- The Diamond and BOTH FDW Masters taken to HAND

Which ONE of the following describes the INITIAL action taken by an RO, and the reason for the action, in accordance with OMP 1-18 (Implementation Standard During Abnormal And Emergency Events)?

A. Decrease Feedwater to stabilize reactor power

B. Decrease Feedwater to stabilize RCS pressure

C. Insert control rods to stabilize RCS pressure

D. Insert control rods to stabilize reactor power

ILT46 ONS SRO NRC Examination QUESTION 24 24 **A**

General Discussion

During the transient, ICS sees the failed Thot as temperature being too high. In response, it increases FDW and inserts control rods to reduce Tave. This will cause RCS temperature to actually decrease which will cause RCS pressure to decrease. When controls are taken to MANUAL, the control rod are inserted further than they were initially and FDW is higher than it was initially (feedwater is power). Per OMP 1-18, to be called stable, CTP has to be less than or equal to the pre transient power level. Reducing FDW will increase RCS temperature and reduce CTP back towards the pretransient levels.

FDW is an approved acronym for Feedwater System per Chapter F of the EOP/AP Writer's Guide

RCS is an approved acronym for Reactor Coolant System per Chapter F of the EOP/AP Writer's Guide

Answer A Discussion

Correct. With Th failing high, indicated Tave increases and ICS causes control rods to insert (based on Tave error) and FDW to increase in an attempt to restore (indicated) Tave to setpoint. Since actual Tave is decreasing, FDW will be decreased to stabilize reactor power.

Answer B Discussion

Incorrect but plausible because decreasing FDW would stabilize RCS pressure. However in this case the priority for the operator is to stabilize reactor power with FDW.

Answer C Discussion

Incorrect. Plausible because after the initial reduction in FDW rods will mostly likely require inserting and rods are often used to stabilize RCS pressure.

Answer D Discussion

Incorrect. Plausible because after the initial reduction in FDW rods will mostly likely require inserting and this will stabilize reactor power.

Basis for meeting the K

The question gives a loss / failure of NNI and asks for the action and reason for that action being taken.

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	BANK	ILT42 Q24

Development References

SAE-L074 (Obj: R3)
OMP 1-18 Pg 3, Att J Rev 35
ILT42 Q24
Q24 ADM-OMP (Obj: R10, R52)

Student References Provided

BWA02 AK3.2 - Loss of NNI-X
Knowledge of the reasons for the following responses as they apply to the (Loss of NNI-X)
(CFR: 41.5 / 41.10, 45.6, 45.13)
Normal, abnormal and emergency operating procedures associated with (Loss of NNI-X).

401-9 Comments:

Remarks/Status

BWA07 AK1.3 - Flooding
Knowledge of the operational implications of the following concepts as
Annunciators and conditions indicating signals, and remedial actions associated with the (Flooding)

Given the following Unit 2 conditions:
- Reactor power = 100%
- 2SA-18/A-11, TURBINE BSMT WATER EMERGENCY HIGH LEVEL, is in alarm
- Turbine Building flooding is confirmed

In accordance with the Turbine Building Flood tab of the EOP…

1) Emergency Feedwater pumps ___(1)___ required to be utilized to fill the Steam Generators in addition to the Main Feedwater pumps.

2) While maximizing feed to the SGs, the MAXIMUM <u>feed rate</u> limits of Rule 7 (SG Feed Control) ___(2)____ apply while maintaining Tave > 532 °F.

Which ONE of the following completes the statements above?

A. 1. are
2. do

B. 1. are
2. do NOT

C. 1. are NOT
2. do

D. 1. are NOT
2. do NOT

General Discussion

EOP is an approved acronym for Emergency Operating Procedure per Chapter F of the EOP/AP Writer's Guide

SG is an approved acronym for Steam Generators per Chapter F of the EOP/AP Writer's Guide

Answer A Discussion

Correct. There is a note in the TBF tab that states "•Feeding to 95% O.R. in Step 1 supercedes guidance in Rule 7 (SG Feed Control), Table 4 (SG Level Control Points)." This note is for the LEVEL CONTROL PTS, but not for the FEED RATES. Step 1 directs to feed at the maximum allowable rate using all available feedwater sources.

Answer B Discussion

1st part is correct. 2nd part is incorrect but plausible because a note in the TBF tab of the EOP before step 1 states "Feeding to 95% O.R. in Step 1 supersedes guidance in Rule 7 (SG Feed Control), Table 4 (SG Level Control Points). It is easy to miss the fact that the note is only referring to the level control points and not the flow limits.

Answer C Discussion

1st part is incorrect but plausible because Main Feedwater is still available and can provide feedwater flow in excess of the limits of rule 7 without emergency feedwater. 2nd part is correct.

Answer D Discussion

1st part is incorrect but plausible because Main Feedwater is still available and can provide feedwater flow in excess of the limits of rule 7 without emergency feedwater. 2nd part is incorrect but plausible because a note in the TBF tab of the EOP before step 1 states "Feeding to 95% O.R. in Step 1 supersedes guidance in Rule 7 (SG Feed Control), Table 4 (SG Level Control Points). It is easy to miss the fact that the note is only referring to the level control points and not the flow limits.

Basis for meeting the K

The question requires knowledge of remedial actions associated with Turbine Building Flooding.

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Memory	BANK	ILT43 Q25

Development References

ILT43 Q25
ARG 2SA-18
EOP TBF
EOP Rule 7
OP-OC-EAP-TBF (Obj. R2&3) Pg 7

Student References Provided

BWA07 AK1.3 - Flooding

Knowledge of the operational implications of the following concepts as

Annunciators and conditions indicating signals, and remedial actions associated with the (Flooding)

401-9 Comments:

Remarks/Status

BWE03 EA2.1 - Inadequate Subcooling Margin
Ability to determine and interpret the following as they apply to the (Inadequate Subcooling Margin)
(CFR: 43.5 / 45.13)
Facility conditions and selection of appropriate procedures during abnormal and emergency operations.

Given the following Unit 1 conditions:
Time = 1200

- Reactor trips from 100% power due to a 1A Main Steam Line Break
- BOTH 1A and 1B SG pressures rapidly decreasing
- Core SCM = 0ºF

Time = 1204

- Tcold reaches lowest value of 416ºF

Time = 1215

- Tcold = 498ºF stable
- Core SCM = 78ºF stable
- Rule 2 (Loss of SCM) is complete

1) __ (1) __ was the EOP tab that was entered first from Subsequent Actions.

2) Rule 8 (Pressurized Thermal Shock) __ (2) __ required to be invoked.

Which ONE of the following completes the statements above?

A. 1. Loss of SCM
2. is

B. 1. Loss of SCM
2. is NOT

C. 1. Excessive Heat Transfer
2. is

D. 1. Excessive Heat Transfer
2. is NOT

General Discussion

SCM is an approved acronym for Subcooling Margin per Chapter F of the EOP/AP Writer's Guide

EOP is an approved acronym for Emergency Operating Procedure per Chapter F of the EOP/AP Writer's Guide

Answer A Discussion

Correct.
First part is correct. The LOSCM tab will be entered first based upon the order steps are completed in the Subsequent Actions tab. It will determine in the LOSCM tab that SCM was lost due to EHT and then the transfer to EHT tab will be made from the LOSCM tab.
Second part is Correct. Per Rule 8 if "HPI has injected through an open or throttled open 1HP-26, 27, 409, 410 with all RCPs OFF" then Rule 8 would be invoked. Rule 2 has been complete so RCPs have been secured and HPI has been initiated.

Answer B Discussion

Incorrect.
First part is correct. The LOSCM tab will be entered first based upon the order steps are completed in the Subsequent Actions tab. It will determine in the LOSCM tab that SCM was lost due to EHT and then the transfer to EHT tab will be made from the LOSCM tab.

Second part is incorrect because Rule 8 is required. It is plausible there are two conditions, either of which require Rule 8. If all RCP's are off with HPI on (met) OR a cooldown below 400 degrees at > 100 degrees per hour has occurred (not met). If both were required, it would be correct.

Answer C Discussion

Incorrect.
1st part is incorrect because the LOSCM is higher on the SA foldout page so it will be entered. It is plausible because the steam leak is the cause of the LOSCM AND when verifying that on step 4 in the LOSCM tab, it has you transfer to the excessive heat transfer tab.
Second part is Correct. Per Rule 8 if "HPI has injected through an open or throttled open 1HP-26, 27, 409, 410 with all RCPs OFF" then Rule 8 would be evoked. Rule 2 has been complete so RCPs have been secured and HPI has been initiated.

Answer D Discussion

Incorrect.
1st part is incorrect but plausible (see C).
Second part is incorrect but plausible (see B).

Basis for meeting the K

Requires selection of procedure (which Tab of the EOP) following a Loss of subcooling due to an overcooling event.

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	BANK	ILT39 Q18

Development References

ILT39 Q18
EAP-LOSCM (Obj: 2, 5) Pg 15
EAP-EOP (Obj: R22) Pg 15, 16
EOP Rule 8
EOP Tabs

Student References Provided

BWE03 EA2.1 - Inadequate Subcooling Margin
Ability to determine and interpret the following as they apply to the (Inadequate Subcooling Margin)
(CFR: 43.5 / 45.13)
Facility conditions and selection of appropriate procedures during abnormal and emergency operations.

ILT46 ONS SRO NRC Examination **QUESTION 26** 26 **A**

401-9 Comments:	Remarks/Status

ILT46 ONS SRO NRC Examination **QUESTION 27** 27 **B**

BWE09 2.4.31 - Natural Circulation Operations
BWE09 GENERIC
Knowledge of annunciator alarms, indications, or response procedures. (CFR: 41.10 / 45.3)

Given the following Unit 2 conditions:
Initial conditions:

- Main Steam Line Break occurred on the 2A SG outside of containment
- The Excessive Heat Transfer tab of the EOP was completed
- The crew transitioned to the Forced Cooldown (FCD) Tab

Current conditions:

- ALL RCPs are OFF
- The decision has been made to perform a natural circulation cooldown

1) In accordance with Rule 7 (SG Feed Control), level in the 2B SG is required to be maintained at __(1)___ while performing the cooldown.

2) In accordance with the FCD tab, the first action taken to collapse a bubble formed in the Reactor Vessel head during the cooldown is to __(2)___.

Which ONE of the following completes the statements above?

A. 1. 240” XSUR
   2. open the head vents

B. 1. 240” XSUR
   2. increase RCS pressure

C. 1. 270” XSUR
   2. open the head vents

D. 1. 270” XSUR
   2. increase RCS pressure

ILT46 ONS SRO NRC Examination **QUESTION 27** 27 **B**

General Discussion

SG is an approved acronym for Steam Generator per Chapter F of the EOP/AP Writer's Guide

RCP is an approved acronym for Reactor Coolant Pump per Chapter F of the EOP/AP Writer's Guide

XSUR is an approved acronym for Extended Startup Range per Chapter F of the EOP/AP Writer's Guide

RCS is an approved acronym for Reactor Coolant System per Chapter F of the EOP/AP Writer's Guide

Answer A Discussion

1st part is correct. 2nd part is incorrect but plausible since it is the actions taken if increasing RCS pressure does not work..

Answer B Discussion

Correct. Since the pressure in containment would not have exceeded 3 psig during this transient 240" XSUR is the correct level. Increasing RCS pressure 200 psig is tried first if a head bubble develops during cooldown.

Answer C Discussion

1st part is incorrect but plausible because if the break was in containment, it would be correct since that would have containment pressure > 3 psig. 2nd part is incorrect but plausible since it is the actions taken if increasing RCS pressure does not work..

Answer D Discussion

1st part is incorrect but plausible because if the break was in containment, it would be correct since that would have containment pressure > 3 psig. 2nd part is correct.

Basis for meeting the K

Requires knowledge of the response procedure (FCD tab) used to perform a natural circulation cooldown.

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	MODIFIED	ILT43 Q27

Development References

ILT43 Q27
EOP FCD (Obj: R5) Pg 29, 31
EOP Rule 7 SG Feed Pg 5/9
FCD tab Pg 8&9/81

Student References Provided

BWE09 2.4.31 - Natural Circulation Operations
BWE09 GENERIC
Knowledge of annunciator alarms, indications, or response procedures. (CFR: 41.10 / 45.3)

401-9 Comments:

Remarks/Status

SYS003 A3.04 - Reactor Coolant Pump System (RCPS)
Ability to monitor automatic operation of the RCPS, including: (CFR: 41.7 / 45.5)
RCS flow ....

Given the following Unit 1 conditions:
Time = 1200

- Reactor power = 60% stable
- Delta Tc ICS station in HAND
- 1A1 RCP trips

At Time = 1230, 1A Steam Generator Level will be __(1)__ at Time = 1200 because __(2)__.

Which ONE of the following completes the statement above?

ASSUME NO OPERATOR ACTIONS

A. 1. lower than
2. ICS will runback power to 55%

B. 1. lower than
2. Feedwater flows will re-ratio based on the RCS loop flow mismatch

C. 1. approximately the same as
2. Feedwater re-ratio is blocked with delta Tc in HAND

D. 1. approximately the same as
2. the re-ratio will make 1A SG level increase but the power reduction will then reduce it to approximately its original value

---

General Discussion

ICS is an approved acronym for Integrated Control System per Chapter F of the EOP/AP Writer's Guide

RCP is an approved acronym for Reactor Coolant Pump per Chapter F of the EOP/AP Writer's Guide

RCS is an approved acronym for Reactor Coolant System per Chapter F of the EOP/AP Writer's Guide

SG is an approved acronym for Steam Generator per Chapter F of the EOP/AP Writer's Guide

Answer A Discussion

Incorrect. First part is correct. Second part is plausible since it would be correct if there were a dropped Control Rod.

Answer B Discussion

Correct. The RCS flow adjustment in the Feedwater section of ICS is independent of the delta Tc controller and will still re-ratio feedwater based on RCS flow. This means that since RCS flow decreased in the A loop, FDW flow to the A SG will also decrease to maintain the heat balance.

Answer C Discussion

Incorrect. First part is plausible because the delta Tc controller is in Hand and the RCS flow adjustment passes through the delta Tc controller as shown on the ICS drawings however it is independent of the control station and will still affect FDW flow even with the controller in hand.

Answer D Discussion

Incorrect. This choice is plausible if you get backwards which way FDW re-ratios and mis-apply the ICS runback to 55% power.

Basis for meeting the K

Per chief examiner, auto actions performed by ICS on loss or degraded RCS flow OK. This question requires the ability to monitor for proper ICS response to loss of RCS flow in one loop.

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	NEW	

Development References

STG-ICS R3, R15
ICS Chptr 4
ICS Chptr 2

Student References Provided

SYS003 A3.04 - Reactor Coolant Pump System (RCPS)
Ability to monitor automatic operation of the RCPS, including: (CFR: 41.7 / 45.5)
RCS flow ....

401-9 Comments:

Remarks/Status

SYS003 K4.03 - Reactor Coolant Pump System (RCPS)
Knowledge of RCPS design feature(s) and/or interlock(s) which provide for the following : (CFR: 41.7)
Adequate lubrication of the RCP ....

Given the following Unit 1 conditions:
Initial conditions:

- 1A1 RCP start in progress
- AC oil lift pump is started

Current conditions:

- Oil lift pump low discharge pressure does NOT clear

1) The AC oil lift pump __ (1) __.

2) The bypass position on the RCP start/stop switch __ (2) __ bypass ALL RCP starting interlocks.

Which ONE of the following completes the statements above?

A. 1. must be manually stopped
   2. will NOT

B. 1. must be manually stopped
   2. will

C. 1. will automatically stop after a time delay
   2. will NOT

D. 1. will automatically stop after a time delay
   2. will

General Discussion

RCP is an approved acronym for Reactor Coolant Pump per Chapter F of the EOP/AP Writer's Guide

Answer A Discussion

Incorrect. First part is plausible because some oil lift pumps do not auto stop (i.e. Main Turbine). Second part is correct.

Answer B Discussion

Incorrect. First part is plausible because some oil lift pumps do not auto stop (i.e. Main Turbine). Second part is plausible because the bypass position on the switch will bypass the seal injection requirement but not the oil interlock.

Answer C Discussion

Correct. The AC Oil Lift pump will stop after 3 minutes. The bypass position on the RCP switch does NOT bypass all interlocks it only bypasses the low seal injection flow interlock.

Answer D Discussion

Incorrect. First part is correct. Second part is plausible because the bypass position on the switch will bypass the seal injection requirement interlock.

Basis for meeting the K

The question requies knowledge of interlocks to ensure adequate lubrication of RCPs.

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Memory	MODIFIED	ILT42 Q28

Development References	Student References Provided
PNS CPM (Obj: 3) Pg 13, 19, 20 PNS-CPM	

SYS003 K4.03 - Reactor Coolant Pump System (RCPS)

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

Adequate lubrication of the RCP ....

401-9 Comments:	Remarks/Status

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 was taken out of service 6 months ago
- 3A Purification IX was just placed back in service without being saturated to current RCS boron concentration

1) Group 7 control rods will be __(1)__ .

2) Available shutdown margin (SDM) will be __(2)__.

Which ONE of the following completes the statements above?

A. 1. inserting
   2. increasing

B. 1. inserting
   2. decreasing

C. 1. withdrawing
   2. increasing

D. 1. withdrawing
   2. decreasing

ILT46 ONS SRO NRC Examination QUESTION 30

30

C

General Discussion

Answer A Discussion

1st part is incorrect because the boron "heavy" IX will increase boron concentration in the RCS causing RCS temperature to decrease. This will, in turn cause CR to move out. It is plausible because it is a common misconception to think putting a demineralizer in service that is not boron saturated to take boron out of the RCS. There is also multiple possibilities to be in error when converting from "the effect to temperature change to corresonding rod motion".

2nd part is correct. It is also plausible with the first part. Since rod insertion is generally associated with a negative reactivity addition, it would then be plausible to conclude that adding negative reactivity increases SDM since that is what does occur to a subcritical reactor when control rods do not respond to the reactivity addition.

Answer B Discussion

1st part is incorrect because the boron "heavy" IX will increase boron concentration in the RCS causing RCS temperature to decrease. This will, in turn cause CR to move out. It is plausible because it is a common misconception to think putting a demineralizer in service that is not boron saturated to take boron out of the RCS. There is also multiple possibilities to be in error when converting from "the effect to temperature change to corresonding rod motion".

2nd part is incorrect but plausible since if the candidate did believe that CR were insertning then this would be the correct choice for that rod motion.

Answer C Discussion

Correct. 6 months earlier the IX would be saturated at a higher boron concentration. When placed in service, it will add boron to the RCS therefore control rods will withdraw to offset the negative reactivity added by the boron.

Answer D Discussion

1st part is correct.

2nd part is incorrect because available SDM increases with boron addition since rods withdraw. It is plausible as a distractor because rod withdrawal is generally associated with a postive reactivity addition. It would then be plausible to conclude that adding postive reactivity decreases SDM since that is what does occur to a subcritical reactor when control rods to not respond to the reactivity addition.

Basis for meeting the K

Requires knowledge of how a malfunction of a demineralizer (boron loading) 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	NEW	

Development References

PNS - HPI (Obj: R10) Pg 17

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 ....

Which ONE of the following consists of ONLY components powered from 2TD?

A. 2C LPI pump and 2B HPI pump

B. 2C LPI pump and 2C HPI pump

C. 2B LPI pump and 2B HPI pump

D. 2B LPI pump and 2C HPI pump

General Discussion

LPI is an approved acronym for Low Pressure Injection per Chapter F of the EOP/AP Writer's Guide

HPI is an approved acronym for High Pressure Injection per Chapter F of the EOP/AP Writer's Guide

Answer A Discussion

Incorrect. 2C LPI pump is plausible since it would be correct if it were 2C HPI pump. 2B HPI pump is plausible since it would be correct if it were 2B LPI pump.

Answer B Discussion

Incorrect. 2C LPI pump is plausible since it would be correct if it were 2C HPI pump. 2C HPI pump is correct.

Answer C Discussion

2B LPI pump is correct. 2B HPI pump is plausible since it would meet the standardized bus assignment of Tc-A Td-b. and Te-c.

Answer D Discussion

Correct. Both are powered from 2TD.

Basis for meeting the K

Requires knowledge of the bus power supplies to the LPI pumps.

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Memory	NEW	

Development References

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 K6.02 - 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)

Core flood tanks (accumulators) ....

Given the following Unit 3 conditions:

- Reactor power = 100%
- "3A" Core Flood Tank
  - Pressure = 587 psig stable
  - Level = 12.87 ft stable
- "3B" Core Flood Tank
  - Pressure = 629 psig stable
  - Level = 13.36 ft stable

Which ONE of the following describes the potential adverse effects and its cause that could occur during a large break LOCA?

A. 3A CFT will discharge an inadequate volume of water into the core due to the CFT level.

B. 3A CFT will discharge an inadequate volume of water into the core due to the CFT pressure.

C. 3B CFT will discharge too much inventory during the blow down phase and not cover the hotspot during re-flood due to CFT level.

D. 3B CFT will discharge too much inventory during the blow down phase and not cover the hotspot during re-flood due to CFT pressure.

General Discussion

CFT is an approved acronym for Core Flood Tank per Chapter F of the EOP/AP Writer's Guide

LOCA is an approved acronym for Loss of Coolant Accident per Chapter F of the EOP/AP Writer's Guide

Answer A Discussion

Incorrect:. Plausible because level is low but within the TS range. If level were below 12.56 ft, it could be correct.

Answer B Discussion

Incorrect:. Plausible because pressure is low but within the TS range. If pressure were below 575 psig, it could be correct.

Answer C Discussion

Incorrect. Plausible because level is high but within the TS range. If level were greater than 13.44 ft, it could be correct. The greater water volume means a smaller gas volume to push the water out.

Answer D Discussion

Correct. The CFT pressure is high > 625 psig. This can cause the CFT to discharge too soon and not cover the hot spot during re-flood.

Basis for meeting the K

Question requires knowledge of how CFT conditions (pressure and level) can affect ECCS. Since CFT's are passive components there are no realistic mechanical malfunctions or losses that are credible. Having out of spec parameters satisfies the intent of "loss or malfunction" in that it prohibits the CFT from being able to perform its safety function.

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	BANK	ILT41 Q31

Development References	Student References Provided
ILT41 Q31 PNS-CF (Obj: 10) Pg 17 & 18	

SYS006 K6.02 - 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)

Core flood tanks (accumulators) ....

401-9 Comments:	Remarks/Status

SYS006 K6.19 - 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)
HPI/LPI systems (mode change) ....

Given the following Unit 1 conditions:

- Large Break LOCA has occurred

In accordance with EOP Encl. 5.12, which ONE of the following describes:

1) the range of BWST levels (ft) where LPI pump suction would be aligned to both the RB Emergency Sump and the BWST simultaneously?

2) the action(s) that would be required if 1LP-22 failed to close when isolating the BWST?

A. 1. 15 – 9
2. stop the 1B LPI pump AND 1B RBS pump

B. 1. 15 – 9
2. Maximize total LPI flow < 3100 gpm

C. 1. 9 – 6
2. stop the 1B LPI pump AND 1B RBS pump

D. 1. 9 – 6
2. Maximize total LPI flow < 3100 gpm

General Discussion

LOCA is an approved acronym for Loss of Coolant Accident per Chapter F of the EOP/AP Writer's Guide

BWST is an approved acronym for Borated Water Storage Tank per Chapter F of the EOP/AP Writer's Guide

RB is an approved acronym for Reactor Buildingt per Chapter F of the EOP/AP Writer's Guide

RBS is an approved acronym for Reactor Building Spray per Chapter F of the EOP/AP Writer's Guide

LPI is an approved acronym forLow Pressure Injection per Chapter F of the EOP/AP Writer's Guide

Answer A Discussion

Incorrect: First part is plausible since there are actions being taken to swap the suction from BWST to RBES however the actions allowed in this range do not align suction to both sources. Second part is correct.

Answer B Discussion

Incorrect: First part is plausible since there are actions being taken to swap the suction from BWST to RBES however the actions allowed in this range do not align suction to both sources. Second part is plausible since these actions are compensatory actions in Encl 5.12 for several situations (ex. Correct if only 1 LPI pump is operating when isolating BWST).

Answer C Discussion

CORRECT: At 9’ in BWST, LP-19 & 20 are both opened and suction for RBS & LPI pumps is aligned to both BWST and RBES simultaneously. When BWST level reaches 6’ the BWST is isolated by closing LP-21 and LP-22. If 1LP-22 fails to close, the 1B LPI pump AND 1B RBS pump are secured until 1LP-28 is manually closed.

Answer D Discussion

.Incorrect: First part is correct. Second part is plausible since these actions are compensatory actions in Encl 5.12 for several situations (ex. Correct if only 1 LPI pump is operating when isolating BWST)

Basis for meeting the K

Requires knowledge of the effect a malfunction will have on the ECCS system during mode change from LPI injection mode to LPI recirculation mode.

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	BANK	2009B Q42

Development References
EAP-LOSCM Obj 32.33,34 EOP Enclosure 5.12

Student References Provided

SYS006 K6.19 - 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)

HPI/LPI systems (mode change) ....

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 1 conditions:

- Reactor in MODE 1
- Quench Tank is being pumped to 1A BHUT using the Quench Tank Pump AND the Component Drain Pump

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

2) The __(2)__ will automatically trip once Quench Tank level reaches 80 inches

Which ONE of the following completes the statements above?

A. 1. 90
2. Quench Tank Pump ONLY

B. 1. 90
2. Quench Tank Pump AND Component Drain Pump

C. 1. 100
2. Quench Tank Pump ONLY

D. 1. 100
2. Quench Tank Pump AND Component Drain Pump

ILT46 ONS SRO NRC Examination QUESTION 34 34 **D**

General Discussion

BHUT is an approved acronym for Bleed Holdup Tank per Chapter F of the EOP/AP Writer's Guide

Answer A Discussion

Incorrect. First part is plausible since it would be correct for Units 2 and 3. Second part is plausible since the Component Drain Pump is used to do many other things (EX. Pump down CFT's) therefore it is plausible that since it is not associated ONLY with the Quench Tank that it would not have the low level cutoff associated with the Quench Tank.

Answer B Discussion

Incorrect. First part is plausible since it would be correct for Units 2 and 3. Second part is correct.

Answer C Discussion

Incorrect. First part is correct. Second part is plausible since the Component Drain Pump is used to do many other things (EX. Pump down CFT's) therefore it is plausible that since it is not associated ONLY with the Quench Tank that it would not have the low level cutoff associated with the Quench Tank.

Answer D Discussion

Correct. IAW OP/1104/017 limits and precautions, QT level shall be maintained between 80 and 100 inches. Both the Quench Tank Pump and the Component Drain Tank Pump have the 80" auto cutoff on low QT level.

Basis for meeting the K

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Memory	NEW	

Development References

PNS-CS Obj 10
PNS-CS
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 A2.08 - Component Cooling Water System (CCWS)

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

Effects of shutting (automatically or otherwise) the isolation valves of the letdown cooler ....

Given the following Unit 1 conditions:
Initial conditions:

- Reactor power = 100%
- 1A and 1B Letdown Coolers in service
- Letdown flow = 78 gpm

Current conditions:

- 1A Letdown Cooler is removed from service by the RO in the Control Room

1) CC flow to the 1B Letdown Cooler will __ (1) __.

2) In accordance with OP/1/A/1104/002 (HPI System), once the 1A Letdown Cooler is isolated the MAXIMUM letdown flow is __(2)__ gpm.

Which ONE of the following completes the statements above?

A. 1. stay the same
2. 88

B. 1. stay the same
2. 125

C. 1. increase
2. 88

D. 1. increase
2. 125

ILT46 ONS SRO NRC Examination QUESTION 35

35

D

General Discussion

CC is an approved acronym for Component Cooling System per Chapter F of the EOP/AP Writer's Guide

Answer A Discussion

Incorrect. First part is plausible if the candidate has the misconception that CC flow to the letdown cooler is automatically controlled at a setpoint in the same fashion as other parameters such as HPI seal injection flow. Additionally plausible if it is not understood that CC and HPI to the letdown cooler are controlled by the same switch so removing a letdown cooler from service will necessarily mean isolating both CC and HPI. Second part is plausible since it is the threshold value where flashing of the CC system can occur with inadequate flow balancing of the CC system.

Answer B Discussion

Incorrect. First part is plausible if the candidate has the misconception that CC flow to the letdown cooler is automatically controlled at a setpoint in the same fashion as other parameters such as HPI seal injection flow. Additionally plausible if it is not understood that CC and HPI to the letdown cooler are controlled by the same switch so removing a letdown cooler from service will necessarily mean isolating both CC and HPI. Second part is correct.

Answer C Discussion

First part is correct. Second part is plausible since it is the threshold value where flashing of the CC system can occur with inadequate flow balancing of the CC system.

Answer D Discussion

Correct. Because HPI and CC are isolated when a letdown cooler is removed from service, the CC flow to the in service cooler will increase. L&P's of the HPI procedure limit letdown flow to 125 gpm with only one Letdown Cooler in service.

Basis for meeting the K

Required the ability to predict the consequences of isloating one of the letdown coolers and to use procedure limits and precautions to mitigate the consequences.

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	MODIFIED	ILT45 Q7

Development References

PNS-HPI obj 03
PNS-HPI
1104/02 L&P's

Student References Provided

SYS008 A2.08 - Component Cooling Water System (CCWS)

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

Effects of shutting (automatically or otherwise) the isolation valves of the letdown cooler ....

401-9 Comments:

Remarks/Status

SYS008 K1.02 - Component Cooling Water System (CCWS)

Knowledge of the physical connections and/or cause-effect relationships between the CCWS and the following systems: (CFR: 41.2 to 41.9 / 45.7 to 45.9)

Loads cooled by CCWS ....

Which ONE of the following sets of components are BOTH cooled by the Component Cooling system.

A. RCP Seal Return Coolers AND Quench Tank Coolers

B. RCP Seal Return Coolers AND RCP Motor Coolers

C. RCP Seal Coolers AND Quench Tank Coolers

D. RCP Seal Coolers AND RCP Motor Coolers

General Discussion

RCP is an approved acronym for Reactor Coolant Pump per Chapter F of the EOP/AP Writer's Guide

Answer A Discussion

Incorrect. RCP Seal Return coolers are plausible since CC does cool the RCP Seal Coolers. QT Coolers is correct.

Answer B Discussion

Incorrect. RCP Seal Return coolers are plausible since CC does cool the RCP Seal Coolers. RCP Motor Coolers are plausible since there are RCP components that are cooled by CC.

Answer C Discussion

Correct. Both RCP seal coolers and QT coolers are cooled by CC

Answer D Discussion

Incorrect. RCP Seal Coolers are correct. RCP Motor Coolers are plausible since there are RCP components that are cooled by CC.

Basis for meeting the K

K/A MATCH ANALYSIS
Requires the student to know the physical connection between the component cooling system and loads cooled by the component cooling system.

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Memory	NEW	

Development References
PNS-CC (Obj:1)

Student References Provided

SYS008 K1.02 - Component Cooling Water System (CCWS)

Knowledge of the physical connections and/or cause-effect relationships between the CCWS and the following systems: (CFR: 41.2 to 41.9 / 45.7 to 45.9)

Loads cooled by CCWS ....

401-9 Comments:	Remarks/Status

SYS010 K3.03 - 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)
ESFAS ....

Given the following Unit 3 conditions:

- Time = 1200
- Reactor power = 100%
- Channel A AND Channel B narrow range RCS pressure fail HIGH

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

2) At Time = 1205 an AUTOMATIC ES actuation __(2)__ have occurred.

Which ONE of the following completes the statements above?

ASSUME NO OPERATOR ACTIONS

A. 1. will
   2. will

B. 1. will
   2. will NOT

C. 1. will NOT
   2. will

D. 1. will NOT
   2. will NOT

ILT46 ONS SRO NRC Examination QUESTION 37 37 **A**

General Discussion

This question can be modified in various ways to maniupulate the answer by changing the NR channels that fail. This could result and any of the 4 answers being correct.

RCS is an approved acronym forReactor Coolant System per Chapter F of the EOP/AP Writer's Guide

Answer A Discussion

CORRECT: RPS will trip the reactor on a High Pressure signal since RPS uses a 2nd max to compare to setpoint With two channels failed high a failed channel is used as actual RPS pressure therefore RPS will trip on high RCS pressure. PORV, Pzr heaters and Pzr spray use a median selected RCS pressure using A, B, and E NR pressure. With 2 of the 3 pressure inputs (Ch. A, B, and E)to median selected NR pressure failed high, the pressurizer heaters will be off, the PORV will be open, the spray valve will be open, and ICS will be modifying various signals all of which will be causing actual RCS pressure to decrease. As pressure decreases (with no significant temperature decrease) with no operator actions, RCS pressure will continue to decrease until the ES HPI setpoint of 1600 psig is reached at which time ES Digital 1&2 will actuate and begin to stop the pressure decrease.

Answer B Discussion

Incorrect: First part is correct. Second part is plausible because if it were other combinations of 2 NR pressures (Ex. NR RCS pressure channels C&D), Answer B would be correct.

Answer C Discussion

Incorrect. First part is incorrect but plausilbe if you confuse Narrow Range with Wide Range as RPS pressure inputs also plausible since if one of the channels were Channel E it would be correct. . Second part is plausible if the candidate has backwards which pressures feed RPS and ES. Choosing this answer (both parts) is plausible if the candidate blieved that wide range pressure fed RPS and narrow range pressure fed ES.

Answer D Discussion

Incorrect First part is incorrect but plausilbe if you confuse Narrow Range with Wide Range as RPS pressure inputs also plausible since if one of the channels were Channel E it would be correct. . Second part is plausible because if it were other combinations of 2 NR pressures (Ex. NR RCS pressure channels C&D), Answer B would be correct.

Basis for meeting the K

K/A MATCH ANALYSIS
Requires knowledge of if the effect that a malfunction of the PZR PCS will have on ESFAS actuation

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	MODIFIED	2009A RO Q#36

Development References

2009 NRC Exam Q 36
IC-ES(Obj: 9) pg 14
IC-RPS (Obj: 6) Pg 37
PNS-Pzr (Obj: 7, 8) Figure 5

Student References Provided

SYS010 K3.03 - 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)
ESFAS ....

401-9 Comments:

Remarks/Status

ILT46 ONS SRO NRC Examination QUESTION 38 38 **C**

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 ....

Given the following Unit 1 conditions:

- Reactor power = 100%
- 1B1 Reactor coolant pump trips

Which ONE of the following RPS trips will prevent exceeding the Departure from Nucleate Boiling Ratio (DNBR) safety limit?

A. High flux

B. Flux/Pump

C. Flux/Flow/Imbalance

D. High RCS Temperature

ILT46 ONS SRO NRC Examination QUESTION 38

38

C

General Discussion

RPS is an approved acronym for Reactor Protection System Chapter F of the EOP/AP Writer's Guide

Answer A Discussion

Incorrect, although the high flux trip is provided to prevent damage to the fuel and fuel clad it will not trip in this case. It is plausible to believe it would trip in this case under the misconception that the high flux trip changes based on the maximum allowable thermal power. The high flux trip is changed duirng events however it is changed manually.

Answer B Discussion

Incorrect, this trip looks at the number of RCPs operating verses reactor power instead of RCS flow. If ≥ 2 RCPs are lost above 2% power the reactor will trip.

Answer C Discussion

Correct, the trip setpoint with 3 RCP operating is ~ 80% power. After the pump trips and flow decreases the reactor will trip. This trip prevents DNBR from decreasing less than the safety limit value.

Answer D Discussion

Incorrect, Plausble since there is a High RCS temperature RPS trip and with a loss of RCS flow there would be an initial increase in core temperature however this does not result in a High RCS temperature trip.

Basis for meeting the K

K/A MATCH ANALYSIS
Question requires knowledge of the relation ship between RPS trips and DNBR.

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Memory	MODIFIED	2007 RO RETEST Q#38

Development References

ONS-TSB B 3.3.1
2007 NRC Exam Q 38
IC-RPS (Obj: 7) Pg 34 & 35.

Student References Provided

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

ILT46 ONS SRO NRC Examination **QUESTION 39** 39 **D**

SYS013 K4.08 - Engineered Safety Features Actuation System (ESFAS)
Knowledge of ESFAS design feature(s) and/or interlock(s) which provide for the following : (CFR: 41.7)
Redundancy ....

Given the following Unit 1 conditions:

- Reactor Power = 100%
- 1KVIB panelboard is de-energized

1) The __(1)__ Voters will NOT actuate their associated safeguards equipment

2) Engineered Safeguards System Instrument Channels are in a __(2)__ out of two trip condition.

A. 1. ODD
2. one

B. 1. ODD
2. two

C. 1. EVEN
2. one

D. 1. EVEN
2. two

ILT46 ONS SRO NRC Examination QUESTION 39

39

D

General Discussion

Answer A Discussion

Incorrect. First part is plausible since it would be correct for 1KVIA being de-energized. Second part is plausible assuming the instrument channels trips on loss of power.

Answer B Discussion

Incorrect. First part is plausible since it would be correct for 1KVIA being de-energized. Second part is correct.

Answer C Discussion

Incorrect. First part is correct. Second part is plausible assuming the instrument channels trips on loss of power.

Answer D Discussion

Correct. KVIB provides power for the even voters (ES 2,4,6,8) and the 1B instrument channel. If an instrument channel loses power it is then unable to send a trip signal to the voters.

Basis for meeting the K

Requires knowledge of the redundancy built in to ES with regards to separate power supplies for the odd and even voters and how a single instrument channel can lose power and not affect the ability of ES to actuate as required.

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	NEW	

Development References	Student References Provided
IC-ES Obj R33 IC-ES (Page 60/61)	

SYS013 K4.08 - Engineered Safety Features Actuation System (ESFAS)

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

Redundancy ....

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:

- Reactor power = 100%
- 1A Main Steam Line Break inside containment occurs
- Reactor Building Pressure peaks at 22.4 psig

1) The __(1)__ LPSW pumps have received an ES signal to start.

2) Regarding the 1A RBCU, __(2)__ has/have received an ES signal to OPEN.

Which ONE of the following completes the statements above?

A. 1. "A" and "B" ONLY
2. 1LPSW-18 ONLY

B. 1. "A" and "B" ONLY
2. 1LPSW-18 AND 1LPSW-16

C. 1. "A", "B", AND "C"
2. 1LPSW-18 ONLY

D. 1. "A", "B", AND "C"
2. 1LPSW-18 AND 1LPSW-16

ILT46 ONS SRO NRC Examination QUESTION 40 40 **C**

General Discussion

With an ES 5/6 signal, the end result will be that all RBCUs will be operating in slow speed. A mod was added to place a 3 minute time delay in the circuit after the RBCUs trip.

LPSW is an approved acronym for Low Pressure Service Water per Chapter F of the EOP/AP Writer's Guide

ES is an approved acronym for Engineered Safeguards per Chapter F of the EOP/AP Writer's Guide

RBCU is an approved acronym for Reactor Building Cooling Unitt per Chapter F of the EOP/AP Writer's Guide

Answer A Discussion

Incorrect. First part is plausble since it is true regarding the LPI pumps. There are 3 LPI pumps (A, B, and C) however only the A and B are ES pumps. Second part is correct.

Answer B Discussion

Incorrect. First part is plausble since it is true regarding the LPI pumps. There are 3 LPI pumps (A, B, and C) however only the A and B are ES pumps. Second part is plausible since the 1A RBCU gets a start signal it would only be logical to assume that both the inlet and outlet cooler isolation valves would get an ES signal to open h owever the cooler inlet valves are left in the Open position and do not receive an ES signal.

Answer C Discussion

Correct. All 3 LPSW pumps get an ES signal to start and only the outlet LPSW valve gets an ES signal to open.

Answer D Discussion

Incorrect. First part is correct. Second part is plausible since the 1A RBCU gets a start signal it would only be logical to assume that both the inlet and outlet cooler isolation valves would get an ES signal to open h owever the cooler inlet valves are left in the Open position and do not receive an ES signal.

Basis for meeting the K

Requires the ability to monitor RBCU operation during initiation of safeguards (ES) mode of operation

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	NEW	

Development References

PNS-RBC (Obj: 16)
SSS-LPW Obj R14

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 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 ....

Given the following Unit 1 conditions:

- Reactor in MODE 1

1) The LOWER Reactor Building Pressure that will result in an automatic start of the Reactor Building Spray pumps is __(1)__ psig.

2) The BWST to LPI and RBS pump suction valves (1LP-21 and 1LP-22) __(2)__.

Which ONE of the following completes the statements above?

A. 1. 4.2
   2. are normally OPEN

B. 1. 4.2
   2. automatically OPEN on ECCS actuation

C. 1. 11.5
   2. are normally OPEN

D. 1. 11.5
   2. automatically OPEN on ECCS actuation

General Discussion

BWST is an approved acronym for Borated Water Storage Tankt per Chapter F of the EOP/AP Writer's Guide

LPI is an approved acronym for Low Pressure Injection per Chapter F of the EOP/AP Writer's Guide

RBS is an approved acronym for Reactor Building Spray per Chapter F of the EOP/AP Writer's Guide

ECCS is an approved acronym for Emergency Core Cooling Systemt per Chapter F of the EOP/AP Writer's Guide

Answer A Discussion

Incorrect. First part is plausible since this is above the high RP pressure setpoint for ES 1-6 and would cause an ECCS actuation of HPI and LPI systems as well as RB isolation. Second part is correct.

Answer B Discussion

Incorrect. First part is plausible since this is above the high RP pressure setpoint for ES 1-6 and would cause an ECCS actuation of HPI and LPI systems as well as RB isolation. Second part is plausible since it is true for the HPI pump suction to the BWST (HP-24 & HP-25).

Answer C Discussion

Correct. 10 psig RB pressure actuates ES 7 & 8 and RBS pumps are associated with ES channels 7 and 8. The LPI/RBS pumps suctions valves are required to be open since they do not get an open signal from ECCS actuation.

Answer D Discussion

Incorrect. First part is correct. Second part is plausible since it is true for the HPI pump suction to the BWST (HP-24 & HP-25).

Basis for meeting the K

Requires knowledge of the relationship between auto starts of the RBS pumps and ECCS actuation. Also requires knowledge of the relationship between ECCS actuation and RBS pump suction.

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Memory	NEW	

Development References

PNS-RBS Obj 04, 06
PNS-RBS

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

SYS026 K3.02 - Containment Spray System (CSS)
Knowledge of the effect that a loss or malfunction of the CSS will have on the following: (CFR: 41.7 / 45.6)
Recirculation spray system ....

Given the following Unit 1 conditions:
Initial conditions:

- Reactor power = 100%
- 1TC locked out
- 1BS-2 breaker is open and will not close

Current conditions:

- ES 1 – 8 actuates due to a Large Break LOCA

When the Reactor Building Spray system is placed in the recirculation mode:

1) Its purpose is to __ (1) __.

2) The RBS system __ (2) __ be able to perform its safety function.

Which ONE of the following completes the statements above?

A. 1. entrain Iodine thus reducing offsite dose
2. will

B. 1. entrain Iodine thus reducing offsite dose
2. will NOT

C. 1. minimize hydrogen production due to Zirc water reaction
2. will

D. 1. minimize hydrogen production due to Zirc water reaction
2. will NOT

General Discussion

ES is an approved acronym for Engineered Safeguards per Chapter F of the EOP/AP Writer's Guide

LOCA is an approved acronym for Loss of Coolant Accident per Chapter F of the EOP/AP Writer's Guide

RBS is an approved acronym for Reactor Building Spray per Chapter F of the EOP/AP Writer's Guide

Answer A Discussion

Incorrect. First part is correct. Second part is plausible because a candidate could have the misconception that either 1BS-2 is normally open (like 1HP-27) or that the "A" pump is powered from 1TD.

Answer B Discussion

Correct. In the recirc mode RBS entrains Iodine to limit offsite dose due to RB leakage. With 1TC locked out and 1BS-2 breaker open neither train of RBS will function. 1BS-2 is normally closed and thus will not go to it's ES position. Thus it's safety function will not be met.

Answer C Discussion

Incorrect. First part is plausible because it is true for Zinc and aluminum reaction. Second part is plausible because a candidate could have the misconception that either 1BS-2 is normally open (like 1HP-27) or that the "A" pump is powered from 1TD.

Answer D Discussion

Incorrect. First part is plausible because it is true for Zinc and aluminum reaction. Second part is correct.

Basis for meeting the K

Question requires knowledge about how failures of the RBS system will affect the system when placed in the recirc mode.

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	BANK	ILT42 Q43

Development References

ILT42 Q43
PNS-BS (Obj: 5, 10) Pg 7, 8, 9, 12

Student References Provided

SYS026 K3.02 - Containment Spray System (CSS)
Knowledge of the effect that a loss or malfunction of the CSS will have on the following: (CFR: 41.7 / 45.6)
Recirculation spray system ....

401-9 Comments:

Remarks/Status

SYS039 A4.01 - 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)
Main steam supply. valves ....

Given the following Unit 3 conditions:
Initial conditions:

- Reactor power = 100%
- 3MS-112 & 3MS-173 (SSRH 3A/3B Controls) are OPEN in MANUAL
- 3MS-77, 78, 80, 81 (MS to SSRH's) control switches in OPEN

Current conditions:

- Main Turbine trips

1) 3MS-112 & 3MS-173 will __ (1) __.

2) 3MS-77, 78, 80, 81 will __ (2) __.

Which ONE of the following completes the statements above?

A. 1. close
2. close

B. 1. close
2. remain open

C. 1. remain open
2. close

D. 1. remain open
2. remain open

General Discussion

Answer A Discussion

Incorrect.
First part is correct. 3MS-112/173 will close whether their control switch is in auto or manual when the reactor trips.
Second part is incorrect and plausible. That fact that 3MS-112/173 will close whether their control switch is in auto or manual when the reactor trips makes it reasonable and plausible the 3MS-77, 78, 80, 81 will close also.

Answer B Discussion

Correct.
First part is correct. 3MS-112/173 will close whether their control switch is in auto or manual when the reactor trips.
Second part is correct. MS-77/78/80/81 will remain open if their control switches are in open when the reactor trips.

Answer C Discussion

Incorrect.
First part is incorrect and plausible. The misconception that a valve should remain in its current position even on a reactor trip is reasonable. That fact that 3MS-77, 78, 80, 81 will remain open when the reactor trips with their control switch in open makes it reasonable and plausible that 3MS-112 / 173 will remain open.
Second part is incorrect and plausible. That fact that 3MS-112/173 will close whether

Answer D Discussion

Incorrect.
First part is incorrect and plausible. The misconception that a valve should remain in its current position even on a reactor trip is reasonable. That fact that 3MS-77, 78, 80, 81 will remain open when the reactor trips with their control switch in open makes it reasonable and plausible that 3MS-112 / 173 will remain open.
Second part is correct. MS-77/78/80/81 will remain open if their control switches are in open when the reactor trips.

Basis for meeting the K

Question requires knowledge of how the MSRs are isolated following a turbine trip. The candidate must distinquish between two different operating characteristics of valves for the SSRH's.

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	BANK	ILT39 Q42

Development References
STG-MSR R18 STG-MSR

Student References Provided

SYS039 A4.01 - 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)
Main steam supply. valves ....

401-9 Comments:

Remarks/Status

SYS059 A2.06 - 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)

Loss of steam flow to MFW system ....

Given the following Unit 1 conditions
Initial conditions:

- Reactor power = 70% stable

Current conditions:

- 1HPE-6 (Heater 1A1 Bleed Inlet) closed

Which ONE of the following predicts the:

1) impact of the malfunction on Feedwater flow assuming no operator action?

2) procedure which will be used to reopen 1HPE-6?

A. 1. higher
2. OP/1/A/1106/23 (High and Low Pressure Extraction)

B. 1. higher
2. OP/1/A/1106/002 (Condensate and FDW system)

C. 1. lower
2. OP/1/A/1106/23 (High and Low Pressure Extraction)

D. 1. lower
2. OP/1/A/1106/002 (Condensate and FDW system)

ILT46 ONS SRO NRC Examination QUESTION 44

44

C

General Discussion

Answer A Discussion

Incorrect: First part is plausible due to the initial ICS response. Initially, CTP will begin to increase which would generally indicate an increase in FDW flow is required however ICS will attempt to maintain CTP at setpoint and will therefore decrease the demand to the remaining portions of ICS which will then actually decrease FDW flow. Since the big picture of ICS is to maintain the primary and secondary heat balance it is plausible to deduce that ICS would increase feedwater to match the initial increase in CTP. Second part is correct.

Answer B Discussion

Incorrect: First part is plausible as described in A. Second part is plausible since OP/1/A/1106/002 (Condensate and FDW system) is the procedure used to control most FDW heater operations. Additionally, it is the procedure to which you are directed if you are not able to reopen the extraction valve.

Answer C Discussion

CORRECT: Initially, CTP will begin to increase however ICS will attempt to maintain CTP at setpoint and will therefore decrease the demand to the remaining portions of ICS. Additionally the FDW temperature correction ckt in the FDW subsection will modify FDW demand down since FDW temperature will be lower due to the loss of extraction steam. OP/1/A/1106/23, Enclosure 4.1 (Re-opening Extraction Valves) contains guidance for re-opening extraction valves at power.

Answer D Discussion

Incorrect: First part is correct. Second part is plausible since OP/1/A/1106/002 (Condensate and FDW system) is the procedure used to control most FDW heater operations. Additionally, it is the procedure to which you are directed if you are not able to reopen the extraction valve.

Basis for meeting the K

K/A MATCH ANALYSIS
Requires ability to predict the impact on FDW system when steam flow is shut off to a high pressure feedwater heater and then requires knowledge of procedures use to mitigate the consequences of the operation

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	BANK	2009A RO Q#44

Development References

2009A NRC Exam
OP/1/A/1106/23, Enclosure 4.1., Re-opening Extraction Valves)
STG-ICS Introduction (Obj: R12)
STG-ICS Ch4 Pg 7
STG-FHS Pg 17

Student References Provided

SYS059 A2.06 - 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)

Loss of steam flow to MFW system ....

401-9 Comments:

Remarks/Status

SYS061 A3.03 - Auxiliary / Emergency Feedwater (AFW) System
Ability to monitor automatic operation of the AFW, including: (CFR: 41.7 / 45.5)
AFW S/G level control on automatic start ....

Given the following Unit 1 conditions:
Initial conditions:

- Reactor power = 100%

Current conditions:

- Condenser vacuum = 18.5 inches Hg stable
- 1TA and 1TB de-energized

SG levels will be automatically controlled at _______.

Which ONE of the following completes the statement above?

A. 25 inches Startup Range

B. 30 inches XSUR

C. 50% Operating Range

D. 240 inches XSUR

ILT46 ONS SRO NRC Examination **QUESTION 45** 45 **D**

General Discussion

SG is an approved acronym for Steam Generatort per Chapter F of the EOP/AP Writer's Guide

XSUR is an approved acronym for Extended Startup Range per Chapter F of the EOP/AP Writer's Guide

Answer A Discussion

Incorrect. Plausible because it would be correct if on Main FDW with RCPs.

Answer B Discussion

Incorrect. Plausible because it would be correct if on EFDW with RCPs.

Answer C Discussion

Incorrect. Plausible because it would be correct if on Main FDW without RCPs.

Answer D Discussion

Correct. At 19 inches Hg Main FDW will trip. Without 1TA and 1TB (no RCPs) EFDW will control SG level at 240 inches XSUR.

Basis for meeting the K

Question requires the applicant to have knowledge of how the AFW system maintains SG level on an automatic system start.

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	BANK	ILT42 Q27

Development References

ILT42 Q27
CF-EF (Obj: 31) Pg 33
CF-FPT (Obj: 14) Pg 31
PNS-CPM Pg 13

Student References Provided

SYS061 A3.03 - Auxiliary / Emergency Feedwater (AFW) System
Ability to monitor automatic operation of the AFW, including: (CFR: 41.7 / 45.5)
AFW S/G level control on automatic start ....

401-9 Comments:

Remarks/Status

SYS061 K2.02 - Auxiliary / Emergency Feedwater (AFW) System
Knowledge of bus power supplies to the following: (CFR: 41.7)
AFW electric drive pumps ....

Which ONE of the following utilizes the 1TE ES Power String as its source of electrical power?

A. C LPSW pump

B. 1C RBCU

C. 1B MDEFWP

D. 1B RBS pump

ILT46 ONS SRO NRC Examination QUESTION 46

46

C

General Discussion

ES is an approved acronym forEngineered Safeguards per Chapter F of the EOP/AP Writer's Guide

LPSW is an approved acronym for Low Pressure Service Water per Chapter F of the EOP/AP Writer's Guide

RBCU is an approved acronym for Reactor Building Cooling Unit per Chapter F of the EOP/AP Writer's Guide

RBS is an approved acronym for Reactor Building Spray per Chapter F of the EOP/AP Writer's Guide

MDEFWP is an approved acronym for Motor Driven Emergency Feedwater Pump per Chapter F of the EOP/AP Writer's Guide

Answer A Discussion

Incorrect. Plausible since A LPSW is from Tc and B LPSW is from Td therefore it is reasonable to believer C LPSW is from Te however it is powered from Unit 2.

Answer B Discussion

Incorrect. Plausible since TE would meet the logical alignment of power supplies.

Answer C Discussion

Correct. 1B MDEFWP is powered from TE

Answer D Discussion

Incorrect. Plausible sinde there are two different "B" components powered from TE (MDEFWP & HPIP).

Basis for meeting the K

Requires knowledge of bus power supply to MDEFWP's

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Memory	NEW	

Development References

IC-ES Obj R20.
Power Supply chart

Student References Provided

SYS061 K2.02 - Auxiliary / Emergency Feedwater (AFW) System
Knowledge of bus power supplies to the following: (CFR: 41.7)
AFW electric drive pumps ....

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 ....

Given the following plant conditions:

- The Standby Buses are being powered from the 100 kV line
- The SL Breakers Auto/Manual Selector switches are in AUTO
- The TRIP INTERLOCK DEFEAT SWITCH is in the LEE position

Which ONE of the following conditions will cause the SL Breakers to open?

A. An undervoltage condition occurs on Standby Bus 1 ONLY.

B. An undervoltage condition would have to occur on BOTH Standby Bus 1 AND Standby Bus 2.

C. The 1st level 100KV Degraded Voltage Relay has been satisfied for 9 seconds AND the 2nd level 100KV Degraded Voltage Relay is now satisfied.

D. The 1st level 100KV Degraded Voltage Relay is satisfied now AND the 2nd level 100KV Degraded Voltage Relay has been satisfied for 9 seconds.

ILT46 ONS SRO NRC Examination QUESTION 47

47

B

General Discussion

Subset A&B. If an UV conditions on STBY Bus 1 ONLY will cause SL breakers to open, then UV on STBY Bus 1 AND 2 will get it also. Modified question and answers A&B to eliminate the subset issue.

Answer A Discussion

Incorrect. Plausible because under voltage will cause the breakers to open. However it takes under voltage on both buses.

Answer B Discussion

Correct. Undervoltage protection is all that will trip the SL breakers in this case. UV protection is only active if the Auto/Manual Switches are in Auto and it requires both busses to have an undervoltage condition.

Answer C Discussion

Incorrect. Plausible because this would cause a trip if the Trip Interlock Defeat Switch was in the Central position.

Answer D Discussion

Incorrect. Plausible because this would cause a trip if the Trip Interlock Defeat Switch was in the Central position.

Basis for meeting the K

Requires knowledge of how the off-site power source (CT-5) relates to the ONS AC distribution system. Including what would cause the SL breakers to open. This would allow the onsite power source (keowee) to then power the MFBs.

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	BANK	ILT41 Q46

Development References	Student References Provided
ILT41 Q46 EL-PSL (Obj: 10) Pg 46-49	

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

SYS063 2.2.39 - DC Electrical Distribution System
SYS063 GENERIC
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%
- 1PA Battery is inoperable

In accordance with SLC 16.8.3 (Power Battery Parameters):

1) The MAXIMUM Completion time allowed to declare the Unit 1 TDEFDW pump inoperable is __ (1) __.

2) Cross connecting __ (2) __ buses is required.

Which ONE of the following completes the statements above?

A. 1. immediately
2. 1PA and 1PB

B. 1. immediately
2. 1PA, 2PA and 3PA

C. 1. within one hour
2. 1PA and 1PB

D. 1. within one hour
2. 1PA, 2PA and 3PA

ILT46 ONS SRO NRC Examination QUESTION 48

48

B

General Discussion

TDEFWP is an approved acronym for Turbine Driven Emergency Feedwater Pump per Chapter F of the EOP/AP Writer's Guide

Answer A Discussion

Incorrect. First part is correct. Second part is plausible because the required actions are to cross-connect the buses however it is referring to cross connecting with other units not your own.

Answer B Discussion

Correct. SLC 16.8.3 Condition B is for a single power battery inoperable and requires declaring the TDEFDW pump inoperable immediately. It also requires cross connecting all units PA buses.

Answer C Discussion

Incorrect. First part is plausible because one hour is a common TS completion time. Second part is plausible because the candidate could have the misconception that tying the units busses together would satisfy the SLC for some period of time.

Answer D Discussion

Incorrect. First part is plausible because one hour is a common TS completion time. Second part is correct.

Basis for meeting the K

Requires knowledge of 1 hr or less SLC requirments related to DC distribution systems.

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Memory	BANK	ILT42 Q49

Development References	Student References Provided
ADM-ITS Obj R7 SLC 16.8.3	

SYS063 2.2.39 - DC Electrical Distribution System

SYS063 GENERIC

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

SYS064 K3.02 - 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)

ESFAS controlled or actuated systems ....

Given the following Unit 1 conditions:

Time = 1200

- Reactor power = 100%
- ACB-4 Closed
- LOCA LOOP occurs

Time = 1205

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

Which ONE of the following describes how ECCS systems are being powered at Time = 1210?

A. KHU-1 through the Overhead power path

B. KHU-1 through the underground power path

C. CT-5 powered from Lee combustion turbine

D. CT-5 powered from Central Switchyard

ILT46 ONS SRO NRC Examination QUESTION 49 49 **A**

General Discussion

ECCS is an approved acronym for Emergency Core Cooling Systems per Chapter F of the EOP/AP Writer's Guide

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.

Answer B Discussion

Incorrect. Plausible for the following reasons.
If candidate does not know which ACB is for the overhead power path and which one is for the underground.
If candidate does not understand Power Switching Logic it is plausible to believe that PSL would align KHU-1 to the underground if KHU-2 is lost since there are conditions which result in the overhead KHU auto aligning to the underground.

Answer C Discussion

Incorrect. Plausible since this would be correct if Lee were energizing the Standby Buses prior to the LOCA/LOOP.

Answer D Discussion

Incorrect. Plausible since this would be correct if Central were energizing the Standby Buses prior to the LOCA/LOOP.

Basis for meeting the K

Required knowledge of the effect that a loss of KHU (our D/G equivalency) would have on ESFAS systems that had already actuated.

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	NEW	

Development References
EL-PSL Obj 11 EL-PSL

Student References Provided

SYS064 K3.02 - 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)

ESFAS controlled or actuated systems ....

401-9 Comments:

Remarks/Status

SYS073 A4.02 - Process Radiation Monitoring (PRM) System
Ability to manually operate and/or monitor in the control room: (CFR: 41.7 / 45.5 to 45.8)
Radiation monitoring system control panel ....

Which ONE of the following describes the operation of the Unit Vent Radiation Monitors RIA-45 and RIA-46 when the switchover acceptance range setpoint is reached?

RIA-45 will read ___(1)____ and RIA-46 will provide ___(2)____.

A. 1. offscale high
2. only alarm and unit vent radiation level indication

B. 1. offscale high
2. the same interlock functions that RIA-45 performs

C. 1. ZERO
2. only alarm and unit vent radiation level indication

D. 1. ZERO
2. the same interlock functions that RIA-45 performs

ILT46 ONS SRO NRC Examination QUESTION 50

50

D

General Discussion

Answer A Discussion

Incorrect: First part is incorrect. Plausible in that student could have a misconception and believe that RIA-45 stays off-scale high. RIA-45 will read zero. RIA-46 will provide the same interlock functions as RIA-45 (which would include tripping Purge fans and closing Purge valves).

Answer B Discussion

Incorrect: First part is incorrect. Plausible in that student could have a misconception and believe that RIA-45 stays off-scale high. RIA- 45 will read zero. Student could have a misconception and believe that RIA-45 stays off-scale high

Answer C Discussion

Incorrect: First part is correct. RIA-46 will provide same interlock function as RIA-45..

Answer D Discussion

Correct: First part is correct. RIA-45 will read zero and RIA-46 will provide the same interlock functions as RIA-45 (which would include tripping Purge fans and closing Purge valves).

Basis for meeting the K

Requires the ability to monitor the RIA control panel for proper operation.

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Memory	BANK	ILT43 Q72

Development References
RAD-RIA Obj 8 RAD-RIA

Student References Provided

SYS073 A4.02 - Process Radiation Monitoring (PRM) System

Ability to manually operate and/or monitor in the control room: (CFR: 41.7 / 45.5 to 45.8)

Radiation monitoring system control panel ....

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 1 conditions:

- Reactor power = 100%
- A and B LPSW pumps are turned OFF and cannot be restarted
- 1AP/24 (Loss of LPSW) initiated

1) The LOWEST CRD temperature that will require a Reactor trip is __(1)__ °F in accordance with 1AP/20 (Loss of Component Cooling).

2) RCW system temperatures would be expected to __(2)__.

Which ONE of the following completest the statements above?

A. 1. 140
   2. increase

B. 1. 140
   2. remain unchanged

C. 1. 180
   2. increase

D. 1. 180
   2. remain unchanged

ILT46 ONS SRO NRC Examination QUESTION 51

51

D

General Discussion

PLPSW is an approved acronym for Low Pressure Service Water per Chapter F of the EOP/AP Writer's Guide

CRD is an approved acronym forControl Rod Drive per Chapter F of the EOP/AP Writer's Guide

RCW is an approved acronym for Recirculating Cooling Water per Chapter F of the EOP/AP Writer's Guide

Answer A Discussion

Incorrect: First part is plausible since it is the high temperature OAC alarm setpoint. Second part is plausible under the misconception that LPSW is the cooling medium for RCW.

Answer B Discussion

Incorrect: First part is plausible since it is the high temperature OAC alarm setpoint. Second part is correct

Answer C Discussion

Incorrect: First part is correct. Second part is plausible under the misconception that LPSW is the cooling medium for RCW.

Answer D Discussion

Correct. AP/20 requires tripping Rx when any two CRD stator temps reach 180 degrees and since CCW cools RCW, a loss of LPSW should have no direct impact on RCW system temperatures.

Basis for meeting the K

Following a loss of LPSW this question requires the ability to monitor parameters to prevent exceeding design limits. The CRD parameters used are increasing due to loss of cooling medium for our closed loop RB system (Component Cooling). The RCW system is our Outside the RB closed loop cooling system and abiliyt to predict changes in temperature due to a loss of the service water system also matches the KA

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	NEW	

Development References

EAP-APG Obj R9 SSS-RCW Obj 12
AP/20 (Loss of Component Cooling)
SSS-RCW

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

SYS078 2.1.20 - Instrument Air System (IAS)
SYS078 GENERIC
Ability to interpret and execute procedure steps. (CFR: 41.10 / 43.5 / 45.12)

Given the following Unit 1 conditions:

- Reactor Power = 100%
- Instrument Air pressure = 63 psig slowly decreasing

Immediate Manual Actions of the EOP will be performed after AP/22 (Loss of Instrument Air) directs tripping the _______.

Which ONE of the following completes the statement above?

A. Reactor ONLY

B. Reactor and Main Turbine ONLY

C. Reactor and Main Feedwater Pumps ONLY

D. Reactor, Main Turbine, AND the Main Feedwater Pumps

General Discussion

Answer A Discussion

Incorrect. Plausible since the AP does direct tripping the Rx however not ONLY the Rx.

Answer B Discussion

Incorrect. Plausible since the Main turbine will automatically trip AND when the Rx is tripped, IMA's of the EOP will direct pushing the Turbine Trip pushbutton. Although Plausible, Main Turbine is clearly a wrong choice since AP/22 does NOT direct tripping the Main Turbine. Also plausible since there are two components directed to be tripped.

Answer C Discussion

Correct. Per AP/22:
IAAT both of the following apply:
__ Unit is in MODE 1 or 2
__ IA header pressure is ≤ 65 psig,
THEN perform the following:
A. __ Trip Rx.
B. __ Trip all Main FDW pumps.

Answer D Discussion

Incorrect. Plausible since two of the 3 are directed to be tripped and the third (Main Turbine) will automatically trip.

Basis for meeting the K

Requires the ability to execute procedure steps contained in AP/22 as a result of loss of IA.

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Memory	NEW	

Development References

EAP-APG Obj R9
AP/22

Student References Provided

SYS078 2.1.20 - Instrument Air System (IAS)
SYS078 GENERIC
Ability to interpret and execute procedure steps. (CFR: 41.10 / 43.5 / 45.12)

401-9 Comments:

Remarks/Status

SYS078 K4.01 - Instrument Air System (IAS)
Knowledge of IAS 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:

- Reactor trip from 100% due to loss of all Main Feedwater
- 1FDW-316 pneumatic supply line has ruptured and the valve cannot be operated from Control Room
- Enclosure 5.27 (Alternate Methods of Feeding the Steam Generator) in progress
- SRO notified that the startup path to the 1B SG CANNOT be used

Which ONE of the following describes how RCS temperature will be controlled?

A. Using ONLY the 1A SG

B. Use 1A SG AND manually throttle 1FDW-316

C. Use 1A SG AND feed 1B SG with Alternate Units EFDW

D. Align TDEFWP to 1B SG and use 1MS-94 spindle to throttle TDEFWP speed to control flow to 1B SG

ILT46 ONS SRO NRC Examination QUESTION 53

53

B

General Discussion

SG is an approved acronym for Steam Generator per Chapter F of the EOP/AP Writer's Guide

TDEFWP is an approved acronym for Turbine Driven Emergency Feedwater Pump per Chapter F of the EOP/AP Writer's Guide

EFDW is an approved acronym for Emergency Feedwater per Chapter F of the EOP/AP Writer's Guide

RCS is an approved acronym for Reactor Coolant System per Chapter F of the EOP/AP Writer's Guide

Answer A Discussion

Incorrect. Although single SG cooldowns are performed in the EOP, this is not one of the cases that would use that alignment.

Answer B Discussion

Correct. If startup source is unavailable, Encl. 5,27 directs locally throttling the EFDW control valves to control flow to the SG.

Answer C Discussion

Incorrect. Although feeding with an alternate unit is one of the ways Encl. 5.27 alignes feed to a SG, it is not use din this case.

Answer D Discussion

Incorrect. Although feeding by throttling 1MS-94 to control TDEFWP speed t is one of the ways Encl. 5.27 alignes feed to a SG, it is not used in this case. It would be use if locally operating the valve did not work.

Basis for meeting the K

Per Chief Examiner, using Manual control of EFDW valves due to loss of IA supply OK. Requires knowledge of the design feature which provides for manually controlling FDW-316 when all motive force to the valve has been lost..

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	NEW	

Development References

EAP-LOHT obj R30
EOP Encl 5.27

Student References Provided

SYS078 K4.01 - Instrument Air System (IAS)

Knowledge of IAS 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

ILT46 ONS SRO NRC Examination **QUESTION 54** 54 **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 Cavity washdown in progress
- RB Purge in progress
- Reactor Building Sump is being pumped

Time = 1205

- Pressurizer level 322 inches decreasing
- 1RIA-49 (Reactor Building High Gas) in HIGH alarm

1) The Containment Evacuation alarm __(1)__ AUTOMATICALLY actuate as a result of the 1RIA-49 HIGH alarm.

2) __(2)__ is the procedure that will be entered FIRST.

Which ONE of the following completes the statements above?

A. 1. will
2. AP/26 (Loss of Decay Heat Removal)

B. 1. will
2. AP/2 (Excessive RCS Leakage)

C. 1. will NOT
2. AP/26 (Loss of Decay Heat Removal)

D. 1. will NOT
2. AP/2 (Excessive RCS Leakage)

General Discussion

Answer A Discussion

Incorrect. First part is correct. Second part is plausible since AP/26 will be the AP used to find and isolate the RCS leak however AP/2 is entered first and AP/2 directs entry into AP/26 under these conditions.

Answer B Discussion

Correct. 1RIA-49 H IGH alarm does actuate the RB Evacuation alarm. Although AP/26 is the AP that directs activities to find and isolate the RCS leak while on DHR, AP/2 entry conditions are met and is therefore entered first. AP/2 will direct entry into AP/26

Answer C Discussion

Incorrect. First part ia plausible since some other RIA's in the RB do NOT activate the Conhtainment Evauation alarm (Ex. RIA-3, 57, 58). Second part is plausible since AP/26 will be the AP used to find and isolate the RCS leak however AP/2 is entered first and AP/2 directs entry into AP/26 under these conditions.

Answer D Discussion

Incorrect. First part ia plausible since some other RIA's in the RB do NOT activate the Conhtainment Evauation alarm (Ex. RIA-3, 57, 58). Second part is correct.

Basis for meeting the K

Chief Examiner said that do not have to test "recognition of the alarm" to meet KA.. Requires predicting actuation of the Containment Evacuation alarm and using procedures to mitigate the conditions that caused the alarm.

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	NEW	

Development References

RAD-RIA Obj 8
RAD-RIA
AP/2
AP/26

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

SYS103 A4.01 - Containment System
Ability to manually operate and/or monitor in the control room: (CFR: 41.7 / 45.5 to 45.8)
Flow control, pressure control, and temperature control valves, including pneumatic valve controller ....

Given the following Unit 1 conditions:

- Reactor in MODE 5
- RB Main Purge in operation

Which ONE of the following will cause the RB Main Purge Fan to trip OFF?

A. Suction pressure = 5 inches of water vacuum

B. 1RIA-45, UNIT VENT GAS NORM, reaches its ALERT setpoint

C. Statalarm 1SA9/B-3, RBV PURGE INLET TEMPERATURE LOW, alarms

D. 1PR-3 (RB PURGE CONTROL) green CLOSED light is lit and red OPEN light is off on 1VB2

General Discussion

RB is an approved acronym for Reactor Building per Chapter F of the EOP/AP Writer's Guide

Answer A Discussion

INCORRECT. Plausible because vacuum on the suction piping must be less than 9” of water to start the Purge Fan, and will trip the fan if exceeded.

Answer B Discussion

INCORRECT. Plausible because 1RIA-45 WILL stop the purge, but only at the HIGH setpoint, not ALERT (Ref. ARG 1SA-08, B-9). Closes PR-2 through PR-5; any of these valves closed will trip the fan.

Answer C Discussion

INCORRECT. Plausible because OP/1/A/1102/014, RB Purge System, P&L 2.7 tells the operator to stop the RB Purge Fan on this alarm. LP PNS-RBP says the same.

Answer D Discussion

CORRECT. The purge fan is interlocked so that it will not start unless PR-3 is open >10% (Ref. LP PNS-RBP 2.2.B.12). Fan will trip if PR-3 is closed.

Basis for meeting the K

Question requires the ability to manually operate PR-3 from the control room. PR-3 a pneumatic valve controller that controls Containment Purge flow. Knowing that the purge fan will trip off if PR-3 gets a close indication is an integral part of being able to manually operate the valve during Containment Purge operations.

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Memory	BANK	ILT43 Q61

Development References
PNS-RBP Obj. R7 PNS-RBP Pg 19/20

Student References Provided

SYS103 A4.01 - Containment System

Ability to manually operate and/or monitor in the control room: (CFR: 41.7 / 45.5 to 45.8)

Flow control, pressure control, and temperature control valves, including pneumatic valve controller ....

401-9 Comments:

Remarks/Status

SYS001 K5.18 - Control Rod Drive System

Knowledge of the following operational implications as they apply to the CRDS: (CFR: 41.5/45.7)

Anticipation of criticality at any time when adding positive reactivity during startup ....

Given the following Unit 1 conditions:

- Startup in progress
- Estimated Critical Rod Position (ECP) calculation as follows:
  - ECP = Gp 7 @ 12% withdrawn (wd)
  - -0.75% delta K/K = Gp 6 @ 64% wd
  - -1% delta K/K = Gp 6 @ 55% wd
- Safety Rod withdrawal is about to begin

In accordance with AD-OP-ALL-0203 (Reactivity Management), which ONE of the following describes the EARLIEST condition where criticality should be expected?

Withdrawing Control Rods and ________.

A. Group 1 > 0% wd

B. Group 6 $\geq$ 55% wd

C. Group 6 $\geq$ 64% wd

D. Group 7 $\geq$ 12% wd

ILT46 ONS SRO NRC Examination QUESTION 56 56 **A**

General Discussion

Answer A Discussion

Correct, IAW AD-OP-ALL-0203, Criticality should be expected any time positive reactivity additions are being made.

Answer B Discussion

Incorrect. Plausible since this basically where SDM becomes <1% and is therefore a threshold value for operator actions.

Answer C Discussion

Incorrect. Plausible since this is the lower window of allowed criticality for the given ECP data

Answer D Discussion

Plausible since this is the actual calculated rod position for criticality.

Basis for meeting the K

Requires knowledge of when to anticipate criticality during positive reactivity additions.

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Memory	NEW	

Development References

ADM-SD Obj R9
AD-OP-ALL-0203 Pg 40
RT-RBC

Student References Provided

SYS001 K5.18 - Control Rod Drive System

Knowledge of the following operational implications as they apply to the CRDS: (CFR: 41.5/45.7)

Anticipation of criticality at any time when adding positive reactivity during startup ....

401-9 Comments:

Remarks/Status

ILT46 ONS SRO NRC Examination QUESTION 57 57 **A**

SYS002 A2.04 - Reactor Coolant System (RCS)

Ability to (a) predict the impacts of the following malfunctions or operations on the RCS; 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)

Loss of heat sinks ....

Given the following Unit 1 conditions:

- Reactor has tripped from 100%
- ALL Condensate, Feedwater, AND Emergency Feedwater pumps are unavailable
- BOTH 1A and 1B SG's are dry
- RCS temperature = 584°F slowly increasing
- RCS pressure = 2044 psig slowly increasing

1) Assuming NO operator actions, RCS __(1)__ will stop increasing FIRST.

2) The EOP will direct using __(2)__ to remove core decay heat.

Which ONE of the following completes the statements above?

A. 1. pressure
 2. HPI Forced Cooling

B. 1. pressure
 2. SSF ASW

C. 1. temperature
 1. HPI Forced Cooling

D. 1. temperature
 2. SSF ASW

ILT46 ONS SRO NRC Examination QUESTION 57

57

A

General Discussion

SG is an approved acronym for Steam Generator per Chapter F of the EOP/AP Writer's Guide

HPI is an approved acronym for High Pressure Injection per Chapter F of the EOP/AP Writer's Guide

SSF is an approved acronym for Standby Shutdown Facility per Chapter F of the EOP/AP Writer's Guide

ASW is an approved acronym for Auxiliary Service Water per Chapter F of the EOP/AP Writer's Guide

Answer A Discussion

Correct. When RCS pressure reaches 2205 psig the spray valve will open. For slow increases in RCS temperature this will stop the RCS pressure increase as the spray valve will result in cycling RCS pressure between 2155 psig and 2205 psig. Even if the temperature increase is too rapid for the spray valve to be able to stop the pressure increase, RCS pressure will increase to the PORV setpoint and cycle there at about 2450 psig until the RCS reached saturation temp for that pressure which is about 668 degrees F. The EOP will direct using HPI forced cooling once either RCS pressure reaches 2300 psig or Pzr level reaches 375 inches.

Answer B Discussion

Incorrect. First part is correct. Second part is plausible since it would be correct if HPI forced cooling were not available.

Answer C Discussion

Incorrect. First part is plausible since RCS temperature will stop increasing once RCS reaches saturated conditions however the spray valve and/or the PORV will stop the pressure increase before that occurs. Second part is correct.

Answer D Discussion

Incorrect. First part is plausible since RCS temperature will stop increasing once RCS reaches saturated conditions however the spray valve and/or the PORV will stop the pressure increase before that occurs. Second part is plausible since it would be correct if HPI forced cooling were not available.

Basis for meeting the K

Requires the ability to predict the impact of a LOHT on the RCS and then use the EOP to mitigate the malfunction.

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	NEW	

Development References

PNS-PZR Obj 07, 15
EAP-LOHT Obj R22
PNS-PZR
PNS-LOHT

Student References Provided

SYS002 A2.04 - Reactor Coolant System (RCS)

Ability to (a) predict the impacts of the following malfunctions or operations on the RCS; 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)

Loss of heat sinks ....

401-9 Comments:

Remarks/Status

SYS015 K3.01 - Nuclear Instrumentation System (NIS)
Knowledge of the effect that a loss or malfunction of the NIS will have on the following: (CFR: 41.7 / 45.6)
RPS ....

Given the following Unit 1 conditions:
Initial Conditions:

- Reactor Power = 100%
- 1B RPS channel in Manual Bypass due to failed RB pressure transmitter

Current Conditions:

- 1NI-7 fails HIGH

The 1C RPS channel:

1) __(1)__ AUTOMATICALLY trip.

2) __(2)__ be placed in Manual Bypass in accordance with OP/1/A/1105/014 (Control Room Instrumentation).

Which ONE of the following completes the statements above?

A. 1. did
2. will

B. 1. did
2. will NOT

C. 1. did NOT
2. will

D. 1. did NOT
2. will NOT

General Discussion

RPS is an approved acronym for Reactor Protection System per Chapter F of the EOP/AP Writer's Guide

RB is an approved acronym for Reactor Building per Chapter F of the EOP/AP Writer's Guide

Answer A Discussion

Incorrect First part is plausible since NI-7 feeds the C RPS channel and in the pre-digital RPS system this would have caused the channel to trip however with the new digital system using the 2nd min/max logic the channel does not trip even though the associated NI is above its trip setpoint., The second part is plausible since it would be correct if the 1B channel was not already in Manual Bypass. Additionally plausible since the function that has failed in the 1C channel is a different function than the one in the 1B channel therefore the failed channel function is not a "required" function IAW tech specs.

Answer B Discussion

Incorrect First part is plausible since NI-7 feeds the C RPS channel and in the pre-digital RPS system this would have caused the channel to trip however with the new digital system using the 2nd min/max logic the channel does not trip even though the associated NI is above its trip setpoint., second part is correct.

Answer C Discussion

First part is correct, The second part is plausible since it would be correct if the 1B channel was not already in Manual Bypass. Additionally plausible since the function that has failed in the 1C channel is a different function than the one in the 1B channel therefore the failed channel function is not a "required" function IAW tech specs.

Answer D Discussion

Correct. With the new digital RPS 2nd min/max logic it takes at least two functions exceeding the RPS trip setpoint to cause any channel to trip. With the 1B RPS channel already in Manual Bypass, the 1C channel would be placed in TRIP and not Manual Bypass.

Basis for meeting the K

Required knowledge of the effect of a failure of one of the power range NI's will have on its associated RPS channel.

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	NEW	

Development References

IC-RPS Obj R7
IC-RPS
OP/1105/14

Student References Provided

SYS015 K3.01 - Nuclear Instrumentation System (NIS)

Knowledge of the effect that a loss or malfunction of the NIS will have on the following: (CFR: 41.7 / 45.6)

RPS ....

401-9 Comments:

Remarks/Status

SYS016 K1.12 - Non-Nuclear Instrumentation System (NNIS)
Knowledge of the physical connections and/or cause-effect relationships between the NNIS and the following systems: (CFR: 41.2 to 41.9 / 45.7 to 45.8)
S/G ....

Given the following Unit 1 conditions:
- Reactor power = 90% stable
- 1A and 1B Main FDW Control valves are in HAND
- Controlling Feedwater valve ΔP fails LOW

1) Steam Generator levels __(1)__ increase.

2) IF the conditions above result in a Reactor trip, the FDW Control Valve ICS Hand/Auto stations will __(2)__ .

Which ONE of the following completes the statements above?

ASSUME NO OPERATOR ACTIONS

A. 1. will
2. remain in HAND

B. 1. will
2. revert to AUTO

C. 1. will NOT
2. remain in HAND

D. 1. will NOT
2. revert to AUTO

ILT46 ONS SRO NRC Examination QUESTION 59

59

B

General Discussion

FDW is an approved acronym for Feedwater per Chapter F of the EOP/AP Writer's Guide

ICS is an approved acronym for Integrated Control System per Chapter F of the EOP/AP Writer's Guide

Answer A Discussion

Incorrect. 1st part is correct. 2nd part is plausible because some of the ICS H/A stations trafer back to auto when in hand and some of them will stay in hand (such as loop masters).

Answer B Discussion

Correct. If valve DP fails low the FDW pump will speed up to try and return valve DP to approximately 35 psid. With FDW valves in Manual, the increased speed will result in increased flow which will result in increased SG level. If a reactor trip occurs while in MODE 1 or 2 with the FDW valve H/A stations in Manual they will revert to Auto to allow ICS to run back feedwater.

Answer C Discussion

Incorrect. 1st part is plausible because if it were the LOOP Masters in MANUAL, it would be correct or if it were the loop Flow DP that had failed, it would be correct. It is incorrect because the FWP speed has changed which changes flow. Without changing valve position, SG levels will increase. Second part is plausible because some of the ICS H/A stations trafer back to auto when in hand and some of them will stay in hand (such as loop masters).

Answer D Discussion

Incorrect. 1st part is plausible because if it were the LOOP Masters in MANUAL, it would be correct or if it were the loop Flow DP that had failed, it would be correct. It is incorrect because the FWP speed has changed which changes flow. Without changing valve position, SG levels will increase. 2nd part is correct.

Basis for meeting the K

Requires knowledge of the effect of a failed delta P instrument on SG levels and the appropriate FDW controls to operate to stabilize the plant

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	NEW	

Development References
STG-ICS Ch 4 Feedwater (Obj: R21) Pg 22, 23, 24 CF-FPT (Obj: 8 & 14) Pg 21,23,30

Student References Provided

SYS016 K1.12 - Non-Nuclear Instrumentation System (NNIS)

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

S/G ....

401-9 Comments:

Remarks/Status

SYS033 A1.01 - Spent Fuel Pool Cooling System (SFPCS)

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

Spent fuel pool water level ....

Unit 2 initial conditions:

- Reactor in MODE 6
- Fuel Transfer Canal slightly above 21.34' mark on canal wall
- RB Hatch closed
- RB Purge is operating
- 2SF-1 AND 2SF-2 are open

Current conditions:

- RB Purge trips

Which ONE of the following predicts the response of actual Fuel Transfer Canal level?

Fuel Transfer Canal level will…

A. decrease then remain constant

B. initially decrease then return to previous level

C. increase then remain constant

D. initially increase then return to previous level

ILT46 ONS SRO NRC Examination QUESTION 60

60

A

General Discussion

RB is an approved acronym for Reactor Building per Chapter F of the EOP/AP Writer's Guide

Answer A Discussion

Correct. When the Reactor Building Purge (RBP) System is in operation, the RB is maintained at slightly less than atmospheric pressure, resulting in the FTC level being higher than the SFP level, due to the differential pressure. When the RBP System is secured the RB pressure equalizes with the outside atmosphere. The pressure increase causes the pool levels to equalize, resulting in a decrease in FTC level and an increase in the SFP level.

Answer B Discussion

Incorrect. Fuel Transfer Canal level will decrease until equalized with SFP level then remain constant. Returning to initial level is plausible since it would be indicative of inadequate venting during level changes. Since the RB equipment hatch is installed the RB is essentially a closed environment except for the RB Purge alignment. With the Fuel Transfer Canal connected to the SFP. When the RB purge fan trips, it changes RB pressure and therefore SFP and FTC water levels. What makes returning to previous level plausible is the belief that since the RB will be vented to the atmosphere through the RB purge lines after the purge fan trips it will take some time for RB pressure to equalize with atmospheric pressure following the purge fan trip.

Answer C Discussion

Incorrect. Plausible because it would be correct if discussing Spent Fuel Pool level instead of FTC level.

Answer D Discussion

Incorrect. First part is plausible since it would be correct if discussing SFP level. Returning to initial level is plausible since it would be indicative of inadequate venting during level changes. Since the RB equipment hatch is installed the RB is essentially a closed environment except for the RB Purge alignment. With the Fuel Transfer Canal connected to the SFP. When the RB purge fan trips, it changes RB pressure and therefore SFP and FTC water levels. What makes returning to previous level plausible is the belief that since the RB will be vented to the atmosphere through the RB purge lines after the purge fan trips it will take some time for RB pressure to equalize with atmospheric pressure following the purge fan trip.

Basis for meeting the K

Requires ability to predict the impact of changing RB pressure on Fuel Transfer Canal level to ensure design level is not exceeded. Since 21.34' is the design minimum level for a full FTC, predicting the change in level when the RB Purge is secured and ensuring indicated level would not result in violating the 21.34' requirement when the purge trips is preventing exceeding design limits.

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	BANK	2009B Q62

Development References

Obj. FH-SFC R13

Student References Provided

SYS033 A1.01 - Spent Fuel Pool Cooling System (SFPCS)

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

Spent fuel pool water level ....

401-9 Comments:

Remarks/Status

SYS041 K2.01 - Steam Dump System (SDS)/Turbine Bypass Control

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

ICS, normal and alternate power supply ....

Given the following Unit 1 conditions:

Initial conditions:

- Reactor power = 100%
- Turbine Bypass Valves (TBV's) in HAND

Current Conditions

- 1KU is de-energized

1) The TBV's are __(1)__.

2) The TBV's __(2)__ manually operable from the Control Room.

Which ONE of the following completes the statements above ?

A. 1. closed
2. are

B. 1. 50% open
2. are

C. 1. closed
2. are NOT

D. 1. 50% open
2. are NOT

ILT46 ONS SRO NRC Examination QUESTION 61

61

A

General Discussion

Answer A Discussion

Correct. The TBV's are unique in that Auto Power (KI) and Hand Power (KU) feed a Static Analog Memory module that provides the hand signal from BOTH KI and KU and will therefore continue to provide a signal on loss of Hand power. Since KI is supplying Hand power the valves would remain closed and operable from the Control Room

Answer B Discussion

Incorrect: First part is plausible since all other ICS H/A stations fail to 50% signal if the associated baily station is in Hand when Hand power is lost. Second part is correct.

Answer C Discussion

Incorrect: First part is correct and plausible vs part 2 since many electrical components will have a 0 signal if electrical power is lost. Second part is plausible since it is correct for all other ICS H/A control stations.

Answer D Discussion

Incorrect: First part is plausible since all other ICS H/A stations fail to 50% signal if the associated baily station is in Hand when Hand power is lost. Second part is plausible since it is correct for all other ICS H/A control stations.

Basis for meeting the K

K/A MATCH ANALYSIS
Requires knowledge of both the normal and alternate supplies to ICS H/A stations.

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Memory	BANK	2009 RO Q#60

Development References

2009 NRC Exam Q60
AP/23 Rev 20
STG-ICS Ch 8, Power (Obj: R33) Pg 133, 134

Student References Provided

SYS041 K2.01 - Steam Dump System (SDS)/Turbine Bypass Control
Knowledge of bus power supplies to the following: (CFR: 41.7)
ICS, normal and alternate power supply ....

401-9 Comments:

Remarks/Status

SYS056 2.4.2 - Condensate System

SYS056 GENERIC

Knowledge of system set points, interlocks and automatic actions associated with EOP entry conditions. (CFR: 41.7 / 45.7 / 45.8)

Given the following Unit 1 conditions:

0359:45

- Reactor power = 70% stable
- 1B CBP trips

0400:00

- Main FDW Pump suction pressure = 235 psig decreasing

0401:00

- Main FDW Pump suction pressure = 230 psig decreasing

0401:30

- Main FDW Pump suction pressure = 225 psig stable

Based on the above conditions, complete the following statements:

1) Of the times listed above, 1C-61 (Cond Cooler Bypass Control) will first open at __ (1) __.

2) At 0401:35, the entry conditions for the EOP __ (2) __ met.

Which ONE of the following completes the statements above?

A. 1. 0400:00
   2. are

B. 1. 0400:00
   2. are NOT

C. 1. 0401:30
   2. are

D. 1. 0401:30
   2. are NOT

ILT46 ONS SRO NRC Examination QUESTION 62

62

A

General Discussion

FDW is an approved acronym for Feedwater per Chapter F of the EOP/AP Writer's Guide

Answer A Discussion

Correct: When MFDWP suction pressure is less than or equal to 235 psig, 1C-61 will open and the unit will runback . This unit runback is an entry condition for AP/1. After 90 seconds, if pressure is still below 235 psig, MFPs and therefore, the reactor will trip requiring entry into the EOP.

Answer B Discussion

Incorrect: First part is correct. Second part is incorrect because the MFPs just tripped which caused a reactor trip. Its plausible because if pressure was low but had remained or returned above 235 psig, it would be correct.

Answer C Discussion

Incorrect: First part is incorrect because no time delay associated with C-61. Its plausible because there is a 90 second time delay associated with the FDW pump trip. 2nd part is correct.

Answer D Discussion

1st part is incorrect but plausible (see C). 2nd part is incorrect but plausible (see B).

Basis for meeting the K

Requires knowledge of how a loss of a CBP affects Main FDWP suction pressure and when it will cause a unit runback / trip and the ability to determine the procedure to enter.

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	MODIFIED	ILT41 Q62

Development References

ILT41 Q62
CF-C (Obj: 19) Pg 32
CF-FDW (Obj: 3) Pg 10, 39

Student References Provided

SYS056 2.4.2 - Condensate System

SYS056 GENERIC

Knowledge of system set points, interlocks and automatic actions associated with EOP entry conditions. (CFR: 41.7 / 45.7 / 45.8)

401-9 Comments:

Remarks/Status

ILT46 ONS SRO NRC Examination QUESTION 63 63 **C**

SYS071 A3.03 - Waste Gas Disposal System (WGDS)
Ability to monitor automatic operation of the Waste Gas Disposal System including: (CFR: 41.7 / 45.5)
Radiation monitoring system alarm and actuating signals ....

Given the following Unit 1 conditions:

- 1A GWD tank release in progress
- 1RIA-37 HIGH alarm actuates
- 1SA-8/B9 (Process Monitor Radiation High) actuates

Which ONE of the following describes the:

1) impact on the Gaseous Waste Disposal (GWD) system?

2) procedure that contains actions that must be performed prior to re-initiating the release?

A. 1. Closes 1A GWD tank inlet AND outlet valves
2. OP/1-2/A/1104/018 (GWD System) ONLY

B. 1. Closes 1A GWD tank inlet AND outlet valves
2. AP/18 (Abnormal Release of Radioactivity) and OP/1-2/A/1104/018 (GWD System) ONLY

C. 1. Closes 1A GWD tank outlet valves ONLY
2. OP/1-2/A/1104/018 (GWD System) ONLY

D. 1. Closes 1A GWD tank outlet valves ONLY
2. AP/18 (Abnormal Release of Radioactivity) and OP/1-2/A/1104/018 (GWD System) ONLY

General Discussion

Answer A Discussion

Incorrect. First part is plausible since it does close the outlet valves and it would be logical to assume it closes the inlet vlaves as well in an effort to islolate the GWD tank. Second part is correct.

Answer B Discussion

Incorrect. First part is plausible since it does close the outlet valves and it would be logical to assume it closes the inlet vlaves as well in an effort to islolate the GWD tank. Second part is plausible since the OP is used and it would be logical to assume AP/18 would apply since this is abnormal however AP/18 entry conditions are not met.

Answer C Discussion

Correct. A HIGH alarm from RIA-37 will close all of the GWD tank outlet valves and isolate the Waste Gas Exhauster. The associated ARG will direct going to OP/1-2/A/1104/018 (GWD System) to provide additional guidance on what to do with the release that has now been terminated. The entry conditions for AP/18 are not met.

Answer D Discussion

Incorrect. First part is correct. Second part is plausible since the OP is used and it would be logical to assume AP/18 would apply since this is abnormal however AP/18 entry conditions are not m

Basis for meeting the K

Requiresthe ability to monitor automatic operation of the GWD system following a high alarm on the RIA.

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Memory	MODIFIED	ILT40 Q73

Development References

Obj. EAP-APG R9 RAD-RIA R2
RAD-RIA pg 46
GWD drwg

Student References Provided

SYS071 A3.03 - Waste Gas Disposal System (WGDS)

Ability to monitor automatic operation of the Waste Gas Disposal System including: (CFR: 41.7 / 45.5)

Radiation monitoring system alarm and actuating signals ....

401-9 Comments:

Remarks/Status

SYS072 A4.03 - Area Radiation Monitoring (ARM) System
Ability to manually operate and/or monitor in the control room: (CFR: 41.7 / 45.5 to 45.8)
Check source for operability demonstration ....

Given the following Unit 1 conditions:

- PT/0/A/0230/001, Radiation Monitor Check completed on Unit 1
- 1RIA-57 = .75 R/HR

Which ONE of the following is an indication of a satisfactory source check?

A. Alert Alarm Actuation ONLY

B. Alert AND High Alarm Actuation

C. Area Monitor Fault Alarm Actuation

D. Indication remains at .75 R/HR with no alarms

ILT46 ONS SRO NRC Examination QUESTION 64 64 **D**

General Discussion

Answer A Discussion

Incorrect. Plausible to believe that source check causes an ALERT alarm under the logical misconception that exposing a source to the RM would cause counts indication to increase. Additionally plausible to believe ALERT only since the ALERT alarms are set lower than the HIGH alarms.

Answer B Discussion

Incorrect. Plausible to believe that source check causes an ALERT and HIGH alarm under the logical misconception that exposing a source to the RM would cause counts indication to increase.

Answer C Discussion

Incorrect. Plausible to believe that receiving a Fault alarm would indicate acceptable performance of a source check. Under the misconception that there is a redundant indication monitored by the RIA (like the new digital RPS operation where all NI indications are looked at to determine if one of them is bad) and therefore a Fault would be logical since the actual radiation levels in the building are not increasing.

Answer D Discussion

Correct. No change in counts expected. Procedure states that indication should remain from 5E-01 to 1.

Basis for meeting the K

Requires the ability to monitor an area monitors source check operation to determine if it is successful.

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Memory	BANK	ILT43 Q50

Development References

ILT43 Q50
RAD-RIA (Obj: 10) Pg 36
PT/0/A/0230/001 Encl 13.5, Pg 10

Student References Provided

SYS072 A4.03 - Area Radiation Monitoring (ARM) System
Ability to manually operate and/or monitor in the control room: (CFR: 41.7 / 45.5 to 45.8)
Check source for operability demonstration ....

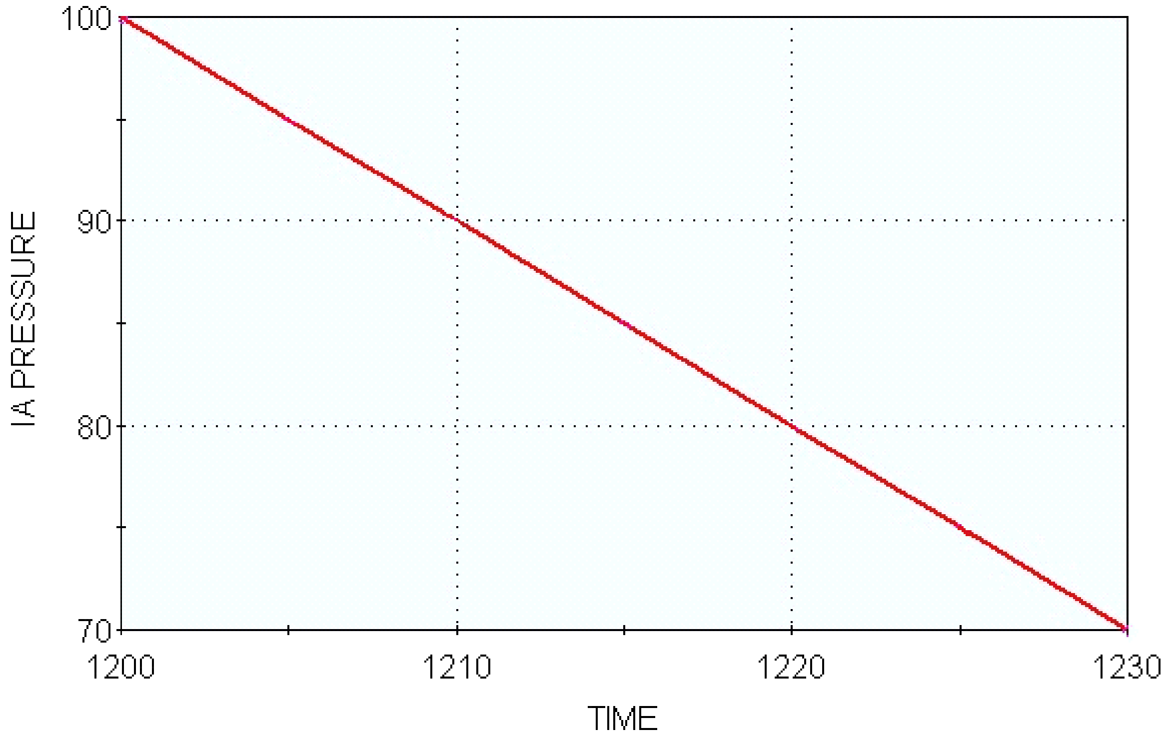
401-9 Comments:

Remarks/Status

ILT46 ONS SRO NRC Examination **QUESTION 65** 65 **D**

SYS079 K4.01 - Station Air System (SAS)
Knowledge of SAS design feature(s) and/or interlock(s) which provide for the following: (CFR: 41.7)
Cross-connect with IAS ....

IA Pressure vs. Time



Based on the graph above, which ONE of the following describes the EARLIEST time at which SA-141 (SA to IA Controller) will automatically open?

A. 1207

B. 1210

C. 1212

D. 1215

General Discussion

Answer A Discussion

Incorrect: Plausible since 93 psig is the pressure at which the Backup IA compressors will start.

Answer B Discussion

Incorrect: Plausible since 90 psig is the pressure at which the Diesel Air Compressors will start

Answer C Discussion

Incorrect: Plausible sine 88 psig is the pressure at which the AIA compressors will start

Answer D Discussion

CORRECT: SA to IA Controller (SA-141) valve senses the IA system pressure and opens at 85 psig to allow service air into the IA system.

Basis for meeting the K

K/A MATCH ANALYSIS
Requires knowledge of automatic cross-connect between Service air and Instrument air systems.

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	BANK	2009A RO Q#64

Development References

2009A Q64
SSS-IA (Obj: 39) Pg 27, 28, 50

Student References Provided

SYS079 K4.01 - Station Air System (SAS)
Knowledge of SAS design feature(s) and/or interlock(s) which provide for the following: (CFR: 41.7)
Cross-connect with IAS ....

401-9 Comments:

Remarks/Status

GEN2.1 2.1.17 - GENERIC - Conduct of Operations
Conduct of Operations
Ability to make accurate, clear, and concise verbal reports. (CFR: 41.10 / 45.12 / 45.13)

Given the following Unit 1 conditions:

- Reactor power = 100%
- The BOP determines that the Steam Packing Exhauster is OFF

1) The BOP will communicate this to the crew using a crew __ (1) __.

2) The above communication __ (2) __ required to be 3-way.

Per SOMP 1-07 (Control Room Oversight) AND OMP 1-24 (Operations Communications Standards), which ONE of the following completes the statements above?

A. 1. update
2. is

B. 1. update
2. is NOT

C. 1. brief
2. is

D. 1. brief
2. is NOT

ILT46 ONS SRO NRC Examination QUESTION 66 66 **B**

General Discussion

The applicant is given a scenario where an OAC alarm has been received in the C/R that is associated with planned maintenance. OMP 2-2 (Conduct of Ops) requires the following actions: This alarm is considered an "Unexpected Alarm" because even though it is associated with a planned activity, it was not "pre-identified" prior to the activity being performed. The alarm is required to be announced to the crew and repeated back by the CRS. Additionally upon first receipt of an unexpected alarm the alarm response is required to be reviewed. This is true for both annunciators and priority (below the line) OAC alarms.

BOP is an approved acronym for Balance of Plant per Chapter F of the EOP/AP Writer's Guide

Answer A Discussion

Incorrect. First part is correct. Second part is plausible because 3-way is required when communicating this to the CRSRO.

Answer B Discussion

Correct. Per SOMP 1-7, identifed equipmet problems are to be communicated to the crew using "crew update". 3-way communication not required during updats.

Answer C Discussion

Incorrect. First part is plausible because crew briefs are used to ensure the crew understands plant conditions and direction. Second part is plausible because 3-way is required when communicating this to the CRSRO

Answer D Discussion

Incorrect. First part is plausible because crew briefs are used to ensure the crew understands plant conditions and direction.. This is the case for computer alarms above the line. Second part is correct.

Basis for meeting the K

The K/A is matched because the candidate is required to demonstrate the ability to properly respond to an unexpected alarm received in the Control Room. This response includes the requirement to verbally communicate the event.

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Memory	BANK	ILT41 Q66

Development References

ILT41 Q66
ADM-COM (Obj: 3, 5) Pg 8
OMP1-24 (Obj: 1) PPT
OMP 1-24 Pg 3, 10 Rev 16

Student References Provided

GEN2.1 2.1.17 - GENERIC - Conduct of Operations

Conduct of Operations

Ability to make accurate, clear, and concise verbal reports. (CFR: 41.10 / 45.12 / 45.13)

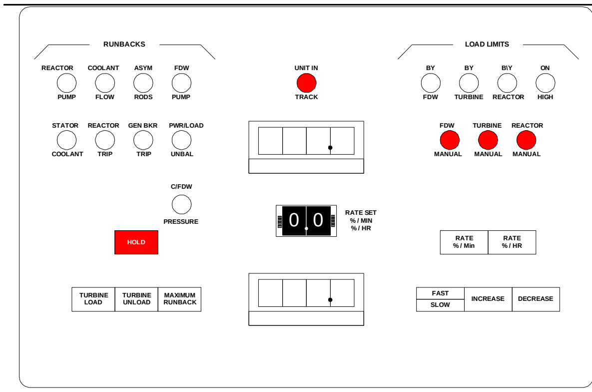
401-9 Comments:

Remarks/Status

GEN2.1 2.1.31 - GENERIC - Conduct of Operations

Conduct of Operations

Ability to locate control room switches, controls, and indications, and to determine that they correctly reflect the desired plant lineup. (CFR: 41.10 / 45.12)



Note: Drawing not representative of actual plant conditions.

Given the following Unit 1 conditions:
Initial conditions:

- Time = 0400
- Reactor power = 100% decreasing
- Control Rod Group 1 Rod 3 = 0% withdrawn

Current conditions:

- Time = 0430
- Reactor power = 68% decreasing
- 1B1 RCP trips

1) At 0400, the power to which the ICS is running the plant back is displayed in the __ (1) __ window. (refer to the drawing above)

2) After the RCP trips, the unit __ (2) __ automatically stabilize at the required reactor power for plant conditions.

Which ONE of the following completes the statements above?

A. 1. upper
2. will

B. 1. upper
2. will NOT

C. 1. lower
2. will

D. 1. lower
2. will NOT

General Discussion

When the CR drops into the core, ICS will run the plant back at 1% per minute to 55% power. When the RCP trips with power at 68%, it is already below the 74% power requirement for the RCP runback. The plant will continue to runback to 55% power. Per AP1 however, power is to be reduced to 45% within 2 hours when an asymmetric control rod condition exists and only 3 RCPs are operating. Then Therefore, the plant will not run back (stabilize) to the power required by plant conditions.

RCP is an approved acronym for Reactor Coolant Pump per Chapter F of the EOP/AP Writer's Guide

ICS is an approved acronym for Integrated Control System per Chapter F of the EOP/AP Writer's Guide

Answer A Discussion

Incorrect. First part is plausible if the candidate has the misconception that the upper window is CTPD SET. Second part is plausible because ICS will continue to runback to 55% which is what it is designed to do.

Answer B Discussion

Incorrect. First part is plausible if the candidate has the misconception that the upper window is CTPD SET. Second part is correct.

Answer C Discussion

Incorrect. First part is correct. Second part is incorrect but plausible (see A).

Answer D Discussion

Correct. During a runback the CTPD SET is shown in the lower window. This is the power the plant is going to. ICS will automatically run the plant back to 55% which is adequate for 4 RCP operation. With only 3 RCPs operating, AP/1 directs you to further reduce power to < 45% within 2 hours, then < 40% after that.

Basis for meeting the K

Question requires knowledge of the location of controls used while monitoring a unit runback and if indications are as expected for current plant conditions.

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	BANK	ILT41 Q24

Development References

ILT41 Q24
STG-ICS Ch 2 CTPD (Obj: R3) Pg 21,24, 25
AP/01 Unit runback, 4H Step 11 & 12

Student References Provided

GEN2.1 2.1.31 - GENERIC - Conduct of Operations

Conduct of Operations

Ability to locate control room switches, controls, and indications, and to determine that they correctly reflect the desired plant lineup. (CFR: 41.10 / 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)

Given the following plant conditions:

- Unit 1 Reactor power = 100%
- Unit 2 Reactor in MODE 3

In accordance with OMP 2-1 Attachment D (SSF Staffing Requirements), which ONE of the following:

1) states restrictions on the RO designated to man the SSF when NO SSF event is in progress?

2) describes the minimum actions required for one of the designated SSF RO's to take a short trip to the station canteen?

A.
1. MUST remain in the Horseshoe area of the Control Room
2. The RO must be relieved by another licensed operator that is NOT part of the minimum staffing before leaving the designated area

B.
1. MUST remain in the Horseshoe area of the Control Room
2. A method of communication must be established to enable notification of the requirement to activate the SSF before leaving the designated area

C.
1. Can be anywhere inside the Control Room CAD doors
2. The RO must be relieved by other licensed operator that is NOT part of the minimum staffing before leaving the designated area

D.
1. Can be anywhere inside the Control Room CAD doors
2. A method of communication must be established to enable notification of the requirement to activate the SSF before leaving the designated area

---

ILT46 ONS SRO NRC Examination QUESTION 68

68

D

General Discussion

SSF is an approved acronym for Standby Shutdown Facility per Chapter F of the EOP/AP Writer's Guide

RO is an approved acronym for Reactor Operator per Chapter F of the EOP/AP Writer's Guide

Answer A Discussion

Incorrect. First part is plausible as there are specific requirements where RO's must remain in the horseshoe area as described in Att B of OMP 2-1. Additionally, since there are time critical actions associated with activities in the SSF it would be logical to assume the SSF RO must be inside the horseshoe area to ensure a timely imitation of AP/25 activities to ensure TCA's are met. Second part is plausible since it would be correct if both Units required the SSF to be operable and the Control Room were staffed with the minimum staffing under those conditions (4 RO's). Second part is plausible since it would be correct with minimum staffing if only one of the units were above MODE 4 and therefore only one unit required an SSF RO.

Answer B Discussion

Incorrect. First part is plausible as there are specific requirements where RO's must remain in the horseshoe area as described in Att B of OMP 2-1. Additionally, since there are time critical actions associated with activities in the SSF it would be logical to assume the SSF RO must be inside the horseshoe area to ensure a timely imitation of AP/25 activities to ensure TCA's are met. . Second part is correct,

Answer C Discussion

Incorrect. First part is correct. Second part is plausible since it would be correct if both Units required the SSF to be operable and the Control Room were staffed with the minimum staffing under those conditions (4 RO's). Second part is plausible since it would be correct with minimum staffing if only one of the units were above MODE 4 and therefore only one unit required an SSF RO.

Answer D Discussion

Correct. Per ATT D of AOM 2-1 the SSF RO must be between the CAD doors however when both units require the SSF RO, it is acceptable for one of the two SSF RO's to leave the control room area for short periods of time as long as a method of communication is established to enable notification of the requirement to man the SSF.

Basis for meeting the K

Requires ability to use OMP 2-01 requirements regarding requirments placed on the RO designated as the SSF RO.

Basis for Hi Cog

Requires analyzing the status of Units 1 and 2 and then applying the requirements of OMP 2-01 to that analysis.

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Memory	BANK	ILT40 Q38

Development References

ILT40 Q68
ADM-OMP (Obj: R5)
OMP 2-01 Attach. B & D

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

GEN2.2 2.2.1 - GENERIC - Equipment Control

Equipment Control

Ability to perform pre-startup procedures for the facility, including operating those controls associated with plant equipment that could affect reactivity. (CFR: 41.5 / 41.10 / 43.5 / 43.6 / 45.1)

Given the following Unit 1 conditions:

- Startup in progress
- The OATC Reactor Operator manipulating Control Rods is training an individual on OJT from License Class
- 1SA-03/E-7 (TO Bearing Header Pressure Low) actuates

In accordance with AD-OP-ALL-0203 (Reactivity Management):

1) stopping control rod withdrawal __ (1) __ required.

2) the OATC __ (2) __ allowed to peer-check the withdrawal of control rods being done by the trainee.

Which ONE of the following completes the statements above?

A. 1. is
2. is

B. 1. is
2. is NOT

C. 1. is NOT
2. is

D. 1. is NOT
2. is NOT

General Discussion

The Reactivity Management procedure changed to a fleet procedure (AD-OP-ALL-0203). With the change, the oversight title of "designated SRO" changed to "Reactivity Manager". Also, the expectation that the oversight can peer check rod withdrawal has changed such that with the new / current reactivity management procedure, the oversight position is NOT allowed to peer check reactivity related manipulations. This results in the answer changing from A to B for this question.

ADM-OMP lesson on HOLD but only using it to reference the objectives. The actual question material is taken from the AD procedure.

OATC is an approved acronym for Operator At The Controls per Chapter F of the EOP/AP Writer's Guide

Answer A Discussion

1st part is correct Per AD-OP-ALL-0203, stopping withdrawal of CRs is required upon reciept of any uinexpected annunciater. 2nd part is incorrect but plausible since under most other conditions the OATC is allowed to peer check operation of controls in the Control Room.

Answer B Discussion

Correct, per AD-OP-ALL-0203, reactivity manipulation shall be stopped for ANY alarm on the same unit. The OATC and trainee are treated as a single operator and a separate licensed operator is required to perform the peer check.

Answer C Discussion

1st part is incorrect but plausible because the alarm is not related to the startup. Since the alarm is not related to the startup and there are other licensed operators available in the control room to respond to the alarm it is logical to deduce that the alarm should have no impact on the startup activitites. 2nd part is incorrect but plausible since under most other conditions the OATC is allowed to peer check operation of controls in the Control Room.

Answer D Discussion

1st part is incorrect but plausible because the alarm is not related to the startup. Since the alarm is not related to the startup and there are other licensed operators available in the control room to respond to the alarm it is logical to deduce that the alarm should have no impact on the startup activitites.
2nd part is correct.

Basis for meeting the K

Question requires knowledge of procedural requirements while withdrawing control rods including when it is required to be stopped and can the SRO peer check the withdrawal.

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Memory	MODIFIED	ILT42 Q68

Development References

ILT42 Q68
ADM-OMP (Obj: R5, R23)
AD-OP-ALL-0203 Pg 16, 31, 41

Student References Provided

GEN2.2 2.2.1 - GENERIC - Equipment Control

Equipment Control

Ability to perform pre-startup procedures for the facility, including operating those controls associated with plant equipment that could affect reactivity. (CFR: 41.5 / 41.10 / 43.5 / 43.6 / 45.1)

401-9 Comments:

Remarks/Status

GEN2.2 2.2.14 - GENERIC - Equipment Control

Equipment Control

Knowledge of the process for controlling equipment configuration or status. (CFR: 41.10 / 43.3 / 45.13)

In accordance with OMP 1-02 (Rules of Practice), which ONE of the following describes:

1) a condition which would allow Independent Verification of a single valve to be waived?

2) the <u>minimum</u> level of approval required?

A. 1. Dose received will be = 14 mr for a single check
   2. Control Room Supervisor

B. 1. Valve located in a room where the area dose rate = 878 mr/hr
   2. Control Room Supervisor

C. 1. Dose received will be = 14 mr for a single check
   2. Shift Manager

D. 1. Valve located in a room where the area dose rate = 878 mr/hr
   2. Shift Manager

ILT46 ONS SRO NRC Examination QUESTION 70

70

A

General Discussion

The terminology for supervirory positions have changed:
Plant SRO is now Shift Supervisor
Operations Superintendent is now Operations Manager

Answer A Discussion

CORRECT: Per OMP 1-2, IV waiver allowed for personnel dose if a single valve IV will result in a dose of > 10 mrem. Any Ops supervision can make this determination so the Control Room Supervisor is the MINIMUM level of approval.

Answer B Discussion

Incorrect. 1st part is incorrect because the threshold for dose rate in an area is 1 R/Hr. It is plausible because it is still a High Rad area 2nd part is correct.

Answer C Discussion

Incorrect. 1st part is correct. 2nd part incorrect; plausible because the Shift Manager can approve the waiver. Its incorrect because they are not the "Minimum" level of approval.

Answer D Discussion

Incorrect. 1st part is incorrect but plausible (see B). 2nd part is incorrect but plausible (see C).

Basis for meeting the K

K/A MATCH ANALYSIS
Requires knowledge of the independent verification process associated with equipment configuration control

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Memory	BANK	2009 RO Q#69

Development References

2009 NRC Exam Q69
ADM-OMP (Obj R36)
OMP 1-2 Pg 13

Student References Provided

GEN2.2 2.2.14 - GENERIC - Equipment Control
Equipment Control
Knowledge of the process for controlling equipment configuration or status. (CFR: 41.10 / 43.3 / 45.13)

401-9 Comments:

Remarks/Status

GEN2.2 2.2.44 - GENERIC - Equipment Control

Equipment Control

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:

- Reactor power = 100%
- RCS Pressure = 2150 psig stable
- Pressurizer Temperature = 628°F stable

Which ONE of the following describes the:

1) INITIAL plant response to energizing ALL Pressurizer heaters?

2) RCS pressure setpoint (psig) that will result in 1RC-1 opening?

A. 1. RCS Pressure will increase
2. 2155

B. 1. Pressurizer temperature will increase
2. 2155

C. 1. RCS Pressure will increase
2. 2205

D. 1. Pressurizer temperature will increase
2. 2205

ILT46 ONS SRO NRC Examination QUESTION 71

71

D

General Discussion

Answer A Discussion

Incorrect. First part is plausible since it is the normal response of RCS pressure to energizing Pzr heaters as long as the Pzr is saturated. If Pzr temperature were at saturation for 2150 psig this would be the correct answer. Second part is plausible since it is the setpoint for 1RC-1 going closed and RCS pressure is below that setpoint.

Answer B Discussion

Incorrect. First part is correct. Second part is plausible since it is the setpoint for 1RC-1 going closed and RCS pressure is below that setpoint.

Answer C Discussion

Incorrect. First part is plausible since it is the normal response of RCS pressure to energizing Pzr heaters as long as the Pzr is saturated. If Pzr temperature were at saturation for 2150 psig this would be the correct answer Second part is correct

Answer D Discussion

Correct. Pzr saturation temp for 2150 psig is approximately 645 degrees F. With actual Pzr temp at 628 degrees F, the pressurizer is subcooled therefore energizing Pzr heaters will increase Pzr temp until the Pzr reaches saturation temp. 2205 psig is the open setpoint for 1RC-1 (spray valve).

Basis for meeting the K

Question requires interpreting control room indications to determine the status of the Pressurizer and then understanding how energizing Pzr heaters with a subcooled Pzr will affect system conditions.

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	NEW	

Development References
PNS-PZR obj 4 PNS-PZR

Student References Provided

GEN2.2 2.2.44 - GENERIC - Equipment Control

Equipment Control

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

GEN2.3 2.3.12 - GENERIC - Radiation Control

Radiation Control

Knowledge of radiological safety principles pertaining to licensed operator duties, such as containment entry requirements, fuel handling responsibilities, access to locked high-radiation areas, aligning filters, etc. (CFR: 41.12 / 45.9 / 45.10)

Given the following Unit 1 conditions:

Initial conditions:

- Reactor in MODE 6
- RB Purge in progress

Current conditions:

- IRIA-47 (RB Particulate) in HIGH alarm
- AP/18, Abnormal Release of Radioactivity is initiated

1) RB Purge __(1)__ automatically terminate.

2) AP/18 __(2)__ direct the evacuation of personnel from the RB

A. 1. will
   2. does

B. 1. will
   2. does NOT

C. 1. will NOT
   2. does

D. 1. will NOT
   2. does NOT

ILT46 ONS SRO NRC Examination QUESTION 72 72 **C**

General Discussion

RB is an approved acronym for Reactor Building per Chapter F of the EOP/AP Writer's Guide

Answer A Discussion

1st part is incorrect. Plausible since it is logical to believe that high activity in the RB (which would be indicated by increasing RIA-47 indication) would trip the RB Purge and therefore stop moving RB environment to the atmosphere. Additionally plausible since the Vent Stack RIA's will trip the RB Purge to automatically terminate the release from the RB. 2nd part is correct (AP/18 Section 4H Step 3 RNO).

Answer B Discussion

1st part is incorrect. Plausible since it is logical to believe that high activity in the RB (which would be indicated by increasing RIA-47 indication) would trip the RB Purge and therefore stop moving RB environment to the atmosphere. Additionally plausible since the Vent Stack RIA's will trip the RB Purge to automatically terminate the release from the RB. 2nd part is incorrect because AP/18 does direct the evacuation of non-essential personnel from the RB. Its plausible because AP/18 in alarm does not automatically sound the RB evacuation alarm.

Answer C Discussion

Correct. RIA-45 alarming will automatically terminate the RB Purge. AP/18 directs RB evacuation of unnecessary personnel in Section 4H if RIA 47,48,49 or 49A are in alarm.

Answer D Discussion

1st part is correct. 2nd part is incorrect but plausible (see B).

Basis for meeting the K

K/A MATCH ANALYSIS
Requires knowledge of licensed operator duties required to reduce the possibility of excessive dose being received by individuals inside containment during a boron dilution event.

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Memory	NEW	

Development References
RAD-RIA (Obj: 8, 14) Pg 24, 25, AP/18, Section 4H, Step 3

Student References Provided

GEN2.3 2.3.12 - GENERIC - Radiation Control

Radiation Control

Knowledge of radiological safety principles pertaining to licensed operator duties, such as containment entry requirements, fuel handling responsibilities, access to locked high-radiation areas, aligning filters, etc. (CFR: 41.12 / 45.9 / 45.10)

401-9 Comments:	Remarks/Status

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 3 conditions:

- 3A GWD gas tank release in progress
- Release is at 2/3 Station Limit

1) 1RIA-45 High and Alert setpoints will be set at __ (1) __ the normal 1/3 Station Limit as listed in PT/0/A/230/001 (Radiation Monitor Check).

2) If 1RIA-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

RIA-45 setpoints are adjusted during a GWD release however, RIA-45 will not terminate a GWD release. This is done automatically by RIA-37 if it alarms. Therefore, for an RIA-45 alarm, the release will have to be termianted manually.

Answer A Discussion

Incorrect. First part is incorrect and plausible. Per PT/0/A/230/001the non-releasing unit's RIA-45 setpoint is half that of the releasing unit's. Second part is incorrect and plausible. The station release limit could be exceeded and the other unit's RIA-45 in high alarm. The release will be automatically terminated if the RIA-37 setpoint is exceeded on the releasing unit. Therefore it is reasonable to conclude a High alarm on the 1RIA-45 would trigger an automatic termination of the release.

Answer B Discussion

Incorrect. First part is incorrect and plausible. Per PT/0/A/230/001the non-releasing unit's RIA-45 setpoint is half that of the releasing unit's. Second part is correct. Per OP/3/A/1104/018 (GWD System) if RIA-45 High alarm actuates on a non-releasing unit, the other unit must be notified to manually terminate the release. RIA-37/38 are the process monitors that are interlocked to terminate the release.

Answer C Discussion

Incorrect. First part is correct. Per PT/0/A/230/001 (Radiation Monitor Check) the setpoint on the non-releasing unit is set at half the value in the PT.
Second part is incorrect and plausible. The station release limit could be exceeded and the other unit's RIA-45 in high alarm. The release will be automatically terminated if the RIA-37 setpoint is exceeded on the releasing unit. Therefore it is reasonable to conclude a High alarm on the 1RIA-45 would trigger an automatic termination of the release.

Answer D Discussion

Correct. First part is correct. Per PT/0/A/230/001 (Radiation Monitor Check) the setpoint on the non-releasing unit is set at half the value in the PT.
Second part is correct. Per OP/3/A/1104/018 (GWD System) if RIA-45 High alarm actuates on a non-releasing unit, the other unit must be notified to manually terminate the release. RIA-37/38 are the process monitors that are interlocked to terminate the release.

Basis for meeting the K

Requires knowledge of fixed radiation monitoring systems

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Memory	BANK	ILT43 Q73

Development References	Student References Provided
ILT43 Q73 WE-GWD (Obj: 7) Pg 15, 26	

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

GEN2.4 2.4.12 - GENERIC - Emergency Procedures / Plan
Emergency Procedures / Plan
Knowledge of general operating crew responsibilities during emergency operations. (CFR: 41.10 / 45.12)

Given the following Plant conditions:

- Unit 1 = 100%
- Unit 2 has an event in progress that requires SSF ASW activation

1) In accordance with OMP 2-1 (Duties and Responsibilities of On-Shift Operations Personnel), the __(1)__ BOP will be dispatched to perform AP/25 (SSF Activation).

2) Prior to leaving the Control Room for the SSF, AP/25 directs tripping __(2)__ RCP(s).

Which ONE of the following completes the statements above?

A. 1. Unit 1
2. ALL

B. 1. Unit 1
2. all but ONE

C. 1. Unit 2
2. ALL

D. 1. Unit 2
2. all but ONE

ILT46 ONS SRO NRC Examination QUESTION 74 74 **C**

General Discussion

SSF is an approved acronym for Standby Shutdown Factility per Chapter F of the EOP/AP Writer's Guide

ASW is an approved acronym for Auxiliary Service Water per Chapter F of the EOP/AP Writer's Guide

RCP is an approved acronym for Reactor Coolant Pump per Chapter F of the EOP/AP Writer's Guide

Answer A Discussion

Incorrect. First part is plausible since both the Unit 1 and 2 BOP are in the same control room and it is a BOP who is dispatched to the SSF. Additionally, since Unit 1 has no event in progress in would be logical to send the Unit 1 BOP so that both the Unit 2 OATC and BOP were available in the Control Room.. Second part is correct

Answer B Discussion

Incorrect. First part is plausible since both the Unit 1 and 2 BOP are in the same control room and it is a BOP who is dispatched to the SSF. Additionally, since Unit 1 has no event in progress in would be logical to send the Unit 1 BOP so that both the Unit 2 OATC and BOP were available in the Control Room.. Second part is plausible since during a LOHT all but one RCP is secured and with the need to established SSF-ASW it is reasonable to assume a LOHT has occurred and therefore one RCP would be left running.

Answer C Discussion

Correct. The BOP on the affected unit is dispatched to the SSF. ALL RCP's are secured per AP/25 prior to leaving the control room.

Answer D Discussion

Incorrect. First part is correct. Second part is plausible since during a LOHT all but one RCP is secured and with the need to established SSF-ASW it is reasonable to assume a LOHT has occurred and therefore one RCP would be left running.

Basis for meeting the K

Requires generic knowledge of operating crew responsibilities during emergency operations,

Basis for Hi Cog

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	NEW	

Development References

EAP-SSF Obj R31 ADM-OMP Obj R5
OMP-2-1
EAP-SSF

Student References Provided

GEN2.4 2.4.12 - GENERIC - Emergency Procedures / Plan
Emergency Procedures / Plan
Knowledge of general operating crew responsibilities during emergency operations. (CFR: 41.10 / 45.12)

401-9 Comments:

Remarks/Status

GEN2.4 2.4.9 - GENERIC - Emergency Procedures / Plan

Emergency Procedures / Plan

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:
Initial conditions:

- Reactor in MODE 6
- LPI aligned in NORMAL Mode
- RCS level = 75" on LT-5 stable
- 1B LPI Pump tagged out

Current conditions:

- RCS level = 72" on LT-5 decreasing

1) In accordance with OP/1/A/1104/004 (LPI System), the __(1)__ LPI pump will be in operation?

2) In accordance with AP/26 (Loss of Decay Heat Removal), which ONE of the following describes the reason ALL LPI pumps are initially secured?

A. 1. 1C
2. prevent pump damage due to loss of suction

B. 1. 1A
2. prevent pump damage due to loss of suction

C. 1. 1C
2. determine if leak source is on the discharge of the LPI pumps

D. 1. 1A
2. determine if leak source is on the discharge of the LPI pumps

---

ILT46 ONS SRO NRC Examination QUESTION 75

75

D

General Discussion

LPI is an approved acronym for Low Pressure Injection per Chapter F of the EOP/AP Writer's Guide

RCS is an approved acronym for Reactor Coolant System per Chapter F of the EOP/AP Writer's Guide

Answer A Discussion

Incorrect. First part is plausible since it is one of the two LPI pumps and is the only remaining ES pump. It would be logical to assume the philosophy would be to save the ECCS pump and therefore the 1C pump (non-ES pump) would be desired. That philosophy is plausible since until fairly recently (3-5 years) that was the philosophy used.

Second part is plausible since RV level indicates the fuel transfer canal is not full therefore it is plausible to be concerned about losing suction to the LPI pumps due to decreasing inventory.

Answer B Discussion

Incorrect. First part is correct.

Second part is plausible since RV level indicates the fuel transfer canal is not full therefore it is plausible to be concerned about losing suction to the LPI pumps due to decreasing inventory.

Answer C Discussion

Incorrect. First part is plausible since it is one of the two LPI pumps and is the only remaining ES pump. It would be logical to assume the philosophy would be to save the ECCS pump and therefore the 1C pump (non-ES pump) would be desired. That philosophy is plausible since until fairly recently (3-5 years) that was the philosophy used

Second part is correct.

Answer D Discussion

Correct. IAW 1104/04, "If possible, operate 1A or 1B LPI pump for DHR. These pumps automatically restart when power is regained after loss of power scenarios".

Once you transfer to AP/26, subsequent actions will direct stopping all LPI pumps to see if it impacts the leak rate.

Basis for meeting the K

Requires knowledge of actions required when shutdown and on DHR to mitigate a loss of coolant event.

Basis for Hi Cog

Requires analyzing plant conditions and applying that analysis to procedural guidance for the event.

Basis for SRO only

Job Level	Cognitive Level	QuestionType	Question Source
RO	Comprehension	MODIFIED	ILT40 Q31

Development References

Obj. EAP-APG R9
EAP-AP/26 IMA's
AP/2

Student References Provided

GEN2.4 2.4.9 - GENERIC - Emergency Procedures / Plan

Emergency Procedures / Plan

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

APE022 2.1.32 - Loss of Reactor Coolant Makeup
APE022 GENERIC
Ability to explain and apply system limits and precautions. (CFR: 41.10 / 43.2 / 45.12)

Given the following Unit 1 conditions:
Initial conditions:

- RCS cooldown in progress
- RCS temperature = 310 °F slowly decreasing

Current conditions:

- Both the 1A and 1B HPI pumps have failed
- AP/14 (Loss of HPI Normal Makeup and/or RCP Seal Injection) in progress
- 1C HPI pump has been aligned to provide RCS makeup

1) In accordance with OP/1/A/1104/002 (HPI System), aligning the 1C HPI pump as the RCS Makeup pump __(1)__ make the 1HP-120 Travel Stop inoperable

2) In accordance with the basis of Tech Spec 3.4.12 (LTOP), with ALL LTOP Administrative Controls in place, additional operator actions to mitigate an LTOP event are required within __(2)__ minutes of the event initiation.

Which ONE of the following completes the statements above?

A. 1. does
2. 10

B. 1. does
2. 25

C. 1. does NOT
2. 10

D. 1. does NOT
2. 25

ILT46 ONS SRO NRC Examination QUESTION 76

76

A

General Discussion

RCS is an approved acronym for Reactor Coolant System per Chapter F of the EOP/AP Writer's Guide

RCP is an approved acronym for Reactor Coolant Pump per Chapter F of the EOP/AP Writer's Guide

HPI is an approved acronym for High Pressure Injection per Chapter F of the EOP/AP Writer's Guide
LTOP is an approved acronym for Low Temperature Overpressure Protection per Chapter F of the EOP/AP Writer's Guide

Answer A Discussion

Correct. IAW L&P's of the HPI procedure, aligning the C HPI pump to normal makeup makes the HP-120 travel stop inoperable until adjusted using the appropriate PT. The basis of TS 3.4.12 (LTOP) explains that the LTOP admin controls provide the operator 10 minutes to recognize and mitigate an LTOP event.

Answer B Discussion

Incorrect. First part is correct. Second part is plausible since it is the time allowed the operator to align the ADV's to be used as a source of RCS cooldown under certain conditions.

Answer C Discussion

Incorrect. First part is plausible since 1HP-120 has already been setup and adjusted such that either the A or B HPI pump can be used. Since the pumps are the same type pumps it would be logical to assume that if the A and B pump are OK, the C pump should be OK as well. Second part is correct.

Answer D Discussion

Incorrect. First part is plausible since 1HP-120 has already been setup and adjusted such that either the A or B HPI pump can be used. Since the pumps are the same type pumps it would be logical to assume that if the A and B pump are OK, the C pump should be OK as well. Second part is plausible since it is the time allowed the operator to align the ADV's to be used as a source of RCS cooldown under certain conditions.

Basis for meeting the K

Requires the ability to apply HPI system limits and precautions found in the HPI operating procedure to situations presented by a loss of Reactor Coolant Makeup.

Basis for Hi Cog

Basis for SRO only

Requires application of system Limits and precautions as well as knowledge found in the basis of Tech Specs that is the basis for the specification and not system knowledge. It cannot be answered with above the line information or 1 hr or less TS Required Actions or Completion Times

Job Level	Cognitive Level	QuestionType	Question Source
SRO	Comprehension	NEW	

Development References

ADM-TSS Obj R5, PNS-HPI Obj 24
ADM-TSS page 14 and page 215
1104/02
AP/14

Student References Provided

APE022 2.1.32 - Loss of Reactor Coolant Makeup
APE022 GENERIC
Ability to explain and apply system limits and precautions. (CFR: 41.10 / 43.2 / 45.12)

401-9 Comments:

Remarks/Status

ILT46 ONS SRO NRC Examination QUESTION 77 77 **D**

APE027 AA2.18 - 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)

Operable control channel ....

Given the following Unit 1 conditions:

- 1A Main FDWP has tripped
- Reactor Power = 76% decreasing
- RCS Pressure = 2215 psig increasing
- 1RC-1 (Pressurizer Spray) indicates Closed

1) 1RC-1 __(1)__ operating as designed.

2) In accordance with the basis of Tech Spec 2.0 (Safety Limits), the RCS pressure Safety Limit __(2)__ take credit for the operation of 1RC-1.

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

General Discussion

RCS is an approved acronym for Reactor Coolant System per Chapter F of the EOP/AP Writer's Guide

Answer A Discussion

Incorrect. First part is plausible since the High RCS pressure does not occur until 2255 psig therefore 2215 is still significantly below that value and therefore plausible. The second part is plausible since the spray valve is primarily responsible for preventing RCS pressure from reaching the high RCS pressure RPS trip setpoint for most RCS transients that result in increasing RCS pressure. It also is responsible for providing the operator with time to establish Condensate Booster Pump feed during a LOHT and therefore preventing the need to enter HPI forced cooling mode. Since the Spray valve is relied on for mitigating increasing RCS pressure events it is plausible to believe it is credited in the Safety Analysis

Answer B Discussion

Incorrect. First part is plausible since the High RCS pressure does not occur until 2255 psig therefore 2215 is still significantly below that value and therefore plausible. The second part is correct.

Answer C Discussion

Incorrect. The first part is correct. The second part is plausible since the spray valve is primarily responsible for preventing RCS pressure from reaching the high RCS pressure RPS trip setpoint for most RCS transients that result in increasing RCS pressure. It also is responsible for providing the operator with time to establish Condensate Booster Pump feed during a LOHT and therefore preventing the need to enter HPI forced cooling mode. Since the Spray valve is relied on for mitigating increasing RCS pressure events it is plausible to believe it is credited in the Safety Analysis

Answer D Discussion

Correct. The setpoint to open 1RC-1 is 2205 psig therefore it should be open at this time. The basis of the RCS pressure Safety Analysis explains that no credit is taken for the spray valve.

Basis for meeting the K

Requires determining if the RCS Spray valve is operable as part of the Pzr pressure control system. Specifically required deducing a failure of the spray valve based on interpreting plant data.

Basis for Hi Cog

Basis for SRO only

Required knowledge from the basis of Tech Specs that is not above the line, 1 hr or less, or a Safety Limit.

Job Level	Cognitive Level	QuestionType	Question Source
SRO	Comprehension	NEW	

Development References

PNS-PZR Obj 7, ADM-TSS Obj R5
PNS-PZR
Safety Limit basis

Student References Provided

APE027 AA2.18 - 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)

Operable control channel ....

401-9 Comments:

Remarks/Status

EPE038 EA2.10 - Steam Generator Tube Rupture (SGTR)

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

Flowpath for charging and letdown flows ....

Given the following Unit 1 conditions:

- Reactor power = 90% decreasing
- SGTR tab in progress
- Pressurizer level = 205 inches slowly increasing

1) In accordance with plant procedures, 1HP-26 __(1)__ be used to maintain Pzr level PRIOR to tripping the Reactor.

2) With Pzr level being maintained, the MAXIMUM power level at which the SGTR tab will direct tripping the REACTOR is __(2)__ %.

Which ONE of the following completes the statements above?

A. 1. can
   2. 18

B. 1. can
   2. 5

C. 1. can NOT
   2. 18

D. 1. can NOT
   2. 5

ILT46 ONS SRO NRC Examination QUESTION 78

78

B

General Discussion

SGTR is an approved acronym for Steam Generator Tube Rupture per Chapter F of the EOP/AP Writer's Guide

Pzr is an approved acronym for Pressurizer per Chapter F of the EOP/AP Writer's Guide

Answer A Discussion

Incorrect. First part is correct. Second part is plausible since it would be correct if Pressurizer level were decreasing with full HPI.

Answer B Discussion

Correct. 1HP-26 can be used to maintain Pzr level prior to the Rx being tripped. The SGTR tab directs tripping the reactor once power is < or = 5%.

Answer C Discussion

Incorrect. First part is plausible since it would be correct for any RCS leakage other than SG tube leakage. Second part is plausible since it would be correct if Pressurizer level were decreasing with full HPI.

Answer D Discussion

Incorrect. First part is plausible since it would be correct for any RCS leakage other than SG tube leakage. Second part is correct.

Basis for meeting the K

Requires the ability to determine what the allowable charging flowpath can be during a SGTR.

Basis for Hi Cog

Basis for SRO only

Requires detailed knowledge of the procedure (the power level where the Rx is tripped). It cannot be answered using entry conditions or major mitigation strategy.

Job Level	Cognitive Level	QuestionType	Question Source
SRO	Comprehension	NEW	

Development References

EAP-SGTR R1
SGTR tab
AP/2

Student References Provided

EPE038 EA2.10 - Steam Generator Tube Rupture (SGTR)
Ability to determine or interpret the following as they apply to a SGTR : (CFR 43.5 / 45.13)
Flowpath for charging and letdown flows ....

401-9 Comments:

Remarks/Status

APE057 2.2.36 - Loss of Vital AC Electrical Instrument Bus

APE057 GENERIC

Ability to analyze the effect of maintenance activities, such as degraded power sources, on the status of limiting conditions for operations. (CFR: 41.10 / 43.2 / 45.13)

Given the following Unit 1 conditions:
Initial conditions:

- Reactor Power = 100%
- 1KVIC power supply is transferred to 1KRB in support of Maintenance on 1DIC inverter

Current conditions:

- 1DIC inverter work is completed and it is ready to be aligned to 1KVIC

1) In accordance with the basis of Tech Spec 3.8.6 (Inverters-Operating), 1KVIC Panelboard is __(1)__ .

2) In accordance with the basis of Tech Spec 3.8.8 (Distribution Systems-Operating), the 1DIC Inverter is __(2)__.

A. 1. operable
2. operable

B. 1. operable
2. inoperable

C. 1. inoperable
2. operable

D. 1. inoperable
2. inoperable

General Discussion

Answer A Discussion

Incorrect. First part is correct. Second part is plausible since at that time there is nothing actual wrong with the inverter therefore it is a logical conclusion that if the inverter is not broken and is ready to energize the panelboard then it must be Operable.

Answer B Discussion

Correct. In accordance with the bases of TS 3.8.8 the Panelboard is operable if aligned from the assocated inverter or alternate regulated gvoltage source (KRA/KRB). In accordance with the bases of TS 3.8.6 the inverter is only operable if connected to the panelboard.

Answer C Discussion

Incorrect. First part is plausible since the panelboard is not being powered from a safety related power supply. Additionally, the candidate could easily apply the logic required by TS for the associated inverter to be operable (meaning that if the inverter is only operable if it is tied to the panelboard then logic dictates the panelboard is only Operable if tied to the inverter. Second part is plausible since at that time there is nothing actual wrong with the inverter therefore it is a logical conclusion that if the inverter is not broken and is ready to energize the panelboard then it must be Operable.

Answer D Discussion

Incorrect. First part is plausible since the panelboard is not being powered from a safety related power supply. Additionally, the candidate could easily apply the logic required by TS for the associated inverter to be operable (meaning that if the inverter is only operable if it is tied to the panelboard then logic dictates the panelboard is only Operable if tied to the inverter. Second part is correct.

Basis for meeting the K

Question requires the ability to analyze component status based on the progress of maintenance activities and determine if the requirments of TS LCO's are met. Since 1KVIC is an AC Vital Electrical bus the KA is met.

Basis for Hi Cog

Basis for SRO only

The question requires Operability dereminations based on information found solely in the basis of TS. It cannot be answered with "above the line" knowledge only, it is not a 1 hr or less TS.

Job Level	Cognitive Level	QuestionType	Question Source
SRO	Comprehension	BANK	ILT43 Q80

Development References

ILT43 Q80
ADM-TSS (Obj: R5) Pg 50, 51
TS 3.8.6 basis
TS 3.8.8 basis
SRO Only Guidance

Student References Provided

APE057 2.2.36 - Loss of Vital AC Electrical Instrument Bus

APE057 GENERIC

Ability to analyze the effect of maintenance activities, such as degraded power sources, on the status of limiting conditions for operations. (CFR: 41.10 / 43.2 / 45.13)

401-9 Comments:

Remarks/Status

APE065 2.4.8 - Loss of Instrument Air
APE065 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%
- BOP and OATC are only RO's available
- Degrading instrument air pressure results in a manual Reactor Trip in accordance with AP/22 (Loss of Instrument Air)
- During the transient, indications of a Main Steam Line Break (MSLB) were observed
- RCS pressure decreased to 1437 psig and then began to increase

1) In accordance with OMP 1-18 (Implementation Standard During Abnormal and Emergency Events) the Procedure Director will direct that AP/22 be performed in parallel with the EOP __(1)__.

2) In accordance with Rule 5 (Main Steam Line Break) HPI can be throttled once Pressurizer level has returned to __ (2) __.

Which ONE of the following completes the statements above?

A.
1. immediately after Immediate Manual Actions and Symptoms Check are completed
2. on scale and increasing

B.
1. immediately after Immediate Manual Actions and Symptoms Check are completed
2. $\geq$ 100 inches

C.
1. ONLY after Rule 5 (Main Steam Line Break) and EOP Enclosure 5.1 (ES Actuation) have been completed
2. on scale and increasing

D.
1. ONLY after Rule 5 (Main Steam Line Break) and EOP Enclosure 5.1 (ES Actuation) have been completed
2. $\geq$ 100 inches

ILT46 ONS SRO NRC Examination QUESTION 80

80

C

General Discussion

BOP is an approved acronym for Balance Of Plant per Chapter F of the EOP/AP Writer's Guide

OATC is an approved acronym for Operator At The Controls per Chapter F of the EOP/AP Writer's Guide

RCS is an approved acronym for Reactor Coolant System per Chapter F of the EOP/AP Writer's Guide

Answer A Discussion

Incorrect. First part is plausible since there is a loss of Instrument Air and therefore the entry conditions to the AP are met. Additionally, there is a case where selecting to run an AP immediately after IMA's and Symptoms Check would be correct (Turbine Building Flood). Second part is correct.

Answer B Discussion

Incorrect. First part is plausible since there is a loss of Instrument Air and therefore the entry conditions to the AP are met. Additionally, there is a case where selecting to run an AP immediately after IMA's and Symptoms Check would be correct (Turbine Building Flood). Second part is plausible since 100 inches is the normal post-trip Pressurizer level established by the EOP.

Answer C Discussion

Correct. Actions in the EOP are prioritized above those in an AP therefore the PD will ensure RO's have completed Rule 5 and Encl. 5.1 prior to diverting resources to AP/22. Rule 5 directs throttling HPI once Pzr level is on scale and increasing.

Answer D Discussion

Incorrect. First part is correct. Second part is plausible since 100 inches is the normal post-trip Pressurizer level established by the EOP.

Basis for meeting the K

Requires knowledge of how AP's and EOP are used in conjunction with each other following loss of IA and subsequent issues that occur as a result of the loss of IA..

Basis for Hi Cog

Basis for SRO only

The question requires "Assessing plant conditions (normal, abnormal, or emergency) and then selecting a procedure or section of a procedure to mitigate, recover, or with which to proceed." Once the reactor is tripped, Rule 5, Encl. 5.1, and AP/22 all apply and must be performed. The SRO has to prioritize the actions of the RO's to ensure the higher priority procedures are performed first.

Job Level	Cognitive Level	QuestionType	Question Source
SRO	Comprehension	NEW	

Development References
ADM-OMP obj R10, EAP-EHT obj R14 OMP 1-18 Rule 5

Student References Provided

APE065 2.4.8 - Loss of Instrument Air

APE065 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
Preview

ILT46 ONS SRO NRC Examination **QUESTION 81** 81 **B**

APE077 AA2.03 - 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 current outside the capability curve............................

Given the following Unit 1 conditions:

- Reactor Power = 45% stable
- AP/34 (Generator Grid Disturbance) in progress
- Generator Output = 350 MWe
- Hydrogen pressure = 60 psig

In accordance with AP/34,

1) The MAXIMUM limit on MVARs is approximately __(1)__.

2) If operation in the acceptable region of the Generator Capability Curve cannot be maintained, __(2)__.

Which ONE of the following completes the statements above?

REFERENCE PROVIDED

A. 1. 725
   2. trip the Reactor

B. 1. 725
   2. Open PCB-20 and PCB-21

C. 1. 475
   2. trip the Reactor

D. 1. 475
   2. Open PCB-20 and PCB-21

General Discussion

Answer A Discussion

Incorrect. First part is correct. Second part is plausible since it would be correct if Rx power were > 50%. Also plausible due to the thumb rule that between 40% and 70% power a load rejection may or may not cause a unit to trip. Given that information it would plausible to deduce that the guidance would require tripping the Rx since it may trip from the load rejection anyway.

Answer B Discussion

Correct. AP/34 Encl 5.1 Capability curve shows that 730 Mvars to be the limit under the given conditions and the AP guidance directs Opening the generator output breakers and entering AP/1.

Answer C Discussion

Incorrect. First part is plausible because it is the limit if there were a leading Power Factor however with a positive Mvar value, PF is lagging. Second part is plausible since it would be correct if Rx power were > 50%. Also plausible due to the thumb rule that between 40 and 70% power a load rejection may or may not cause a unit to trip. Given that information it would plausible to deduce that the guidance would require tripping the Rx since it may trip from the load rejection anyway.

Answer D Discussion

Incorrect. First part is plausible because it is the limit if there were a leading Power Factor however with a positive Mvar value, PF is lagging. Second part is correct.

Basis for meeting the K

Required the ability to interpret Generator data and determine if the requirements of the Generator Capability Curve are met.

Basis for Hi Cog

Basis for SRO only

Requires assessing plant conditions and then using detailed knowledge of the procedure to make a determination of which section of the procedure to proceed with and it is not entry conditions nor major mitigation strategy. Ore specifically, while the ability to read the curve could be considered RO, the detailed knowledge of the procedure required to determine the correct actions based on power level and being in the acceptable region of the curve is detailed knowledge far beyond major mitigation strategy and is therefore SRO.

Simply knowing entry conditions to the EOP and/or AP/1 (Unit Runback) does not give the answer to the question away. Knowing the entry conditions would only allow you to choose the correct procedure following compliance with the direction given in AP/34. Since the power level of the plant (45%) means that we do not know for sure if the reactor would trip if PCB-20 and 21 were open, system knowledge cannot determine the correct answer either. The only way to know the correct answer is to have detailed knowledge of the procedure direction given for this situation in AP/34 and therefore the question meets the threshold for being SRO only.

Job Level	Cognitive Level	QuestionType	Question Source
SRO	Comprehension	NEW	

Development References
EAP-APG R9 AP/34

Student References Provided
AP/34 Gen Capability Curve

APE077 AA2.03 - 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 current outside the capability curve............................

401-9 Comments:

Remarks/Status

APE003 2.1.7 - Dropped Control Rod

APE003 GENERIC

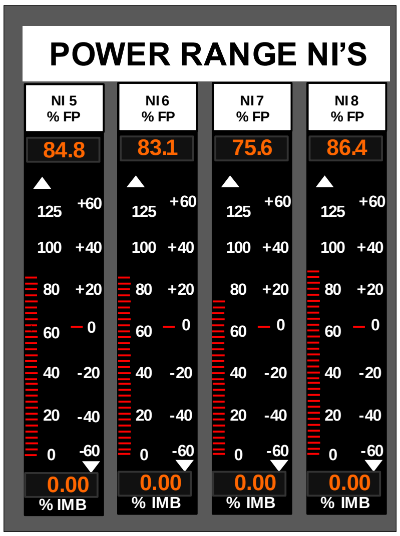
Ability to evaluate plant performance and make operational judgments based on operating characteristics, reactor behavior, and instrument interpretation. (CFR: 41.5 / 43.5 / 45.12 / 45.13)

Given the following Unit 1 conditions:
Initial conditions:

- Reactor power = 85% stable
- Delta Tc in HAND

Current conditions:

- ICS runback in progress
- Reactor power as indicated below



Which ONE of the following describes:

1) the reason for the ICS runback?

2) the consequences of operating the unit under the conditions described above?

A. 1. Dropped Control Rod
2. Allowable Thermal Power limits of Tech Spec 3.4.4 (RCS Loops MODES 1 and 2) could be exceeded

B. 1. Dropped Control Rod
2. Maximum Linear Heat Rate could be exceeded

C. 1. RCP trip
2. Allowable Thermal Power limits of Tech Spec 3.4.4 (RCS Loops MODES 1 and 2) could be exceeded

D. 1. RCP trip

General Discussion

ICS is an approved acronym for Integrated Control System per Chapter F of the EOP/AP Writer's Guide

Answer A Discussion

Incorrect: First part is correct. Second part is plausible since thermal power is limited when there is a dropped control rod and the number of running RCP's determines what the limiting power level is. In summary, However thermal power with a dropped rod is limited based on the number of RCP's and TS 3.4.4 does not consider a dropped rod (only # of RCP's) when establishing the maximum allowable thermal power.

Answer B Discussion

Correct: A dropped control rod will result in depressed power production in the quadrant in which the rod has dropped and depending on the proximity of the rod to other quadrant, it can cause slightly misaligned power production in other quadrants as well. The NI indications show an issue with QPT and the bases of TS 3.2.3 (QPT) describes the issue if Linear Heat Rates as a limiting factor in QPT limits.

Answer C Discussion

Incorrect: First part is plausible for two reasons: 1. There is an RC Flow Runback in
ICS that will perform an ICS runback on loss of a RCP at power. Reactor power is low enough in this question so that there would not be a Rx trip on flux/flow when the RCP was lost therefore there would be a runback in progress if it were a loss of a RCP. With Delta TC in hand there would be no automatic re-ration of feedwater as a function of Delta Tc which adds to plausibility of unbalanced Excore NI indications 2. Since there are 4 pumps (one in each cold leg) it is plausible to associate a RCP with a quadrant of the core and therefore believe that a RCP trip could result in skewed power production in each core due to the flow and temperatures being believed to be different in each quadrant. These indications would be wrong for a RCP trip since the RC flow re-ratio of FDW occurs even if the Delta Tc station is in Hand.
Second part is plausible since thermal power is limited when there is a dropped control rod and the number of running RCP's determines what the limiting power level is. In summary, However thermal power with a dropped rod is limited based on the number of RCP's and TS 3.4.4 does not consider a dropped rod (only # of RCP's) when establishing the maximum allowable thermal power.

Answer D Discussion

Incorrect: First part is plausible for two reasons: 1. There is an RC Flow Runback in
ICS that will perform an ICS runback on loss of a RCP at power. Reactor power is low enough in this question so that there would not be a Rx trip on flux/flow when the RCP was lost therefore there would be a runback in progress if it were a loss of a RCP. With Delta TC in hand there would be no automatic re-ration of feedwater as a function of Delta Tc which adds to plausibility of unbalanced Excore NI indications 2. Since there are 4 pumps (one in each cold leg) it is plausible to associate a RCP with a quadrant of the core and therefore believe that a RCP trip could result in skewed power production in each core due to the flow and temperatures being believed to be different in each quadrant. These indications would be wrong for a RCP trip since the RC flow re-ratio of FDW occurs even if the Delta Tc station is in Hand.
Second part is plausible since it would be correct if there were a loss of a RCP.

Basis for meeting the K

Requires the ability to evaluate plant performance to determine that a Dropped Control Rod exists and based on that evaluation. Make an operational judgement call on the consequences of continued operation with the dropped rod.

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 3.2.3 that is not systems knowledge.
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	BANK	ILT40 Q83

Development References

ILT40 Q83
Adm-TSS (Obj: R5) Pg 158
TS 3.2.3 Basis
SRO Only Guidance

Student References Provided

APE003 2.1.7 - Dropped Control Rod
APE003 GENERIC
Ability to evaluate plant performance and make operational judgments based on operating characteristics, reactor behavior, and instrument

interpretation. (CFR: 41.5 / 43.5 / 45.12 / 45.13)

401-9 Comments:

Remarks/Status

BWE14 EA2.1 - EOP Enclosures
Ability to determine and interpret the following as they apply to the (EOP Enclosures)
(CFR: 43.5 / 45.13)
Facility conditions and selection of appropriate procedures during abnormal and emergency operations.

Given the following Unit 1 conditions:
Time = 0400
- Reactor has been tripped due to SGTR in the 1A SG

Time = 0430
- Feedwater to the 1A SG is isolated
- 1A SG level = 273 inches XSUR increasing

Time = 0500
- 1A SG level = 293 inches XSUR increasing

Time = 0530
- 1A SG reaches the Water in Steam Line Level

In accordance with the SGTR tab:

1) At 0500, EOP Enclosure 5.22 (SG Blowdown) __(1)__ be used to reduce 1A SG level.

2) At 0530, __(2)__ steaming the 1A SG.

Which ONE of the following completes the statements above?

A. 1. will NOT
2. continue

B. 1. will NOT
2. stop

C. 1. will
2. continue

D. 1. will
2. stop

ILT46 ONS SRO NRC Examination QUESTION 83

83

D

General Discussion

SGTR is an approved acronym for Steam Generator Tube Rupture per Chapter F of the EOP/AP Writer's Guide

SG is an approved acronym for Steam Generator per Chapter F of the EOP/AP Writer's Guide

XSUR is an approved acronym for Extended Startup Range per Chapter F of the EOP/AP Writer's Guide

Answer A Discussion

Incorrect. First part is plausible because the candidate may have the misconception that blow down does not occur until "Water in the Steam Line level" is reached. Second part is plausible because it is correct from when level approcahes 285 inches until Water in the Steam Line level is reached.

Answer B Discussion

Incorrect. First part is plausible because the candidate may have the misconception that blow down does not occur until "Water in the Steam Line level" is reached. Second part is correct.

Answer C Discussion

Incorrect. First part is correct. Second part is plausible because it is correct from when level approcahes 285 inches until Water in the Steam Line level is reached.

Answer D Discussion

Correct. Per the SGTR tab when level exceeds 285 inches then level will be reduced by using SG Blowdown. The SG with "Water In Steam Line Level" will not be steamed and the other SG will be.

Basis for meeting the K

Question requires knowledge of the EOP and when a specific enclosure would be performed.

Basis for Hi Cog

Basis for SRO only

In Accordance with Clarification Guidance for SRO-only Questions Rev 1
Question requires "Assessing plant conditions (normal, abnormal, or emergency) and then selecting a procedure or section of a procedure to mitigate, recover, or with which to proceed." In this must determine when an EOP enclosure (Encl. 5.22) must be performed and what action to take when water reaches a certain level. This is detailed procedure knowledge.
Can the question be answered solely by knowing “systems knowledge”, i.e., how the system works, flowpath, logic, component location? NO
Can the question be answered solely by knowing immediate operator actions? NO
Can the question be answered solely by knowing entry conditions for AOPs or plant parameters that require direct entry to major EOPs? NO
Can the question be answered solely by knowing the purpose, overall sequence of events, or overall mitigative strategy of a procedure? NO

Job Level	Cognitive Level	QuestionType	Question Source
SRO	Comprehension	BANK	ILT42 Q85

Development References

EAP-SGTR Obj R16
SGTR tab

Student References Provided

BWE14 EA2.1 - EOP Enclosures
Ability to determine and interpret the following as they apply to the (EOP Enclosures)
(CFR: 43.5 / 45.13)
Facility conditions and selection of appropriate procedures during abnormal and emergency operations.

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:
Initial conditions:

- Time = 0400
- Reactor power = 80% stable
- Control Rods Group 7 = 83% withdrawn
- Group 7 Rod 3 will not move and is declared inoperable

Current conditions:

- Time = 0500
- Reactor power = 80% STABLE
- 1SA7 E/9 CR ROD WITHDRAWAL LIMIT comes into alarm
- Group 7 Control Rods are at 40% withdrawn

In accordance with Tech Spec 3.2.1 (Regulating Rod Position Limits)…

1) Boration __(1)__ have to be initiated within 15 minutes.

2) If Control Rods are not restored to the acceptable region of the rod curves provided in the COLR, the reactor must be in MODE 3 no later than __(2)__.

Which ONE of the following completes the statements above?

REFERENCE PROVIDED

A. 1. does
2. 1900

B. 1. does
2. 1700

C. 1. does NOT
2. 1900

D. 1. does NOT
2. 1700

General Discussion

COLR is an approved acronym for Core Operating Limits Report per Chapter F of the EOP/AP Writer's Guide

Answer A Discussion

Correct.
1st part is correct. With 1 CR inoperable, the appropriate curve will show that the plant is operating in the unacceptable region which requires that boration be inititated within 15 minutes.

2nd part is correct. Condition B provides for 2 hours to restore rods to acceptable region by either boration or power reduction. Once the two hours have elapsed and rods are still not acceptable, Condition C is entered which provides an additional 12 hours to put the reactor in MODE 3.

Answer B Discussion

1st part is correct. With 1 CR inoperable, the appropriate curve will show that the plant is operating in the unacceptable region which requires that boration be initiated within 15 minutes.

2nd part is incorrect but plausible if the candidate incorrectly applies the 12 hour clock start time to the time the LCO was not met.

Answer C Discussion

1st part is incorrect because you are in the "unacceptable region" of the appropriate curve in the COLR. It is plausible because if no CRs were inoperable (a different curve), it would be correct.

2nd part is correct.

Answer D Discussion

1st part is incorrect because you are in the "unacceptable region" of the appropriate curve in the COLR. It is plausible because if no CRs were inoperable (a different curve), it would be correct.

2nd part is incorrect but plausible if the candidate incorrectly applies the 12 hour clock start time to the time the LCO was not met.

Basis for meeting the K

KA: Oconee does not emergency borate for a dilution.

The question requires the applicant to corectly interpret the extent of the dilution on the operating curves in the COLR. Then correctly apply the associated TS.

Basis for Hi Cog

Basis for SRO only

The question requires the applicant to correctly apply the rules of usage of TS to determine time requirements associated with TS Required Actions. In accordance with the Clarification Guidance for SRO-only questions, part 2 of this question cannot be answered by 1 hr TS actions, cannot be answered so9lely by above the line knowledge, cannot be answered solely by knowing Safety Limits, and it does required Application of Required Actions in accordance with rules of application requirements in Section 1.

Job Level	Cognitive Level	QuestionType	Question Source
SRO	Memory	NEW	

Development References
ADM-TSS (Obj: R2) AP/3 COLR SA7 E9 TS 3.2.1 SRO Only Guidance

Student References Provided
TS 3.2.1 COLR Rod curves (4)

APE024 AA2.06 - Emergency Boration
Ability to determine and interpret the following as they apply to the Emergency Boration: (CFR: 43.5 / 45.13)

ILT46 ONS SRO NRC Examination **QUESTION** **84** 84 **A**

When boron dilution is taking place ....

401-9 Comments:

Remarks/Status

ILT46 ONS SRO NRC Examination **QUESTION 85** 85 **C**

BWA05 2.4.46 - Emergency Diesel Actuation
BWA05 GENERIC
Ability to verify that the alarms are consistent with the plant conditions. (CFR: 41.10 / 43.5 / 45.3 / 45.12)

Given the following Unit 1 conditions:

- Reactor power = 100%
- Breaker Status
    - ACB 4 - Closed
    - PCB 8 - Open
    - PCB 9 - Open
- SA-2, C-1 KEOWEE PCB 9 is in alarm
- SA-2, B-1 DACUS BL. KEOWEE TIE PCB 8 is in alarm

1) Keowee Hydro Unit-2 __(1)__ be started in AUTOMATIC from the Control Room.

2) In accordance with the basis of Tech Spec 3.8.1 (AC Systems-Operating), Keowee Hydro Unit -1 is currently __(2)__.

Which ONE of the following completes the statements above?

A. 1. can
2. OPERABLE

B. 1. can
2. INOPERABLE

C. 1. can NOT
2. OPERABLE

D. 1. can NOT
2. INOPERABLE

ILT46 ONS SRO NRC Examination QUESTION 85

85

C

General Discussion

Answer A Discussion

1st part is incorrect because neither KHU will start in the automatic mode (this does not mean emergnecy start). It is plausible because KHU2 is lined up to the underground line and would not go through PCB 9.

2nd part is correct. While KHU 1 is lined up to go through PCB 9, the power path is actually regarded seperately from the KHU as defined in the basis of TS 3.8.1. It is a common misconception that the KHU and power path are the same component.

Answer B Discussion

1st part is incorrect because neither KHU will start in the automatic mode (this does not mean emergnecy start). It is plausible because KHU2 is lined up to the underground line and would not go through PCB 9.

2nd part is incorrect because KHU 1 is still considered operable. It is plausible because the actions for TS 3.8.1 condition C actions cover the KHU and the overhead path.

Answer C Discussion

Correct
1st part is correct. If PCB 8 AND 9 are open, neither KHU will start in the automatic mode.

2nd part is correct. While KHU 1 is lined up to go through PCB 9, the power path is actually regarded seperately from the KHU as defined in the basis of TS 3.8.1. It is a common misconception that the KHU and power path are the same component.

Answer D Discussion

1st part is correct. If PCB 8 AND 9 are open, neither KHU will start in the automatic mode.

2nd part is incorrect because KHU 1 is still considered operable. It is plausible because the actions for TS 3.8.1 condition C actions cover the KHU and the overhead path.

Basis for meeting the K

Oconee uses Keowee Hydro units in lieu of Emergency DGs.

Question requires the applicant to know that with the current alarms in (breaker condition), neither KHU 1 or 2 will start in the automatic mode.

Basis for Hi Cog

Basis for SRO only

The question requires the applicant to know what constitutes operability for the KHUs. This would determine the required operational decisions having to do with TS.

Job Level	Cognitive Level	QuestionType	Question Source
SRO	Comprehension	NEW	

Development References

EL-KHG (Obj:11, 24) Pg 25
TS 3.8.1
TSB 3.8.1
Elec Dwg
SRO Only Guidance

Student References Provided

BWA05 2.4.46 - Emergency Diesel Actuation
BWA05 GENERIC
Ability to verify that the alarms are consistent with the plant conditions. (CFR: 41.10 / 43.5 / 45.3 / 45.12)

401-9 Comments:	Remarks/Status

SYS005 A2.02 - Residual Heat Removal System (RHRS)

Ability to (a) predict the impacts of the following malfunctions or operations on the RHRS, 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)

Pressure transient protection during cold shutdown ....

Given the following Unit conditions:

- RCS temperature = 240°F slowly decreasing
- RCS pressure = 275 psig slowly decreasing

In accordance with Tech Spec 3.4.12 (LTOP System)…

1) Pressurizer level __(1)__ required to be <220 inches?

2) When Pressurizer level does NOT meet the requirements of Tech Spec 3.4.12, __(2)__ is required?

REFERENCE PROVIDED

A. 1. is
   2. shutting down to MODE 5 in accordance with LCO 3.0.3

B. 1. is
   2. establishing a dedicated LTOP operator within 4 hours

C. 1. is NOT
   2. shutting down to MODE 5 in accordance with LCO 3.0.3

D. 1. is NOT
   2. establishing a dedicated LTOP operator within 4 hours

General Discussion

RCS is an approved acronym for Reactor Coolant System per Chapter F of the EOP/AP Writer's Guide

LYOP is an approved acronym for Low Temperature Overpressure Protection per Chapter F of the EOP/AP Writer's Guide

Answer A Discussion

Incorrect. First part is correct. Second part is valid since there is no condition in TS 3.4.12 for Pressurizer Level not being within required band therefore by the rules of Tech Spec LCO 3.0.3 would apply. What makes this an incorrect choice is that there is a condition for Admin Controls not being established and TS basis Identifies Pzr level as one of the required Admin controls.

Answer B Discussion

Correct. Looking at the Low Range Cooldown curve in 1108/01 Encl 4.31 provided as an reference to the candidates, RCS temp is < 325 and RCS pressure is > 100 psig and therefore Pzr level is required to be < 220 inches. The basis of TS 3.4.12 identifies Pressurizer Level as one of the Administrative Controls required. If Pzr level requirements are not met TS 3.4.12 Condition F would then apply which requires providing compensator measures within 4 hours. The basis of TS 3.4.12 explains that a dedicated LTOP operator meets the requirement for compensatory actions.

Answer C Discussion

Incorrect. First part is plausible since the P/T point plotted is just above Line2 on the Low Range Cooldown Curve and traditionally curves required being below and to the left of upper limits therefore if that logic is applied to this point this choice would be selected.
Second part is valid since there is no condition in TS 3.4.12 for Pressurizer Level not being within required band therefore by the rules of Tech Spec LCO 3.0.3 would apply. What makes this an incorrect choice is that there is a condition for Admin Controls not being established and TS basis Identifies Pzr level as one of the required Admin controls.

Answer D Discussion

Incorrect. First part is plausible since the P/T point plotted is just above Line2 on the Low Range Cooldown Curve and traditionally curves required being below and to the left of upper limits therefore if that logic is applied to this point this choice would be selected.
Second part is correct.

Basis for meeting the K

LTOP provides pressure transient protection during shutdown conditions. Predicting the impact of a malfunction of LTOP (not meeting Pzr level requirements) is satisfied by determining actions required by the associated TS.

Basis for Hi Cog

Basis for SRO only

This question requires application of Tech Spec 3.4.12 in that it requires knowing how to determine actions required by the spec based on a given set of plant conditions. It also required knowledge from the basis of the spec to determine that Pzr level is one of the Admin Controls as well as to determine that a dedicated LTOP operator meets the compensatory actions requirement of condition F.

Job Level	Cognitive Level	QuestionType	Question Source
SRO	Comprehension	BANK	2007 SRO RETEST Q#86

Development References
TS 3.4.12 & BASIS OP/0/A/1108/001 Encl 4.31

Student References Provided
OP/0/A/1108/001 Encl 4.31 TS 3.4.12 (LTOP)

SYS005 A2.02 - Residual Heat Removal System (RHRS)

Ability to (a) predict the impacts of the following malfunctions or operations on the RHRS, 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)

Pressure transient protection during cold shutdown ....

401-9 Comments:

Remarks/Status

ILT46 ONS SRO NRC Examination QUESTION 87 87 **D**

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:
Time = 0600

- Reactor power = 90%
- RPS Channel B High RB pressure fails HIGH
- RPS Channel B is Placed in Manual Bypass

Time = 0800

- RPS Channel C High RB pressure fails LOW

Time = 0815

- RPS Channel C placed in TRIP

Time = 0830

- RPS Channel A High RB pressure fails LOW

1) An automatic Reactor trip __(1)__ occurred.

2) TS 3.3.1 (RPS Instrumentation) requires that all CRD trip breakers be open no later than __(2)__.

Which ONE of the following completes the statements above?

REFERENCE PROVIDED

A. 1. has
2. 1430

B. 1. has
2. 2030

C. 1. has NOT
2. 1430

D. 1. has NOT
2. 2030

ILT46 ONS SRO NRC Examination QUESTION 87

87

D

General Discussion

This question test the knowledge of how TS requirements have changed due to a recent mod (Digital ES/RPS).

RPS is an approved acronym for Reactor Protection System per Chapter F of the EOP/AP Writer's Guide

RB is an approved acronym for Reactor Building per Chapter F of the EOP/AP Writer's Guide

CRD is an approved acronym for Control Rod Drive System per Chapter F of the EOP/AP Writer's Guide

Answer A Discussion

Incorrect. First part is plausible since 2 detectors on channels not in Manual Bypass have failed. If the A channel RB pressure had failed High this would be a correct answer. Also plausible since the channel in Manual Bypass does include the failed signal for the Trip Function Alarm Logic so it would have the alarm locked in but it does not include it in the trip function logic so it is wrong.

2nd part is plausible if the information in the Table for TS 3.3.1 was interpreted incorrectly and Condition D was determined to be the correct TS Condition.

Answer B Discussion

Incorrect. First part is plausible since 2 detectors on channels not in Manual Bypass have failed. If the A channel RB pressure had failed High this would be a correct answer. Also plausible since the channel in Manual Bypass does include the failed signal for the Trip Function Alarm Logic so it would have the alarm locked in but it does not include it in the trip function logic so it is wrong..
Second part is correct.

Answer C Discussion

Incorrect. First part is correct. 2nd part is plausible if the information in the Table for TS 3.3.1 was interpreted incorrectly and Condition D was determined to be the correct TS Condition.

Answer D Discussion

Correct. Although one of the RPS channels has been placed in Trip, the Rx does not trip because the instrument failed low. If it had failed high the Rx would have tripped since the B channel is still processed even when in Manual Bypass. With two required channels inoperable 'condition B refers you to the table which directs entry into Condition C which allows 12 hours to open all CRD breakers.

Basis for meeting the K

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

Requires application of a Tech Spec and cannot be answered with "above the line" or 1 hr information.

Job Level	Cognitive Level	QuestionType	Question Source
SRO	Comprehension	NEW	

Development References

IC-RPS (Obj: R14, R31, R32)
TS 3.3.1
TS 3.3.1 Bases
SRO Only Guidance

Student References Provided

TS 3.3.1

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 2.2.22 - Engineered Safety Features Actuation System (ESFAS)
SYS013 GENERIC
Knowledge of limiting conditions for operations and safety limits. (CFR: 41.5 / 43.2 / 45.2)

Given the following Unit 1 conditions:

- Reactor Power = 100%
- While performing SR 3.3.5.2, Manual ES Setpoint Verification, SPOC determines that Reactor Building Pressure High "as found" setpoints to be as follows:
  A = 3.53 psig
  B = 4.04 psig
  C = 4.09 psig

1) The Actual Setpoint for ES RB Pressure High is __(1)__ psig.

2) ALL Tech Spec 3.3.5 (ESPS Input Instrumentation) Conditions that must be entered are Condition(s) __(2)__.

Which ONE of the following completes the statement above?

REFERENCE PROVIDED

A. 1. 3.0
2. A and B

B. 1. 3.0
2. A ONLY

C. 1. 3.5
2. A and B

D. 1. 3.5
2. A ONLY

General Discussion

ES is an approved acronym for Engineered Safeguards per Chapter F of the EOP/AP Writer's Guide

RB is an approved acronym for Reactor Building per Chapter F of the EOP/AP Writer's Guide

Answer A Discussion

Correct. Actual ES setpoint for RB pressure is 3.0 psig. With two channels > the allowable value of 4.0 psig, there is one parameter with two channels inoperable and therefore both Condition A (one parameter with one channel) and Condition B (one parameter with two or more channels) apply.

Answer B Discussion

Incorrect. First part is correct. Second part is plausible since there is a NOTE above the line that allows separate condition entry for each parameter. That means if it were two parameters that did not meet the allowable value (instead of two channels of the same parameter) then this would be the correct choice.

Answer C Discussion

Incorrect. First part is plausible since it is the RB pressure setpoint for the RB pressure RPS trip. Second part is correct.

Answer D Discussion

Incorrect. First part is plausible since it is the RB pressure setpoint for the RB pressure RPS trip. Second part is plausible since there is a NOTE above the line that allows separate condition entry for each parameter. That means if it were two parameters that did not meet the allowable value (instead of two channels of the same parameter) then this would be the correct choice.

Basis for meeting the K

Requires knowledge of requirements to meet LCO statement for ES instrument channels.

Basis for Hi Cog

Basis for SRO only

Requires the ability to apply tech specs. Cannot be answered solely by 1 hr or less info, above the line info, or Safety Limit info.

Job Level	Cognitive Level	QuestionType	Question Source
SRO	Comprehension	NEW	

Development References

IC-ES Obj R1
IC-RPS pg 43
IC-ES page 14
TS 3.3.5 and basis
Admin-TSS pg 159

Student References Provided

TS 3.3.5

SYS013 2.2.22 - Engineered Safety Features Actuation System (ESFAS)
SYS013 GENERIC
Knowledge of limiting conditions for operations and safety limits. (CFR: 41.5 / 43.2 / 45.2)

401-9 Comments:

Remarks/Status

ILT46 ONS SRO NRC Examination QUESTION 89 89 **B**

SYS026 A2.04 - Containment Spray System (CSS)

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

Failure of spray pump ....

Given the following Unit 1 conditions:

- Startup in progress
- Reactor in MODE 3
- 1A RBS pump inoperable

1) Tech Spec 3.6.5 (Reactor Building Spray and Cooling Systems) LCO __(1)__ met.

2) When Tech Spec 3.6.5 LCO is NOT met, Unit 1 entry into MODE 2 __(2)__ allowed.

Which ONE of the following completes the above statement?

A. 1. is
   2. is

B. 1. is
   2. is NOT

C. 1. is NOT
   2. is

D. 1. is NOT
   2. is NOT

General Discussion

RBS is an approved acronym for Reactor Building Spray per Chapter F of the EOP/AP Writer's Guide

Answer A Discussion

Incorrect. First part is correct. Second part is plausible since it would be correct for Unit 2 due to an LCO 3.0.4 exception provide in TS 3.6.5 for Unit 2.

Answer B Discussion

Correct. Only one RBS pump is requiredwhen in MODE 3 or 4. LCO 3.0.4 prevents changing modes with associated LCO's not met.

Answer C Discussion

Incorrect. First part is plausible sinceit would be true in MODES 1 and 2. Second part is plausible since it would be correct for Unit 2 due to an LCO 3.0.4 exception provide in TS 3.6.5 for Unit 2.

Answer D Discussion

Incorrect. First part is plausible sinceit would be true in MODES 1 and 2. Second part is correct.

Basis for meeting the K

Requires the ability to assess the impact of a loss of one of the RBS pumps on the ability to meet TS requirments and also demonstrates the ability to use procedures to control the consequences of the inoperable RBS pump.

Basis for Hi Cog

Basis for SRO only

Second part of the question requires application of the Generic Rules (Section 3) of Tech Specs. Knowing the requirments of LCO 3.0.4 and applying the to a specific conditions meets the criteria of SRO Guidance Doocument as it is applying the Generic Rules (section 3) of Tech Specs.

Job Level	Cognitive Level	QuestionType	Question Source
SRO	Memory	NEW	

Development References
ADM-TSS R5 TS 3.6.5 TS 3.6.5 Bases LCO 3.0.4

Student References Provided

SYS026 A2.04 - Containment Spray System (CSS)

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

Failure of spray pump ....

401-9 Comments:	Remarks/Status

SYS103 2.4.50 - Containment System

SYS103 GENERIC

Ability to verify system alarm setpoints and operate controls identified in the alarm response manual. (CFR: 41.10 / 43.5 / 45.3)

Given the following Unit 1 conditions:

Time = 0700

- Reactor power = 75% stable
- 1A RBCU INOPERABLE

Time = 0800

- 1SA/9 A-6 REACTOR BUILDING NORMAL SUMP LEVEL HIGH/LOW in alarm
- 1C RBCU flow indications
  - Δ Flow = 270 gpm
  - Inlet Flow = 560 gpm

Time = 0810

- 1LPSW-22 (1C RBCU INLET) and 1LPSW-24 (RBCU 1C OUTLET) are closed
- RB Sump level has stopped increasing

1) At 0800, 1SA/9 D-9 RBCU C COOLER RUPTURE __(1)__ be in alarm.

2) At 0810, Containment is __(2)__ in accordance with Tech Spec 3.6.1 (Containment).

Which ONE of the following completes the statements above?

A. 1. should
   2. OPERABLE

B. 1. should
   2. INOPERABLE

C. 1. should NOT
   2. OPERABLE

D. 1. should NOT
   2. INOPERABLE

General Discussion

RBCU is an approved acronym for Reactor Building Cooling Unit per Chapter F of the EOP/AP Writer's Guide

RB is an approved acronym for Reactor Building per Chapter F of the EOP/AP Writer's Guide

Answer A Discussion

Correct
1st part is correct. The alarm setpoints are 327gpm differential flow and 566 gpm DECREASING.

2nd part is correct. The basis of TS 3.6.1 (Containment) clearly defines Containment Operability as a function of Containment Leakage. With the C RBCU isolated there is no issue of additional Containment Leakage therefore containment would be Operable. Additionally, guidance in the ARG confirms Containment Operability.

Answer B Discussion

1st part is correct. The alarm setpoints are 327gpm differential flow and 566 gpm DECREASING.

2nd part is incorrect but plausible since Containment Operability is addressed in the associated ARG and the RBCU's are credited with maintaining Containment pressure within bounds of Safety Analysis therefore it would be logical to conclude that if sufficient heat removal from containment were not available that Containment Operability would be impacted. Having 2 RBCU's inoperable means that there is insufficient heat removal capacity.

Answer C Discussion

1st part is incorrect because the alarm should be in. It is plausible because the alarm is stated at 566 gpm. Unless you understand what this portion of the alarm is actually based on, it would seem that an increasing inlet flow would be indicative of a leak and therefore it would appear that you are below the limit.

2nd part is correct.

Answer D Discussion

1st part is incorrect because the alarm should be in. It is plausible because the alarm is stated at 566 gpm. Unless you understand what this portion of the alarm is actually based on, it would seem that an increasing inlet flow would be indicative of a leak and therefore it would appear that you are below the limit.

2nd part is incorrect but plausible since Containment Operability is addressed in the associated ARG and the RBCU's are credited with maintaining Containment pressure within bounds of Safety Analysis therefore it would be logical to conclude that if sufficient heat removal from containment were not available that Containment Operability would be impacted. Having 2 RBCU's inoperable means that there is insufficient heat removal capacity.

Basis for meeting the K

The question requires knowledge of the system alarm setpoints and how directed actions affect operations of the plant.

Basis for Hi Cog

Basis for SRO only

Question requires making an Operability determination based on information that is contained in Tech Spec basis. Also requires detailed knowledge of the ARG. It cannot be answered with 1 hr or less TS, above the line information, or Safety Limits.

Job Level	Cognitive Level	QuestionType	Question Source
SRO	Comprehension	NEW	

Development References

PNS-RBC (Obj: R13) Pg 18
TS 3.6.1 basis
ARG for 1SA9/A9
SRO Only Guidance6.

Student References Provided

SYS103 2.4.50 - Containment System

ILT46 ONS SRO NRC Examination QUESTION 90 90 **A**

SYS103 GENERIC

Ability to verify system alarm setpoints and operate controls identified in the alarm response manual. (CFR: 41.10 / 43.5 / 45.3)

401-9 Comments:	Remarks/Status
	.

SYS015 A2.01 - Nuclear Instrumentation System (NIS)

Ability to (a) predict the impacts of the following malfunctions or operations on the NIS; and (b based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: (CFR: 41.5 / 43.5 / 45.3 / 45.5)

Power supply loss or erratic operation ....

Given the following Unit 1 conditions:
Time = 1200:

- Reactor startup in progress
- Reactor power = 6E-3% stable on all WR NI's
- 1NI-1 and 1NI-3 Source Range Channels are unavailable

Time = 1205:

- 1NI-2 Source Range power supply fails

1) 1NI-1 and 1NI-3 are located in RPS channels A and __(1)__ respectively.

2) At Time = 1205, Tech Specs __(2)__ allow the power increase to continue to greater than 5% power.

Which ONE of the following completes the statements above?

A. 1. B
2. does

B. 1. B
2. does NOT

C. 1. C
2. does

D. 1. C
2. does NOT

General Discussion

SR and WR NI channels come from the same detectors. While a high SUR on a WR channel will give a control rod w/d block, high SUR on the SR NI will not. The TS actions for a SR or WR detector failure varies depending on what power is. While portions of this are 1 HR TS knowledge, the decision to continue to Mode 1 is not.

WR is an approved acronym for Wide Range per Chapter F of the EOP/AP Writer's Guide

RPS is an approved acronym for Reactor Protection System per Chapter F of the EOP/AP Writer's Guide

Answer A Discussion

Correct. Both Wide Range and Source Range NI-3 are in the B RPS cabinets.
With power > 4E-4%, TS does not prevent increasing power and entering MODE 1 is actually exiting the Mode of Applicability for the Source Range NI's and is therefore allowed.

Answer B Discussion

1st part is correct.

2nd part is incorrect but plausible because if it were a WR NI, it would be correct. Also, if power were < 4E-4%, it would be correct.

Answer C Discussion

Incorrect
1st part is plausible as it would meet standard psycometric protocols for 1NI-3 to be in the C RPS cabinet.

2nd part is correct. With power > 4E-4%, TS does not prevent increasing power and entering MODE 1 is actually exiting the Mode of Applicability for the Source Range NI's and is therefore allowed.

Answer D Discussion

Incorrect
1st part is plausible as it would meet standard psycometric protocols for 1NI-3 to be in the C RPS cabinet.

2nd part is incorrect but plausible because if it were a WR NI, it would be correct. Also, if power were < 4E-4%, it would be correct.

Basis for meeting the K

The question requires knowledge of how an NI failure would affect plant operations/interlocks. It also requires knowledge of how to apply procedures (TS) to recognize the impact on the plant.

Basis for Hi Cog

Basis for SRO only

The second part of this question is SRO in that it requires the application of the Generic rules of section 3 of Tech Specs.

Job Level	Cognitive Level	QuestionType	Question Source
SRO	Comprehension	NEW	

Development References
IC-NI (Obj: 10) Pg 15, 16 SR-WR Circuitry ADM-TSS (Obj: R2, R4) TS 3.0.4 TS 3.3.9 TS 3.0.10 SRO Only Guidance

Student References Provided

SYS015 A2.01 - Nuclear Instrumentation System (NIS)

Ability to (a) predict the impacts of the following malfunctions or operations on the NIS; and (b based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: (CFR: 41.5 / 43.5 / 45.3 / 45.5)

Power supply loss or erratic operation ....

ILT46 ONS SRO NRC Examination **QUESTION 91** 91 **A**

401-9 Comments:	Remarks/Status

SYS034 K6.01 - Fuel Handling Equipment System (FHES)
Knowledge of the effect of a loss or malfunction on the following will have on the Fuel Handling System : (CFR: 41.7 / 45.7)
Fuel handling equipment ....

Given the following Unit 3 conditions:

- Reactor in MODE 6
- Core offload in progress
- Main Fuel Bridge is withdrawing a fuel assembly

1) A loss of the __(1)__ interlock would increase the risk of fuel assembly damage during withdrawal.

2) In accordance with MP/0/A/1500/009 (Reactor Bridge Operation), __(2)__ must authorize bypassing the above interlock.

Which ONE of the following completes the statement above?

A. 1. Fuel Overload (TS-1)
   2. BOTH the Fuel Handling Supervisor AND the Refueling SRO

B. 1. Fuel Overload (TS-1)
   2. EITHER the Fuel Handling Supervisor OR the Refueling SRO

C. 1. Fuel Hoist Up/Down (TS-2)
   2. BOTH the Fuel Handling Supervisor AND the Refueling SRO

D. 1. Fuel Hoist Up/Down (TS-2)
   2. EITHER the Fuel Handling Supervisor OR the Refueling SRO

General Discussion

Answer A Discussion

Correct. The fuel overload interlock will automatically stop upward movement of the hoist when the setting of 2500 lbs. is reached. This choice is plausible since it would be correct if asking about withdrawing a fuel assemble and the title of the interlock could be misinterpreted to be talking about overloading the structure which the fuel is sitting on. Both the Fuel Handling Supervisor AND the Refueling SRO are required to authorize bypassing the interlock.

Answer B Discussion

Incorrect. First part is correct.. Second part is plausible since there are many reactivity related evolutions that would require the Refueling SRO permission but not the Fuel Handling Supervisor.

Answer C Discussion

Incorrect. Plausible since the TS-2 interlock bypasses the underload (intermediate low load) setting when lowering the hoist and could therefore result in damaging the fuel assembly by trying to push it inward with the mast when it is in contact with something that is stopping its inward motion. This means this would be the correct choice if inserting a fuel assembly. Both the Fuel Handling Supervisor AND the Refueling SRO are required to authorize bypassing the interlock.

Answer D Discussion

Incorrect. Incorrect. Plausible since the TS-2 interlock bypasses the underload (intermediate low load) setting when lowering the hoist and could therefore result in damaging the fuel assembly by trying to push it inward with the mast when it is in contact with something that is stopping its inward motion. This means this would be the correct choice if inserting a fuel assembly. . Second part is plausible since there are many reactivity related evolutions that would require the Refueling SRO permission but not the Fuel Handling Supervisor.

Basis for meeting the K

Per chief examiner question can be about loss or malfunction of bridge interlock and whose authority required to bypass it. This question Requires knowledge of the effect of the loss of one of the bridge interlocks and what authority is required to bypass it.

Basis for Hi Cog

Basis for SRO only

In accordance with Clarification Guidance for SRO-only Questions:

Requires knowledge of procedures and limitations involved with fuel handling.

Job Level	Cognitive Level	QuestionType	Question Source
SRO	Comprehension	BANK	ILT40 Q92

Development References

Obj FH-FHS Obj 24
FH-FHS
MP/1500/09

Student References Provided

SYS034 K6.01 - Fuel Handling Equipment System (FHES)

Knowledge of the effect of a loss or malfunction on the following will have on the Fuel Handling System : (CFR: 41.7 / 45.7)

Fuel handling equipment ....

401-9 Comments:

Remarks/Status

ILT46 ONS SRO NRC Examination **QUESTION 93** 93 **C**

SYS056 2.1.23 - Condensate System

SYS056 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 Unit 1 conditions:

- Loss of all feedwater has occurred
- The Loss Of Heat Transfer (LOHT) tab is in progress
- The RO is lining up to feed the SGs with the Condensate Booster Pumps (CBP)
- The RO has just selected OFF for both channels on AFIS headers A and B.

1) The next procedural step in Rule 3 is to open the __(1)__ block and control valves to allow CBP flow when Steam Generator pressure is decreased.

2) Once Condensate Booster Pump feed has been established in accordance with Rule 3, the procedure director will __(2)__ the LOHT tab.

Which ONE of the following completes the statements above?

A. 1. Main
2. wait until EFDW has been made available before continuing in

B. 1. Main
2. continue in

C. 1. Startup
2. wait until EFDW has been made available before continuing in

D. 1. Startup
2. continue in

General Discussion

The "Ability to Feed" is the key to this question. By definition, the next step has to establish flow to the SGs. If you are not at that step in the procedure, "NO SG can be fed" and you are to proceed to HPI FC (Rule 4).

EFDW is an approved acronym for Emergency Feedwater per Chapter F of the EOP/AP Writer's Guide

SG is an approved acronym for Steam Generator per Chapter F of the EOP/AP Writer's Guide

Answer A Discussion

1st part is incorrect because the procedure directs the use of the Startup Control Valves. It is plausible because it is an available flow path and it would offer less resistance to flow for the CBPs.

2nd part is correct. Per the LOHT tab step 3 RNO the PD will stay at the WHEN step until EFDW is available before continuing.

Answer B Discussion

1st part is incorrect because the procedure directs the use of the Startup Control Valves. It is plausible because it is an available flow path and it would offer less resistance to flow for the CBPs.

2nd part is incorrect but plausible since the guidance is in the LOHT tab.

Answer C Discussion

Correct
1st part is correct in accordance with guidance provided in Rule 3.

2nd part is correct. Per the LOHT tab step 3 RNO the PD will stay at the WHEN step until EFDW is available before continuing.

Answer D Discussion

1st part is correct.

2nd part is incorrect but plausible since the guidance is in the LOHT tab.

Basis for meeting the K

The question requires specific procedure knowledge of Rule 3 when incorporating the CBP (condensate system) as a source of feed.

Basis for Hi Cog

Basis for SRO only

The question requires the applicant to assess plant conditions AND their location in the current procedure to select the correct procedure path (stay at the current step or continue with other directions from the LOHT tab).

Job Level	Cognitive Level	QuestionType	Question Source
SRO	Comprehension	NEW	

Development References
EAP-LOHT (Obj: R1) LOHT tab OMP 1-18 Pg 4/21 Rule 3 FWD Drawing SRO Only Guidance

Student References Provided

SYS056 2.1.23 - Condensate System
SYS056 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

ILT46 ONS SRO NRC Examination QUESTION 94 94 **A**

GEN2.1 2.1.29 - GENERIC - Conduct of Operations
Conduct of Operations
Knowledge of how to conduct system lineups, such as valves, breakers, switches, etc. (CFR: 41.10 / 45.1 / 45.12)

Given the following Unit 1 conditions:

- Maintenance is being performed on Unit 1 condensate system
- The clearance for the section of piping connected to the component is such that the piping can be vented but not drained.

In accordance with SOMP 2-1 (Safety Tagging And Configuration Control)…

1) An SRO with an "Inactive" license __(1)__ allowed to sign the WOTA Ready for Work.

2) Zero Energy Comments __(2)__ have to be entered into ST-2 prior to setting the WOTA Ready for Work.

Which ONE of the following completes the statements above?

A. 1. is
2. do

B. 1. is
2. do NOT

C. 1. is NOT
2. do

D. 1. is NOT
2. do NOT

General Discussion

Answer A Discussion

Correct. In SOMP 2-1, its states for the person signing for the WOTA to be Ready For Work (RFW):

For OPS, other than Keowee, shall be an OPS SRO or OPS Staff member who is a previously licensed SRO.

Prior to setting a WOTA RFW, if the piping CANNOT be drained or depressurized, or if the component CANNOT be completely de-energized, Zero Energy Comments shall be entered in ST-2 for the WOTA.

Answer B Discussion

1st part is correct (See A).

2nd part is incorrect but plausible because the system is depressurized so it is logical to think that it the comments would not have to be entered into ST-2.

Answer C Discussion

1st part is incorrect (see A). It is plausible because an SRO who's license is inactive may not be proficient in current plant procedures/lineups...

2nd part is correct.

Answer D Discussion

1st part is incorrect but plausible (see C).

2nd part is incorrect but plausible (see B).

Basis for meeting the K

The question requires knowledge of he process for performing maintenance on systems. In this case, approvals that allow work when system lineups do not allow complete draining of the system.

Basis for Hi Cog

Basis for SRO only

This question requires knowledge of adminestrative procedures above that which is required of an RO. This is an SRO ONLY objective in the lesson.

Job Level	Cognitive Level	QuestionType	Question Source
SRO	Memory	NEW	

Development References
ADM-OMP (Obj: R53 M&N) SOMP 2-1 Pg 21

Student References Provided

GEN2.1 2.1.29 - GENERIC - Conduct of Operations

Conduct of Operations

Knowledge of how to conduct system lineups, such as valves, breakers, switches, etc. (CFR: 41.10 / 45.1 / 45.12)

401-9 Comments:	Remarks/Status

ILT46 ONS SRO NRC Examination QUESTION 95 95 **B**

GEN2.1 2.1.43 - GENERIC - Conduct of Operations

Conduct of Operations

Ability to use procedures to determine the effects on reactivity of plant changes, such as reactor coolant system temperature, secondary plant, fuel depletion, etc. (CFR: 41.10 / 43.6 / 45.6)

Given the following Unit 1 conditions:

- SGTR tab in progress
- RCS temperature = 530°F stable
- 1A SG isolated
- 3 RCP's operating
- HPI pump suction aligned to BWST
- Group 3 Rod 2 100% withdrawn

1) __ (1) __ tab of the EOP will be utilized to cooldown to LPI.

2) In accordance with the EOP tab above, the lowest RCS temperature allowed prior to performing a Shutdown Margin verification is __(2)__ °F.

Which ONE of the following completes the statements above?

A. 1. SGTR
2. 240

B. 1. SGTR
2. 450

C. 1. FCD
2. 240

D. 1. FCD
2. 450

General Discussion

Recommend NOT using this question. While it is from a previous NRC SRO exam, it is clearly an RO objective in RT-CM02. We could send it as one of the 10 "Freebee" questions but I do not think that it is an SRO question.

RCS is an approved acronym for Reactor Coolant System per Chapter F of the EOP/AP Writer's Guide

SGTR is an approved acronym for Steam Generator Tube Rupture per Chapter F of the EOP/AP Writer's Guide

RCP is an approved acronym for Reactor Coolant Pump per Chapter F of the EOP/AP Writer's Guide

HPI is an approved acronym for High Pressure Injection per Chapter F of the EOP/AP Writer's Guide

LPI is an approved acronym for Low Pressure Injection per Chapter F of the EOP/AP Writer's Guide

BWST is an approved acronym for Borated Water Storage Tank per Chapter F of the EOP/AP Writer's Guide

SG is an approved acronym for Steam Generator per Chapter F of the EOP/AP Writer's Guide

Answer A Discussion

Incorrect. First part is correct. Second part is plausible since it would be correct if all Control Rods were inserted.

Answer B Discussion

Correct. The SGTR tab provides guidance on cooldown to LPI with a SG isolated due to a SGTR. With the conditions given in the stem, you would reach step 199 which is a table of cooldown plateaus. That table specifies being able to cool down to 450 degrees if HPI aligned to BWST and one and only one CR NOT fully inserted.

Answer C Discussion

Incorrect. First part is plausible since most all other cases where a SG is isolated directs you to the FCD tab to perform the cooldown. Also plausible since the SGTR tab is unique in that it is the only non-cooldown tab that does direct cooldown to LPI. Second part is plausible since it would be correct if all Control Rods were inserted.

Answer D Discussion

Incorrect. First part is plausible since most all other cases where a SG is isolated directs you to the FCD tab to perform the cooldown. Also plausible since the SGTR tab is unique in that it is the only non-cooldown tab that does direct cooldown to LPI Second part is correct.

Basis for meeting the K

Question requires knowledge of the affect of RCS on shutdown margin and therefore reactivity. Demonstrates the ability to determine the affect on reactivity that occurs as RCS temperatures are decreased…

Basis for Hi Cog

Basis for SRO only

This first part of this question is SRO as it requires assessing plant conditions and determining a section of the EOP that will direct an RCS cooldown. The second part matches the KA at the SRO level in that it requires detailed knowledge of the procedure that is not answerable by entry conditions or major mitigation strategy.

Job Level	Cognitive Level	QuestionType	Question Source
SRO	Comprehension	NEW	

Development References
EAP-SGTR R13 SGTR tab

Student References Provided

GEN2.1 2.1.43 - GENERIC - Conduct of Operations

Conduct of Operations

Ability to use procedures to determine the effects on reactivity of plant changes, such as reactor coolant system temperature, secondary plant, fuel depletion, etc. (CFR: 41.10 / 43.6 / 45.6)

401-9 Comments:	Remarks/Status

ILT46 ONS SRO NRC Examination QUESTION 96 96 **C**

GEN2.2 2.2.2 - GENERIC - Equipment Control

Equipment Control

Ability to manipulate the console controls as required to operate the facility between shutdown and designated power levels. (CFR: 41.6 / 41.7 / 45.2)

---

1) When Tech Spec 3.2.1 (Regulating Rods Position Limits) requires RCS Boration, the basis of the spec allows the SRO to direct boration using __(1)__.

2) The consequences of being in the Unacceptable region of the rod curve is that __(2)__.

Which ONE of the following completes the statements above?

A. 1. 1A BHUT
2. required shutdown margin may not exist

B. 1. 1A BHUT
2. Quadrant Power Tilt limits may be exceeded

C. 1. BWST
2. required shutdown margin may not exist

D. 1. BWST
2. Quadrant Power Tilt limits may be exceeded

ILT46 ONS SRO NRC Examination QUESTION 96 96 **C**

General Discussion

RCS is an approved acronym for Reactor Coolant System per Chapter F of the EOP/AP Writer's Guide

BHUT is an approved acronym for Bleed Holdup Tank per Chapter F of the EOP/AP Writer's Guide

BWST is an approved acronym for Borated Water Storage Tank per Chapter F of the EOP/AP Writer's Guide

Answer A Discussion

Incorrect: First part is plausible since TS 3.2.1 Condition B directs beginning boration within 15 minutes. It is plausible to believe that the BWST us not allowed since other Tech Specs direct a minimum volume be maintained in the BWST to satisfy refueling requirements and satisfy long term ECCS requirements therefore logic could direct determining that the use of the BWST for this purpose is not allowed. However the bases directs that the boration occur as described in B 3.1.1 and that bases describes the boration as being from CBAST or BWST. Second part is correct.

Answer B Discussion

Incorrect: First part is plausible since TS 3.2.1 Condition B directs beginning boration within 15 minutes. It is plausible to believe that the BWST us not allowed since other Tech Specs direct a minimum volume be maintained in the BWST to satisfy refueling requirements and satisfy long term ECCS requirements therefore logic could direct determining that the use of the BWST for this purpose is not allowed. However the bases directs that the boration occur as described in B 3.1.1 and that bases describes the boration as being from CBAST or BWST.
Second part is plausible since control rod position does affect tilt readings however homogeneous group rod positions generally effect imbalance and not tilt. It would be reasonable to have a misconception that resulting in confusing the tilt vs imbalance impact of rod positions. Additionally, rod position can impact QPT assuming rod misalignment issues exist therefore associating tilt issues with control rod position issues is plausible.

Answer C Discussion

CORRECT: TS 3.2.1 Condition B directs beginning boration within 15 minutes however the bases directs that the boration occur as described in B 3.1.1 and that bases describes the boration as being from CBAST or BWST. The bases of TS 3.2.1 (Regulating Rods Position Limits) describes the consequences of being in the unacceptable region as potentially not having the required Shutdown Margin.

Answer D Discussion

Incorrect. First part is correct. Second part is plausible since control rod position does affect tilt readings however homogeneous group rod positions generally effect imbalance and not tilt. It would be reasonable to have a misconception that resulting in confusing the tilt vs imbalance impact of rod positions. Additionally, rod position can impact QPT assuming rod misalignment issues exist therefore associating tilt issues with control rod position issues is plausible.

Basis for meeting the K

K/A MATCH ANALYSIS
NO 43 tie. Per NRC, OK to ask about SRO decision resulting in directing manipulation of controls (example inserting rods with missed ECP) Requires directing RO to manipulate console controls by beginning RCS boration from the correct source. This activity would require specific direction from the SRO since there is not direct line to the procedure that would be used for boration from the Tech Spec. Also demonstrates ability to determine which controls will need to be manipulated as it results in determining the correct source of borated water to be used for the TS required boration.

Basis for Hi Cog

Basis for SRO only

SRO-ONLY ANALYSIS
Requires knowledge of TS bases requirements for boration as described in bases of TS 3.2.1 and knowledge of the bases behind different portions of rod worth curves as described in TS 3.2.1 (Regulating Rods Position Limits).

Job Level	Cognitive Level	QuestionType	Question Source
SRO	Memory	BANK	2009A Q96

Development References

2009A NRC Exam Q96
CP-012 (Obj: R10) Pg 17
TS 3.2.1 (Regulating Rods Position Limits)
TS 3.2.1 Bases Pg 5
OP/1/A/1102/001 Encl 4.7, Pg 2/19
SRO Only Guidance
TS 3.1.1 Bases

Student References Provided

ILT46 ONS SRO NRC Examination **QUESTION 96** 96 **C**

GEN2.2 2.2.2 - GENERIC - Equipment Control

Equipment Control

Ability to manipulate the console controls as required to operate the facility between shutdown and designated power levels. (CFR: 41.6 / 41.7 / 45.2)

401-9 Comments:	Remarks/Status

ILT46 ONS SRO NRC Examination QUESTION 97 97 **A**

GEN2.3 2.3.12 - GENERIC - Radiation Control

Radiation Control

Knowledge of radiological safety principles pertaining to licensed operator duties, such as containment entry requirements, fuel handling responsibilities, access to locked high-radiation areas, aligning filters, etc. (CFR: 41.12 / 45.9 / 45.10)

Given the following Unit 1 conditions:
Initial conditions:

- Reactor in Mode 6
- Defueling in progress
- 1RIA-3 (Fuel Transfer Canal Monitor) = 4 mr/hr stable
- Main Fuel Bridge Area Monitor = 6 mr/hr stable

Current conditions:

- 1RIA-3 local reading = 0 mr/hr
- 1RIA-3 View Node indication is magenta

The Refueling SRO will determine that Fuel Handling activities in the Reactor Building may ______ in accordance with OP/1/A/1502/007 (Operations Defueling/Refueling Responsibilities)?

Which ONE of the following completes the statement above?

A. NOT continue until a portable area monitor with local alarm capability is in place.

B. continue because only the Main Fuel Bridge Area Monitor is required.

C. NOT continue until continuous RP coverage is present on the Main Fuel Bridge.

D. continue provided 1RIA-49 (RB Normal Gas) is operable.

General Discussion

RP is an approved acronym for Radiation Protection Group per Chapter F of the EOP/AP Writer's Guide

Answer A Discussion

Correct. If 1RIA-3 is inoperable, RP must be contacted to provide a portable Area monitor with local alarm capability in accordance withOP/1502/007.

Answer B Discussion

Incorrect and plausible. Both RIAs would help protect the fuel handlers. However both RIAs are required.

Answer C Discussion

Incorrect and plausible. RP is contacted to supply the replacement instrument but is not required to provide local coverage.

Answer D Discussion

Incorrect and plausible. RIAs 49 would alarm and sound the RB evacuation alarm if highly radioactive gases were released into the RB.

Basis for meeting the K

Requires knowledge of Radiological Safety Principles (Need to be able to monitor Rad levels to continue working in a Rad area especially when moving irraditated fuel assemplies) as it relates to specific SRO fuel handling responsibilites.

Basis for Hi Cog

Basis for SRO only

In accordance with Rev. 1 of "Clarification Guidance for SRO-only Questions":
Question requires knowledge of Fuel Handling procedures. The SRO must evaluate the RIA availability and requirements to continue fuel movement.
This is not an RO task.

Job Level	Cognitive Level	QuestionType	Question Source
SRO	Comprehension	BANK	ILT39 Q97

Development References
OP/1502/07 Encl 4.1

Student References Provided

GEN2.3 2.3.12 - GENERIC - Radiation Control

Radiation Control

Knowledge of radiological safety principles pertaining to licensed operator duties, such as containment entry requirements, fuel handling responsibilities, access to locked high-radiation areas, aligning filters, etc. (CFR: 41.12 / 45.9 / 45.10)

401-9 Comments:

Remarks/Status

ILT46 ONS SRO NRC Examination QUESTION 98 98 **C**

GEN2.3 2.3.6 - GENERIC - Radiation Control
Radiation Control
Ability to approve release permits. (CFR: 41.13 / 43.4 / 45.10)

Given the following plant conditions:

- Shift is preparing for ONE (1) GWR release of the 1A GWD tank at the 1/3 Station Limit
- The release will be through the P/A/C filter
- 1A GWD tank holdup time is 41 days

Which ONE of the following describes the:

1) MINIMUM level of authority for approval in accordance with OP/1-2/A/1104/018 (GWD System)?

2) SLC bases for limiting the Curie content of the Gaseous Waste Disposal (GWD) Tanks?

A.
1. OSM
2. limits Whole Body exposure of individual at the nearest exclusion boundary to $\leq$ 0.5 Rem in the event of a GWD tank rupture.

B.
1. OSM
2. limits Whole Body exposure of individual at the nearest exclusion boundary to $\leq$ 100 mrem during a planned GWD tank release.

C.
1. SRO
2. limits Whole Body exposure of individual at the nearest exclusion boundary to $\leq$ 0.5 Rem in the event of a GWD tank rupture.

D.
1. SRO
2. limits Whole Body exposure of individual at the nearest exclusion boundary to $\leq$ 100 mrem during a planned GWD tank release.

ILT46 ONS SRO NRC Examination QUESTION 98

98 **C**

General Discussion

is an approved acronym for Gaseous Waste Release per Chapter F of the EOP/AP Writer's Guide

Answer A Discussion

1st part is incorrect: OSM approval not required. Plausible because if the hold up time was < 30 days or the PAC filter was not used, it would be correct.
2nd part is correct.

Answer B Discussion

1st part is incorrect but plausible (see A).

2nd part is incorrect. Plausible because yearly limit at site boundary for unmonitored personnel is 100 mrem.

Answer C Discussion

Correct.
1st part is correct:SRO approval only required.

2nd part is correct: Basis for limit in GWD tanks based on exposure at site boundary of .5 REM.

Answer D Discussion

1st part is correct.

2nd part is incorrect but plausible (see B).

Basis for meeting the K

K/A MATCH ANALYSIS
KA matched because the test item evaluates the SROs understanding of conditions that will determine approval authority of a gaseous radioactive release

Basis for Hi Cog

Basis for SRO only

SRO-ONLY ANALYSIS
10CFR55.43(b) item 4 is met because the SRO must evaluate conditions that support radioactive effluent release; 10CFR55.43(b) item 2 is met for SLC limitations

Job Level	Cognitive Level	QuestionType	Question Source
SRO	Memory	BANK	2007 SRO RETEST Q#98

Development References

2007 NRC Retest Exam Q98
WE GWD (Obj: 7) Pg 27
OP/1-2/A/1104/018 Encl 4.9 Pg 7/24
SLC 16.11.13

Student References Provided

GEN2.3 2.3.6 - GENERIC - Radiation Control
Radiation Control
Ability to approve release permits. (CFR: 41.13 / 43.4 / 45.10)

401-9 Comments:

Remarks/Status

GEN2.4 2.4.35 - GENERIC - Emergency Procedures / Plan

Emergency Procedures / Plan

Knowledge of local auxiliary operator tasks during an emergency and the resultant operational effects. (CFR: 41.10 / 43.5 / 45.13)

Given the following Unit 1 conditions:
Initial conditions:

- SGTR on the 1A SG
- SGTR tab is in progress
- TBVs are not available
- RCS Temperature = 530^{o}F stable

Current conditions:

- 1A SG is approaching overfill

1) When directing the local operation of the ADV on the 1A SG to prevent overfill, the TS limit for cooldown rate __(1)__ be exceeded.

2) If while steaming the affected SG, SCM decreases to 0 ^{o}F, the SGTR tab directs the crew to GO TO __(2)__ tab.

Which ONE of the following completes the statements above?

A. 1. can
2. Loss Of Subcooling Margin (LOSCM)

B. 1. can
2. LOCA Cooldown

C. 1. can NOT
2. LOSCM

D. 1. can NOT
2. LOCA Cooldown

General Discussion

SGTR is an approved acronym for Steam Generator Tube Rupture per Chapter F of the EOP/AP Writer's Guide

SG is an approved acronym for Steam Generator per Chapter F of the EOP/AP Writer's Guide

RCS is an approved acronym for Reactor Coolant System per Chapter F of the EOP/AP Writer's Guide

TBV is an approved acronym for Turbine Bypass Valves per Chapter F of the EOP/AP Writer's Guide

ADV is an approved acronym for Atmospheric Dump Valves per Chapter F of the EOP/AP Writer's Guide

LOCA is an approved acronym for Loss Of Coolant Accident per Chapter F of the EOP/AP Writer's Guide

Answer A Discussion

Correct
1st part is correct. A note in the SGTR tab prior to step 51 allows exceeding the TS cooldown rates to prevent overfill.

2nd part is correct. The parallel action page directs you to GO TO the LOSCM tab. There is no provision due to steaming the SG to prevent overfill.

Answer B Discussion

1st part is correct.

2nd part is plausible because in step 67 of the SGTR tab with SCM = 0, it directs you to GO TO the LOCA CD tab. It is incorrect because the LOSCM tab is a higher priority tab than the SGTR tab. This is on the foldout page which is applicable the entire time that you are in the SGTR tab.

Answer C Discussion

1st part is incorrect. It is plausible because this is one of only a couple of conditions where TS cooldown rates are allowed to be exceeded..

2nd part is correct.

Answer D Discussion

1st part is incorrect. It is plausible because this is one of only a couple of conditions where TS cooldown rates are allowed to be exceeded..

2nd part is plausible because in step 67 of the SGTR tab with SCM = 0, it directs you to GO TO the LOCA CD tab. It is incorrect because the LOSCM tab is a higher priority tab than the SGTR tab. This is on the foldout page which is applicable the entire time that you are in the SGTR tab.

Basis for meeting the K

Requires knowledge of how EOP actions of local operator are performed and what actions are required based on the consequences of his actions.

Basis for Hi Cog

Basis for SRO only

This question meets the SRO only guidance by being able to assess plant conditions and select a procedure to transition to.

Job Level	Cognitive Level	QuestionType	Question Source
SRO	Comprehension	NEW	

Development References

EAP-SGTR (Obj: R16) Pg 31
OMP 1-18
SGTR tab
SRO Only Guidance

Student References Provided

GEN2.4 2.4.35 - GENERIC - Emergency Procedures / Plan

ILT46 ONS SRO NRC Examination QUESTION 99 99 **A**

Emergency Procedures / Plan

Knowledge of local auxiliary operator tasks during an emergency and the resultant operational effects. (CFR: 41.10 / 43.5 / 45.13)

401-9 Comments:	Remarks/Status

GEN2.4 2.4.41 - GENERIC - Emergency Procedures / Plan
Emergency Procedures / Plan
Knowledge of the emergency action level thresholds and classifications. (CFR: 41.10 / 43.5 / 45.11)

Given the following Unit 1 conditions:
Time = 1200

- Unit shutting down due to a 30 gpm tube leak in "1A" SG

Time = 1203

- Unit trips due to a loss of Main Feedwater
- Emergency Feedwater is NOT available

Time = 1207

- NEO reports one Main Steam Relief Valve on the 1B SG stuck open
- Unit 2 TDEFWP aligned and feeding Unit 1 Steam Generators
- "1A" SG tube leak = 200 gpm stable

1) The conditions present at 1200 __ (1) ___ require an emergency classification within 15 minutes.

2) At time = 1207 the emergency classification is __ (2) ___.

Assume no additional failures occur AND that Emergency Coordinator Judgment is NOT used as a reason for classification.

Which ONE of the following completes the statements above?

REFERENCE PROVIDED

A. 1. would
2. ALERT

B. 1. would
2. SITE AREA EMERGENCY

C. 1. would NOT
2. ALERT

D. 1. would NOT
2. SITE AREA EMERGENCY

ILT46 ONS SRO NRC Examination QUESTION 100 100 **A**

General Discussion

SG is an approved acronym for Steam Generator per Chapter F of the EOP/AP Writer's Guide

TDEFWP is an approved acronym for Turbine Driven Emergency Feedwater Pump per Chapter F of the EOP/AP Writer's Guide

Answer A Discussion

Correct.
First part is correct. Determining that a classification is required is correct based on using Encl. 4.2 which says that a SG tube leak > 25 gpm is classifiable as an Unusual Event.

Second part is correct. An ALERT is the correct choice based on the SGTR being > 160 gpm.

Answer B Discussion

First part is correct. Determining that a classification is required is correct based on using Encl. 4.2 which says that a SG tube leak > 25 gpm is classifiable as an Unusual Event.

Second part is incorrect and plausible. There are 2 plausible choices that could result in adding an additional 3 points which would result in 7 points and require an SAE be declared.
One plausible choice is if the candidate incorrectly adds the 3 points based on the second block which requires the SGTL and the path to the environment be in the same SG (which it is not). Since the stuck MSRV is on the opposite SG, this would be incorrect.

The 3rd block requires adding 3 points if the SGTL and path to the environment are in opposite SG's (they are) AND the SG's are being fed from the affected unit. Since the SG's are being fed from Unit 2, this would be incorrect.

Answer C Discussion

First part is incorrect and plausible. Using Enclosure 4.1 (Fission Product Barrier Matrix) would result in determining that no classification is required since the threshold value under RCS Barriers is 160 gpm and although the leak is greater than the threshold value under Containment Barriers (which is 10 gpm), there are additional criteria that are not met in that category.

Second part is correct (see A).

Answer D Discussion

First part is incorrect but plausible (see C).

Second part is incorrect but plausible (see B).

Basis for meeting the K

Question requires the applicant to make emergency classifications based on information provided.

Basis for Hi Cog

Basis for SRO only

Requires the applicant to evaluate plant conditions and make emergency classifications based on their evaluation.

Job Level	Cognitive Level	QuestionType	Question Source
SRO	Comprehension	BANK	ILT39 Q82

Development References

ILT39 Q82
EAP-SEP (Obj: R12)
RP/0/1000/001
SRO Only Guidance

Student References Provided

RP/0/1000/001

GEN2.4 2.4.41 - GENERIC - Emergency Procedures / Plan
Emergency Procedures / Plan
Knowledge of the emergency action level thresholds and classifications. (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% Unit 2: 100% Unit 3: 100%

Turnover:

- SASS in Manual for I&E testing
- AMSAC/DSS bypassed for I&E testing
- 1B FDWPT on Handjack for MGU repair, work is completed; AO on station at 1B FDWPT

Event No.	Malfunction No.	Event Type*	Event Description
0a	Pre-Insert		SASS in Manual
0b	Pre-Insert		AMSAC/DSS bypassed for I&E testing
0c	Pre-Insert		Main Turbine fails to trip
0d	Pre-Insert	Override	1A and 1B LPI pump fail to start
1		N: BOP, SRO	Restore 1B MFWP from Hand Jack
2	MCS004	I: OATC, SRO	Controlling Tave Fails HIGH (596ºF)
3	MPS270	C: BOP, SRO (**TS**)	High Oil Level on 1A2 RCP
4	MPS110	C: BOP, SRO (**TS**)	(1HP-5 fails CLOSED) Restore Letdown
5	Override	C: OATC, SRO **(TS)**	Inadvertent DLPIAS actuation
6	MPI290 Override	C: OATC, SRO	Main Turbine Fails to trip (Lockout EHC Pumps) (Occurs with event 7)
7	MPS400	M: ALL	LBLOCA 1A and 1B LPI pumps fail to start Switch will not stop 1A1 RCP when securing RCP's per Rule 2

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

Op-Test No.: 1	Scenario No.: 1	Event No.: 1	Page 1 of 3
Event Description:	**Restore 1B MFWP from Hand Jack**		

Time	Position	Applicant's Actions or Behavior
		Crew Response:
	SRO	Direct BOP to perform OP/1/A/1106/002 B (FDWPT Operation), Encl. 4.13, Taking the 1B FDWPT Off Handjack beginning at Step 2.1
	BOP	Use the above procedure Encl. 4.13, and remove the 1B FDWPT from Handjack and restore speed control to the 1B MGU (motor gear unit)
		2. Procedure
		2.1 **<u>IF</u>** in Mode 1 **<u>OR</u>** Mode 2, perform the following: (**MODE 1**)
		2.1.1 **<u>WHILE</u>** enclosure is in progress monitor the following indications:
		• Appropriate ranged Nis (**Power Range**)
		• 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)
		Examiner Note: The CRS will likely direct the RO to maintain FDW Valve ∆p on scale during the evolution.
		2.2 Remove "T/O SHEET" CR tag from 1B MAIN FDW PUMP (ICS) station.
		2.3 Run 1B MAIN FDW PUMP (ICS) station to "HSS" (high speed stop).
		NOTE: Operator should locally verify Motor Gear Unit moves smoothly from low speed stop and back to high speed stop.
		Booth Cue: AO will report "Standing by the 1B FDWP Motor Gear Unit".
		2.4 Perform the following:
		2.4.1 Establish communication with Operator at 1B FDWPT.
		2.4.2 Run 1B MAIN FDW PUMP (ICS) to low speed stop.
		2.4.3 Run 1B MAIN FDW PUMP (ICS) to high speed stop. (≈ 1/8" from hard stop)

This event is complete when the 1B MFDWPT is placed in AUTO, or as directed by the Lead Examiner.

Op-Test No.: 1 Scenario No.: 1 Event No.: 1 Page 2 of 3

Event Description: **Restore 1B MFWP from Hand Jack**

Time	Position	Applicant's Actions or Behavior
		Examiner Note: OAC Alarm O1E2671, 1B FWP ICS Error will alarm when changing FWP speed demand. 2.4.4 Verify Motor Gear Unit operated smoothly through entire operation. ***Booth Cue: AO will report "1B FDWP Motor Gear Unit operated smoothly through the entire operation".*** 2.5 Turn FWT 1B HANDJACK switch to "OFF". **Crew Response:** **NOTE:** Changes in FDW valve ΔP will cause swings in CTP. Decreases in FDW valve ΔP will cause CTP to decrease. 2.6 **IF** Unit 1 is in Mode 1 or 2 **<u>AND</u>** both FDWPT ICS stations are in "HAND": ***(Does not apply)*** 2.6.1 Ensure FDW valve ΔP > 40 psig. 2.6.2 <u>Begin</u> monitoring CTP until Motor Gear Unit takes control. **NOTE:** Motor Gear Unit control indicated by FDWPT speed and/or suction flow decreasing. Two successful decreases verifies control with Motor Gear Unit.. 2.7 Decrease 1B MAIN FDW PUMP (ICS) until 1B FDWPT controlled by 1B MAIN FDW PUMP (ICS) station. ***Examiner Note: This will be indicated by two successful decreases of speed and/or suction flow.*** 2.8 Increase 1B FDWPT Motor Speed Changer. 2.9 Verify 1B FDWPT speed does **<u>NOT</u>** increase. 2.10 Position 1B FDWP MOTOR SPEED CHANGER to 'FR' under "RAISE" until 1B FDWP MOTOR SPEED CHANGER is at "HSS". 2.11 After 1B FDWPT MOTOR SPEED CHANGER reaches "HSS", hold 1B FDWPT MOTOR SPEED CHANGER switch in 'FR' for 3 to 5 seconds to make all contacts.

This event is complete when the 1B MFDWPT is placed in AUTO, or as directed by the Lead Examiner.

Op-Test No.: 1	Scenario No.: 1	Event No.: 1	Page 3 of 3
Event Description:	**Restore 1B MFWP from Hand Jack**		

Time	Position	Applicant's Actions or Behavior
	SRO/BOP	***Examiner Note: Steps 2.12 – 2.14 do not apply.*** 2.12 **IF** Unit 1 is in Mode 3: **(N/A)** 2.13 **IF** Unit 1 is in Mode 1 or 2 with 1A FDWPT shutdown: **(N/A)** 2.14 **IF** Unit 1 is in Mode 1 or 2 with 1A FDWPT operating but **NOT** in auto: **(N/A)** 2.15 **IF** Unit 1 is in Mode 1 or 2 with 1A FDWPT in auto: 2.15.1 Verify 1A MAIN FDW PUMP (ICS) in "AUTO". 2.15.2 Place 1B MAIN FDW PUMP (ICS) in "AUTO". 2.15.3 Verify ICS adjusts 1B FDWPT speed to balance suction flow. 2.16 **IF** required, remove Turnover Sheet note for control of 1B FDWPT with Motor Speed Changer.

This event is complete when the 1B MFDWPT is placed in AUTO, or as directed by the Lead Examiner.

Op-Test No.: 1	Scenario No.: 1	Event No.: 2	Page 1 of 5
Event Description:	**Controlling Tave Fails HIGH (596ºF)**		

Time	Position	Applicant's Actions or Behavior
		Plant Response: • Controlling NR Tave digital display reads ≈ 596.4°F • Controlling Tave Chessell dislplay reads ≈ 596.4°F • 1SA-2/B4 (RC Average Temperature High/Low) • Controls will insert and FDW flow will increase • RCS pressure will decrease
		Crew Response: • When the Statalarms are received, the candidates should utilize the "Plant Transient Response" process to stabilize the plant.
	OATC	• 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. (decrease FDW)
		Note: The OATC will have to reduce FDW in order to stabilize power below the pre-transient level.
	SRO	• The CRS should: ➢ Refer to AP/28, ICS Instrument Failures ➢ Ensure SPOC is contacted to repair the failed instrument.
		<u>AP/28, ICS Instrument Failures</u> 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.*** 4.2 Initiate notification of the following: • OSM to reference the following: • OMP 1-14 (Notifications) • Emergency Plan • STA

This event is complete when ICS is returned to AUTO, or as directed by the Lead Examiner.

Op-Test No.: 1 Scenario No.: 1 Event No.: 2 Page 2 of 5

Event Description: **Controlling Tave Fails HIGH (596ºF)**

Time	Position	Applicant's Actions or Behavior
		Crew Response:
		AP/28, ICS Instrument Failures (Cont)
	SRO/OATC	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/28 Section 4A RCS Temperature Failure

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.

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. 4.4 (Placing ICS Stations To Auto).

Examiner Note: The Tave instrument will be repaired and ICS returned to AUTO.

This event is complete when ICS is returned to AUTO, or as directed by the Lead Examiner.

Op-Test No.: 1 Scenario No.: 1 Event No.: 2 Page 3 of 5

Event Description: **Controlling Tave Fails HIGH (596ºF)**

Time	Position	Applicant's Actions or Behavior
		OP/1/A/1102/004A Encl. 4.4 Placing ICS Stations in Auto
		1. Initial Conditions
	SRO/OATC	1.1 Verify CTP $\geq$ 3%
		1.2 Review PT/0/A/1103/020 (Power Maneuvering Predictions) to determine current mechanical maneuvering rates. (R.M.)
		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 and 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).
		1.6 Review Limits and Precautions.
		NOTE: • CTP will **NOT** change while placing ICS stations in Auto. All ICS stations must be in auto before adjusting setpoints back to normal values. (R.M.) • Steps in Section 2 (Procedure) must be performed in sequence. (R.M.)
		2. Procedure
		2.1 Ensure "RATE SET" thumbwheels at 0.0.
		2.2 IF TURBINE MASTER is in "HAND", perform Section 3 (Placing Turbine to Auto). **(N/A)**
		2.3 IF either TBV is in "HAND", perform Section 4 (Placing TBV to Auto). **(N/A)**
		2.4 IF REACTOR MASTER **OR** DIAMOND is in manual, perform Section 5 (Placing Rx to Auto). Page 8
		2.5 IF DELTA Tc is in "HAND", perform Section 6 (Placing DELTA Tc to Auto). **(N/A)**
		2.6 IF STM GENERATOR MASTER or either FDW MASTER is in "HAND", perform Section 7 (Placing FDW to Auto). Page 9

This event is complete when ICS is returned to AUTO, or as directed by the Lead Examiner.

Op-Test No.: 1 Scenario No.: 1 Event No.: 2 Page 4 of 5

Event Description: **Controlling Tave Fails HIGH (596ºF)**

Time	Position	Applicant's Actions or Behavior
	SRO/OATC	**OP/1/A/1102/004A Encl. 4.4 (Section 5, Placing Rx to Auto)** **5. Placing Rx to Auto** 5.1 IF Rx Master is in "HAND", perform the following: **(N/A)** A. Ensure DIAMOND is in "MANUAL". B. Place REACTOR MASTER in AUTO. 5.2 IF both SGs are off of Level Control, perform the following: A. IF selected Tave (O1E2086) is different from Tave setpoint (O1A2087) by more than ± 0.15°F, perform the following: 1. Simultaneously perform the following: a) Ensure 1A FDW MASTER in "HAND" b) 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. 2. On REACTOR MASTER, cycle Tave setpoint selector between 565°F and 585°F five times. 3. IF Star Module failed, perform the following: **(N/A)** a) Initiate Work Request to repair Star Module. b) WHEN Star Module repaired, continue procedure. 4. On REACTOR MASTER adjust Tave setpoint (O1E2087) towards selected Tave (O1E2086). B. Verify selected Tave is within ± 0.15°F of Tave setpoint. 5.3 IF either SG is on Level Control, adjust Tave setpoint (O1E2087) to 579°F. **(N/A)** 5.4 Place DIAMOND in "AUTO". 5.5 Return to Section 2 (Procedure).

This event is complete when ICS is returned to AUTO, or as directed by the Lead Examiner.

Op-Test No.: 1 Scenario No.: 1 Event No.: 2 Page 5 of 5

Event Description: **Controlling Tave Fails HIGH (596ºF)**

Time	Position	Applicant's Actions or Behavior
		OP/1/A/1102/004A Encl. 4.4 (Section 7, Placing FDW to Auto)
	SRO/OATC	**7. Placing FDW to Auto**
		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:
		A. Perform the following:
		1. Select 1A FDW MASTER to "MEAS VAR"
		2. Select 1B FDW MASTER to "MEAS VAR"
		B. IF both 1A **AND** 1B FDW Master Measured Variables are on the caret:
		1. Select 1A FDW MASTER to "POS"
		2. Select 1B FDW MASTER to "POS"
		C. Simultaneously perform the following:
		1. Ensure 1A FDW MASTER in "AUTO"
		2. Ensure 1B FDW MASTER in "AUTO"
		D. IF 1A **OR** 1B FDW Master Measured Variable is **NOT** on the caret, perform the following: **(N/A)**
		7.3 Return to Section 2 (Procedure).

This event is complete when ICS is returned to AUTO, or as directed by the Lead Examiner.

Op-Test No.: 1	Scenario No.: 1	Event No.: 3	Page 1 of 6
Event Description: **High Oil Level on 1A2 RCP**			

Time	Position	Applicant's Actions or Behavior
	SRO/BOP	**Plant Response:** • OAC alarm O1A2035 (RCP 1A2 MTR LOWER OIL POT LEVEL) **Crew Response:** Refer to Alarm Response Guide for O1A2035 (RCP 1A2 MTR LOWER OIL POT LEVEL) **(same guidance for HI and HIHI alarms)** 1) If RCP operating: GO TO AP/1/A/1700/016 (Abnormal Reactor Coolant Pump Operation) **<u>AP/1/A/1700/016, Abnormal RCP Operation</u>** **Examiner Note: Because of the nature of this event, the procedure flow path may skip forward and /or return to previous steps not taken earlier. For this reason, the steps are listed in order.** 4.1 **IAAT** <u>any</u> RCP meets immediate trip criteria of Encl 5.1 (RCP Immediate Trip Criteria), **THEN** perform Steps 4.2 - 4.11. **RNO: GO TO** Step 4.12 4.2 Verify MODE 1 <u>or</u> 2. 4.3 Verify Rx power is $\leq$ 70% as indicated on <u>all</u> NIs. 4.4 Verify three RCPs will remain operating after <u>affected</u> RCP is tripped. 4.5 Verify <u>any</u> SG on Low Level Limits. **RNO: GO TO** Step 8. 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 ΔTc. 4.11 **GO TO** Step 4.26. Page 13
This event is complete when actions to secure the 1A2 RCP are completed and LPSW isolated, or as directed by the Lead Examiner.		

Op-Test No.: 1 Scenario No.: 1 Event No.: 3 Page 2 of 6

Event Description: **High Oil Level on 1A2 RCP**

Time	Position	Applicant's Actions or Behavior
	SRO/BOP	**AP/1/A/1700/016 (Cont)**

Examiner Note: In step 4.12, the crew may conservatively decide to secure the RCP because the oil pot level is threatening to go offscale high. If so, they will proceed to step 4.13 and will not end up in Section 4C. This path or the path below are both acceptable.

4.12 **IAAT** either of the following apply:

- Any RCP approaching immediate trip criteria of Encl 5.1 (RCP Immediate Trip Criteria)
- It is desired to secure a RCP

THEN perform Steps 4.13 - 4.15.

RNO: GO TO Step 4.16

4.13 Verify Rx Power > 70%.

4.14 Initiate Encl 5.2 (Rapid Power Reduction). Page 15

4.15 **WHEN** Rx Power is < 70%, **THEN GO TO** Step 4.2.

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
	4A	Seal Failure
	4B	Abnormal Vibration
	4C	**High or Low Oil Pot Level**
	4D	Loss of Seal Return
	4E	Abnormal RCP Temperatures

This event is complete when actions to secure the 1A2 RCP are completed and LPSW isolated, or as directed by the Lead Examiner.

Op-Test No.: 1	Scenario No.: 1 Event No.: 3	Page 3 of 6
Event Description: **High Oil Level on 1A2 RCP**		

Time	Position	Applicant's Actions or Behavior
	SRO/BOP	**AP/1/A/1700/016, Section 4C** 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 12 Start trending RCP oil pot levels. (Turn-on Code "unitpump"RCPT3, example 1A2RCPT3) **NOTE** • RCP oil pot level indication range is +1.5 to -1.5 inches. • RCP motor oil pot temperatures and RCP motor guide bearing temperatures may be used to validate low oil pot level. {4} 13 **IAAT** oil pot level threatens to go off scale high or low for an operating RCP, **THEN** perform Steps 14 - 24. **RNO**: **GO TO** step 25 ***Examiner Note: 1A2 RCP lower oil pot level will continue to increase until it goes off scale high.*** 14 Verify MODE 1 or 2. 15 Verify three RCPs will remain operating after affected RCP is tripped. 16 Verify Rx power is ≤70% as indicated on all NIs. **RNO:** 1. Direct an RO to initiate Encl 5.2 (Rapid Power Reduction) Page 15 2. WHEN Rx power is < 70% on all NIs, THEN continue with this procedure. 17 Verify any SG on Low Level Limits. **RNO: GO TO** Step 20. ***Examiner Note: STATALARMS 1SA-07/D-8 (1A2 RCPMP Trip), 1SA-02/A-3 (RC Loop A Flow Low), & 1SA-02/A-5 (RC Total Flow Low) will alarm when the 1A2 RCP is stopped.*** 20 Verify FDW masters in Auto. 21 Stop the affected RCP. 22 Verify ICS re-ratios feedwater to establish desired ΔTc. ***Examiner Note: Feedwater will re-ratio correctly to maintain 0°F ΔTc.***

This event is complete when actions to secure the 1A2 RCP are completed and LPSW isolated, or as directed by the Lead Examiner.

Op-Test No.: 1 Scenario No.: 1 Event No.: 3 Page 4 of 6

Event Description: **High Oil Level on 1A2 RCP**

Time	Position	Applicant's Actions or Behavior
	SRO/BOP	**AP/1/A/1700/016, Section 4C (Cont)** 23 Initiate Encl 4.3 (Special Instructions for < 4 RCP Operation) of OP/1/A/1102/004 (Operation at Power). Page 52 24 Make 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. 25 **IAAT** an RB fire exists, **THEN** perform Steps 26 - 29. **RNO: GO TO** Step 30 30 **IAAT** either of the following conditions is met: • a RCP with low oil level has been shut down for ≥3 hours, • **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) 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 **WHEN** conditions permit, **THEN EXIT** this procedure. **AP/1/A/1700/016, Continued at step 4.26** 4.26 Initiate Encl 4.3 (Special Instructions for < 4 RCP Operation) of OP/1/A/1102/004 (Operation at Power). Page 52 4.27 **IAAT** a RCP with low oil level 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)

This event is complete when actions to secure the 1A2 RCP are completed and LPSW isolated, or as directed by the Lead Examiner.

Op-Test No.: 1	Scenario No.: 1	Event No.: 3	Page 5 of 6
Event Description: **High Oil Level on 1A2 RCP**			

Time	Position	Applicant's Actions or Behavior
	SRO/BOP	**<u>AP/1/A/1700/016, Section 4C (Cont)</u>** 4.28 **IAAT** <u>either</u> of the following has exceeded 260 ^{o}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 <u>and</u> elastomer damage. 4.29 **IAAT** a RCP has been tripped due to exceeding Immediate Trip Criteria on a RCP <u>motor</u>, **THEN** contact RCP engineer prior to restart. 4.30 **WHEN** conditions permit, **THEN EXIT** this procedure.

This event is complete when actions to secure the 1A2 RCP are completed and LPSW isolated, or as directed by the Lead Examiner.

Op-Test No.: 1 Scenario No.: 1 Event No.: 3 Page 6 of 6

Event Description: **High Oil Level on 1A2 RCP**

Time	Position	Applicant's Actions or Behavior
	SRO/BOP	**AP/1/A/1700/016, Encl 5.2**
		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.
		NOTE Maximum Runback can be stopped if necessary by deselecting the MAXIMUM RUNBACK pushbutton.
		2 Initiate MAXIMUM RUNBACK to < 70% as indicated by all NIs.
	SRO	***Examiner Note: The SRO should enter TS 3.10.1 Conditions A, B, C, D, and E once power decreases below 85% due to inadequate decay heat.***
		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 following pumps: • 1E1 HTR DRN PUMP • 1E2 HTR DRN PUMP
		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.

This event is complete when actions to secure the 1A2 RCP are completed and LPSW isolated, or as directed by the Lead Examiner.

Op-Test No.: 1 Scenario No.: 1 Event No.: 4 Page 1 of 4

Event Description: **(1HP-5 fails CLOSED) Restore Letdown**

Time	Position	Applicant's Actions or Behavior
		Plant Response:
		OAC alarm: HPI LETDOWN FLOW
		Letdown flow = 0 gpm
		1HP-5 indicates closed
		Crew Response:
	SRO	SRO should enter AP/1/A/1700/032 (Loss of Letdown)
		<u>AP/32 Loss of Letdown</u>
		<u>NOTE</u> This AP may be performed by an RO if the EOP is also in progress. The procedure Director should resume directing the actions of this AP as soon as EOP actions allow.
	BOP	4.1 Place 1HP-120 in HAND and reduce demand to zero.
		4.2 Position the standby HPI pump switch to OFF.
		<u>CAUTION</u> RCP individual seal return valves will close if seal injection is < 22 gpm with CC flow < 575 gpm.
		4.3 Throttle 1HP-31, preferably in AUTO, to establish SEAL INLET HDR FLOW to the appropriate value:

	CC TOTAL FLOW	Throttle HPI Seal flow to:
	> 575 gpm	12-15 gpm
	$\leq$ 575 gpm	24-25 gpm

Time	Position	Applicant's Actions or Behavior
		<u>NOTE</u> The running HPI pump may operate below 65 gpm for up to 4 hours. HPI pump time of operation below minimum flow is cumulative.
		4.4 Verify HPI pump flow ≥ 65 gpm. ***Note: Flow will be < 65 gpm.*** <u>30</u> gpm + ___ +___ = ___ gpm (Recirc SI MU)
		RNO: Log beginning time for HPI pump flow below minimum.
		4.5 Initiate makeup to LDST as required.

This event is complete when the Standby HPI pump is placed in AUTO, or as directed by the Lead Examiner.

Op-Test No.: 1	Scenario No.: 1	Event No.: 4	Page 2 of 4
Event Description:	**(1HP-5 fails CLOSED) Restore Letdown**		

Time	Position	Applicant's Actions or Behavior
	SRO/ BOP	**Crew Response:** **<u>AP/32, Loss of Letdown (Cont)</u>** 4.6 Initiate notification of the following : • OSM to reference the following: ○ OMP 1-14 (Notifications) ○ Emergency Plan • STA 4.7 Verify 1HP-5 closed. 4.8 Dispatch an operator to 1HP-5 (Letdown Isolation) (East Pen Rm) to establish communication with Control Room. **<u>NOTE</u>** Tech Spec 3.4.9 applies when indicated Pzr level > 260” (corrected value for 285”). Conditions where it is known that letdown CANNOT be restored do not require waiting until 260” to begin a Rapid Shutdown. 4.9 **IAAT** either of the following exist: • Pzr level > 260”, **AND** letdown **CANNOT** be established • Plant conditions exist such that letdown will **NOT** be restored **THEN** initiate unit shutdown per AP/29 (Rapid Unit Shutdown). 4.10 **IAAT** Pzr level > 375”, **THEN** trip Rx. 4.11 Determine the cause of loss of letdown **AND GO TO** designated mitigation Step:

	Reason for Loss of Letdown	GO TO Step
	1HP-5 failed closed	**4.12**
	-Actual LD Temp high -LD interlock failure -LD line leak -Both LD Coolers isolated -Other	4.28

4.12 Close 1HP-6.

4.13 Close 1HP-7.

This event is complete when the Standby HPI pump is placed in AUTO, or as directed by the Lead Examiner.

Op-Test No.: 1	Scenario No.: 1	Event No.: 4	Page 3 of 4
Event Description:	**(1HP-5 fails CLOSED) Restore Letdown**		

Time	Position	Applicant's Actions or Behavior
	SRO/ BOP	**Crew Response:** **<u>AP/32, Loss of Letdown (Cont)</u>** 4.14 Open 1HP-5 (**Will <u>NOT</u> open from the control room).** **RNO:** 1 Notify operator dispatched to 1HP-5 to: A Manually open 1HP-5 (LETDOWN ISOLATION)(East Pen Rm). ***1HP-5 DOES open locally*** B Maintain continuous communication with Control Room. 2 **IF** 1HP-5 is manually open, **THEN** enter TS 3.6.3. (**see next page**) 4.15 Place the CC system in operation. 4.16 Verify letdown temperature < 135 °F. 4.17 Throttle open 1HP-7 to establish ~ 20 gpm. 4.18 **WHEN** letdown temperature < 190 °F, **THEN** place LETDOWN HI TEMP INTLK BYP switch in NORMAL. 4.19 Open 1HP-6 4.20 Adjust 1HP-7 to control desired letdown flow. 4.21 Re-establish normal makeup through 1HP-120. ***Note: Normal makeup may include placing 1HP-120 in AUTO.*** 4.22 Verify <u>any</u> purification IX in service. 4.23 Notify SPOC to initiate repairs on 1HP-5. 4.24 Re-establish normal RCP seal injection flow. 4.25 Position the standby HPI pump switch to AUTO. 4.26 **WHEN** repairs are compete on 1HP-5 (LETDOWN ISOLATION) (East Pen Rm), **THEN** perform the following: • Locally turn 1HP-5 handwheel fully clockwise. • **EXIT** TS 3.6.3. 4.27 **EXIT**. ***Examiner Note: 1HP-5 will not be repaired for this scenario.***

This event is complete when the Standby HPI pump is placed in AUTO, or as directed by the Lead Examiner.

Op-Test No.: 1 Scenario No.: 1 Event No.: 4 Page 4 of 4

Event Description: **(1HP-5 fails CLOSED) Restore Letdown**

Time	Position	Applicant's Actions or Behavior
	SRO/BOP	**Crew Response:** **<u>AP/32, Loss of Letdown (Cont)</u>** **Examiner Note: If pressurizer level exceeds 260 inches, TS 3.4.9 Condition A should be entered requiring level be restored within 1 hour** The SRO enters TS 3.6.3 Containment Isolation Valves, Condition A due to one or more penetration flow paths with one containment isolation valve inoperable Required Action is to isolate the affected penetration flow path by use of at least one closed and de-activated automatic valve, one closed and de-activated non-automatic power operated valve, closed manual valve, blind flange, or check valve with flow through the valve secured within 4 hours **AND** verify the affected penetration flow path is isolated once per 31 days for isolation devices outside containment. **(TS allows the valve to be open under administrative controls)**

This event is complete when the Standby HPI pump is placed in AUTO, or as directed by the Lead Examiner.

Op-Test No.: 1 Scenario No.: 1 Event No.: 5 Page 1 of 4

Event Description: **Inadvertent DLPIAS actuation**

Time	Position	Applicant's Actions or Behavior
		Plant Response: • 1SA-01/E-11, Diverse LPI Trip • 1SA-07/D-3, ES ODD VOTERS TROUBLE • 1SA-07/E-3, ES EVEN VOTERS TROUBLE • DLPIS red pushbutton Illuminated • LPI Pumps start • LPI injection aligned • LPSW Pumps start
	SRO/OATC	**Crew Response:** **ARG: 1SA-01/E-11, Diverse LPI Trip** 3.1 Determine if DLPIAS condition exists (RCS pressure ≤ 462 psig). 3.2 **IF** RCS pressure is ≤ 462 psig, Go To EP/1/A/1800/001 (Emergency Operating Procedure). 3.3 **IF** ES condition does **NOT** exist, Initiate AP/1/A/1700/042 (Inadvertent ES Actuation). 3.4 Refer to OP/1/A/1105/014 (Control Room Instrumentation Operation And Information). **AP/1/A/1700/042, Inadvertent ES Actuation** 4.1 Verify any of the following have inadvertently actuated: • Diverse HPI • ES Channel 1 • ES Channel 2 **RNO: GO TO** Step 4.4 4.4 Verify any of the following have inadvertently actuated: • ES Channel 5 • ES Channel 6 **RNO:** 1. **IF** ES Channel 1, ES Channel 2, or Diverse HPI have inadvertently actuated, **AND** it is desired to restore letdown, **THEN** initiate AP/42 Encl 5.2 (Letdown Restoration). 2. **GO TO** Step 4.10. 4.10 Close the following: • 1HP-24 • 1HP-25

This event is complete when Enclosure 5.1 is completed and TS/SLCs have been addressed IAW step 4.25, or as directed by the Lead Examiner.

Op-Test No.: 1 Scenario No.: 1 Event No.: 5 Page 2 of 4

Event Description: **Inadvertent DLPIAS actuation**

Time	Position	Applicant's Actions or Behavior
	SRO/OATC	**AP/42, Inadvertent ES Actuation (Cont)**

NOTE
If personnel are available, progression should continue while Encl 5.1 (Required Operator Actions) is in progress.

4.11 Ensure AP/42 Encl 5.1 (Required Operator Actions) is in progress. **Page 23**

4.12 Verify any of the following have inadvertently actuated:

- Diverse LPI
- ES Channel 3
- ES Channel 4

4.13 Verify Diverse LPI has inadvertently actuated.

Examiner Note: Placing Diverse LPI in BYPASS will give you 1SA-01 E-10 statalarm. This is an expected alarm.

4.14 Ensure DIVERSE LPI BYPASS is in BYPASS

4.15 Perform the following on all inadvertently actuated system(s):

- Ensure ES CH-3 is in MANUAL (**does not apply**)
- Ensure ES CH-4 is in MANUAL (**does not apply**)

4.16 Verify LPI was aligned in decay heat removal mode prior to ES actuation.

RNO: 1. Stop the following:

- 1A LPI PUMP
- 1B LPI PUMP

2. Simultaneously close the following:

- 1LP-17
- 1LP-18

4.17 Verify the Rx is critical.

CAUTION
Do **NOT** add demin water to counter the boration until RCS boron concentration stabilizes to prevent a positive reactivity event.

Note: The crew may initiate EOP Encl 5.5 for inventory control. These steps are included beginning on page 36 if necessary.

This event is complete when Enclosure 5.1 is completed and TS/SLCs have been addressed IAW step 4.25, or as directed by the Lead Examiner.

Op-Test No.: 1 Scenario No.: 1 Event No.: 5 Page 3 of 4

Event Description: **Inadvertent DLPIAS actuation**

Time	Position	Applicant's Actions or Behavior
		AP/42, Inadvertent ES Actuation (Cont)
		NOTE ICS in Auto means ICS is in control of Tave and Rx power.
	SRO/OATC	4.18 Verify ICS in Auto 4.19 Verify control rods are outside the desired control band **(they are not)** **RNO: GO TO** Step 4.21 4.21 Verify <u>any</u> of the following have <u>inadvertently actuated</u>: • ES Channel 1 • Diverse HPI **RNO: GO TO** Step 4.24 4.24 Notify SPOC to investigate <u>and</u> repair the cause of the inadvertent ES actuation, as necessary. 4.25 Initiate logging TS/SLC Entry/Exit, as applicable, in accordance with Encl 5.4 (TS/SLC Requirements). ***Examiner Note: If OAC alarm is received for LPSW leakage accumulator level, TS 3.7.7 CONDITION B (7 days) will apply due to LPSW leakage accumulator alarm.*** ***SLC 16.7.6 (Diverse Actuation Systems) will apply due to the automatic actuation logic being blocked if any Diverse Actuation system in OVERRIDE or BYPASS. CONDITION A (7 days)*** ***If the RB RIA's isolated during this event TS.3.4.15 Condition B would be entered until unisolated in* AP/42 Encl 5.1 at step 9** 4.26 **WHEN** <u>all</u> the following exist: • Reason for inadvertent ES Channel <u>or</u> Diverse HPI/LPI actuation has been resolved • ES Channel <u>or</u> Diverse HPI/LPI reset is desired • OSM concurs **THEN** continue.

This event is complete when Enclosure 5.1 is completed and TS/SLCs have been addressed IAW step 4.25, or as directed by the Lead Examiner.

Op-Test No.: 1 Scenario No.: 1 Event No.: 5 Page 4 of 4

Event Description: **Inadvertent DLPIAS actuation**

Time	Position	Applicant's Actions or Behavior
	SRO/BOP	**AP/42 Enclosure 5.1, Required Operator Actions** 1 Initiate announcement of AP Entry using the PA system. **NOTE** If channels are bypassed or in override, 1SA-1/A-10 (ES 1 Trip) and 1SA-1/B-10 (ES 2 Trip) will be off even though the channel may have actuated. 2 Verify any of the following have inadvertently actuated: • Diverse HPI • ES Channel 1 • ES Channel 2 **RNO: GO TO** Step 5 5 Verify any of the following have inadvertently actuated: • ES Channel 7 • ES Channel 8 **RNO: GO TO** Step 9 9 Perform the following: A. Open the following to restore RB RIAs: • 1PR-7 • 1PR-8 • 1PR-9 • 1PR-10 B. From the ENABLE CONTROLS screen on the RIA View Node, perform the following: 1) Select OFF for RB RIA sample pump. 2) Start the RB RIA sample pump. 10 Verify any of the following have inadvertently actuated: • Diverse HPI • ES Channel 1 **RNO: GO TO** Step 12 12 **EXIT** this enclosure. ***Examiner Note: If time permits, the BOP may refer to the ARGs for 1SA-07/D-3 and 1SA-07/E-3. Both ARGs will lead him to go to the ES Cabinets to see if there are any abnormal indications.*** ***Examiner Note: There are no flashing lights or abnormal indications on either the Even or Odd Voters. (Both of those alarms have cleared by this point in the event)***

This event is complete when Enclosure 5.1 is completed and TS/SLCs have been addressed IAW step 4.25, or as directed by the Lead Examiner.

Op-Test No.: 1 Scenario No.: 1 Event No.: 6 Page 1 of 1

Event Description: **Main Turbine fails to trip (lockout EHC Pumps) (occurs with Event 7)**

Time	Position	Applicant's Actions or Behavior
	SRO OATC	**Plant Response:** • 1SA-9/A-6, RB Reactor Building Normal Sump Level High/Low • 1SA-1/A-1, B-1, C-1, D-1, RP Channel Trip • 1SA-2/D-3, RC Press High/Low • ES 1-8 actuate • SCM indicates 0, then superheat • The LBLOCA will result in a reactor trip. • The Main Turbine should trip but does not. This will result in a reduction of steam pressure in both SGs until actions are taken to trip the turbine. This will result in RCS overcooling until the turbine is tripped. **Crew Response:** The SRO will direct the OATC to perform Immediate Manual Actions (IMAs): 3.1 Depress REACTOR TRIP pushbutton. 3.2 Verify reactor power < 5% FP and decreasing. 3.3 Depress turbine TRIP pushbutton.
	OATC	***Examiner Note: The turbine will fail to trip requiring the OATC to place EHC pumps in Pull To Lock (PTL). This will cause the turbine valves to close.*** 3.4 Verify all turbine stop valves closed. **RNO:** Place both EHC Pumps in Pull to Lock 3.5 Verify RCP seal injection available.

This event is complete when the EHC pumps are in pull to lock and the turbine has tripped or as directed by the Lead Examiner.

Op-Test No.: 1 Scenario No.: 1 Event No.: 7 Page 1 of 11

Event Description: **LBLOCA, 1A and 1B LPI pumps fail to start, 1A1 RCP will not trip with the switch, Main Turbine fails to trip**

Time	Position	Applicant's Actions or Behavior
	SRO BOP	The SRO will direct the BOP to perform a Symptoms Check **(OMP 1-18)** • Reactivity Control ➢ Power Range NIs < 5% and decreasing • ICC/Loss of Subcooling Margin (SCM) ➢ If any SCM ≤ 0°F, perform Rule 2 ***Examiner Note: SCM will decrease to 0°F requiring the performance of Rule 2.*** Page 33 • Loss of Heat Transfer (LOHT) ➢ Loss of Main and Emergency FDW (including unsuccessful manual initiation of EFDW) • Excessive Heat Transfer (EHT) ➢ Uncontrolled Main Steam Line(s) pressure decrease • Steam Generator Tube Rupture ➢ CSAE off-gas alarms, process RIAs (RIA-40, 59, 60), area RIAs (RIA-16/17)

This event is complete when the SRO has transferred to the LOCA CD Tab or as directed by the Lead Examiner.

Op-Test No.: 1 Scenario No.: 1 Event No.: 7 Page 2 of 11

Event Description: **LBLOCA, 1A and 1B LPI pumps fail to start, 1A1 RCP will not trip with the switch, Main Turbine fails to trip**

Time	Position	Applicant's Actions or Behavior
	SRO	**Crew response:** After verifying IMAs, the SRO will transfer to the **Subsequent Actions Tab** and review the Parallel Action page. Page 55 ***Examiner Note: Core SCM will indicate 0 °F or superheated (- XX) during this transient depending on when CFTs inject or when the C LPI pump injects. When the SRO reaches the decision point in the SA parallel action page, if superheated he should transfer to the Inadequate Core Cooling (ICC) tab (below) or if saturated, he should transfer to the Loss of Subcooling Margin (LOSCM) tab Page 29.*** The SRO will direct one of the ROs to perform Enclosure 5.1 (ES Actuation) Page 44
	SRO BOP/OATC	**ICC Tab** (Parallel Actions Page 56) **CAUTION** ICC conditions should not exist unless multiple equipment and system failures have occurred. Some of the equipment used in this section may be the same equipment that has failed. It is expected that attempts to restore equipment operations will continue throughout this section. It is also expected that transition to OSAG will occur whenever conditions requiring the transition exist.. 1. **IAAT** CETCs > 1200 ºF, **AND** TSC is ready to provide mitigation guidance, **THEN**: A. Notify TSC to enter the OSAG. B. **EXIT** this procedure. 2. Ensure full HPI and control per Rule 6 (HPI). Page 51 3. **IAAT** RCS pressure is ≤ 550 psig, **OR** RB pressure is ≥ 3 psig, **THEN** perform Steps 4-8. 4. Open: • 1LP-21 • 1LP-17

This event is complete when the SRO has transferred to the LOCA CD Tab or as directed by the Lead Examiner.

Op-Test No.: 1 Scenario No.: 1 Event No.: 7 Page 3 of 11

Event Description: **LBLOCA, 1A and 1B LPI pumps fail to start, 1A1 RCP will not trip with the switch, Main Turbine fails to trip**

Time	Position	Applicant's Actions or Behavior
	SRO BOP/OATC	**Crew response:** **ICC Tab (Cont)** 5. Start 1A LPI pump. (***The 1A LPI pump will fail to start.)*** **RNO**: 1. **IF** 1C LPI Pump is operating, **THEN GO TO** Step 8. 2. Close 1LP-17. 6. Open: • 1LP-22 • 1LP-18 7. Start 1B LPI pump. (***The 1B LPI pump will fail to start).*** **RNO**: 1. **IF** 1C LPI Pump is operating, **THEN GO TO** Step 8. 2. Close 1LP-18 8. Verify two LPI pumps operating. **RNO:** IF LPI/HPI piggyback is aligned, THEN maximize total LPI flow by throttling HPI flow as follows: • 1C LPI pump only < 2900 gpm • 1A or 1B LPI pump only < 3100 gpm 9. **IAAT** all exist: • 1C LPI Pump off • 1C LPI Pump available • LPI required • ECCS pump suction aligned to BWST • 1A LPI Pump unavailable • 1B LPI Pump unavailable **THEN** perform Steps 10-13. **RNO: GO TO** step 14 10. Open: • 1LP-9 • 1LP-10 • 1LP-6 • 1LP-7 • 1LP-17 • 1LP-18 • 1LP-21 • 1LP-22

This event is complete when the SRO has transferred to the LOCA CD Tab or as directed by the Lead Examiner.

Op-Test No.: 1	Scenario No.: 1	Event No.: 7	Page 4 of 11
Event Description:	**LBLOCA, 1A and 1B LPI pumps fail to start, 1A1 RCP will not trip with the switch, Main Turbine fails to trip**		

Time	Position	Applicant's Actions or Behavior
		Crew response:
		<u>ICC Tab (Cont)</u>
	SRO ***CT-1***	11. Start 1C LPI Pump **(should already be started in Encl. 5.1** Page 44)
	BOP/OATC	12. Verify LPI supplying HPI pump suction through piggyback alignment. **RNO: GO TO** Step 14.
		13. Maximize <u>total</u> LPI flow < 2900 gpm by throttling <u>HPI</u> flow.
		14. Open: • 1CF-1 • 1CF-2
		15. **IAAT** core SCM is $\geq$ 0 ºF, **THEN GO TO** LOCA CD tab. ***Note: <u>Core</u> SCM will return to 0 ºF shortly after LPI flow has been established***.
		16. Verify any injection sources available: • HPI • LPI • CFTs
		17. Open: • 1RC-4 • PORV
		18. Locally close breakers: • 1SKJ-08 (1RC-155/1RC-156) • 1SKK-08 (1RC-157/1RC-158) • 1SKL-08 (1RC-159/1RC-160)
		19. Open: • 1RC-155 • 1RC-156 • 1RC-157 • 1RC-158 • 1RC-159 • 1RC-160

This event is complete when the SRO has transferred to the LOCA CD Tab or as directed by the Lead Examiner.

Op-Test No.: 1 Scenario No.: 1 Event No.: 7 Page 5 of 11

Event Description: **LBLOCA, 1A and 1B LPI pumps fail to start, 1A1 RCP will not trip with the switch, Main Turbine fails to trip**

Time	Position	Applicant's Actions or Behavior
	SRO BOP/OATC	**Crew response:**

LOSCM Tab

1. Ensure Rile 2 (Loss of SCM) is in progress or complete.

2. Verify Station ASW feeding any SG.
   RNO: GO TO Step 4.

4. Verify LOSCM caused by excessive heat transfer.
   RNO: GO TO Step 6.

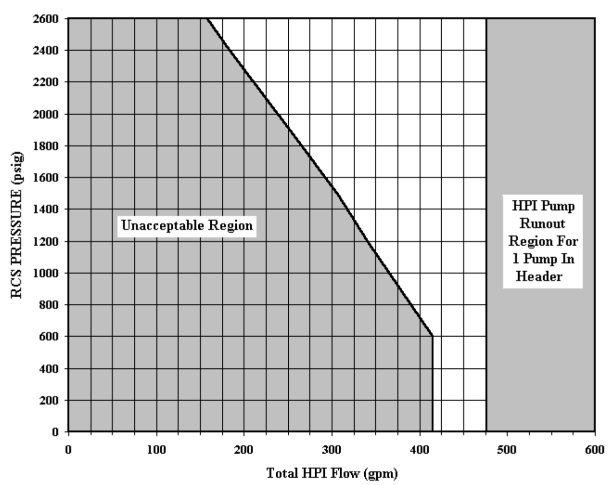
6. **IAAT** either exists:
   - LPI FLOW TRAIN A plus LPI FLOW TRAIN B ≥ 3400 gpm
   - Only one LPI header in operation with header flow ≥ 2900 gpm.

   THEN GO TO LOCA CD tab.

7. Verify SSF activated per AP/25 with SSF RC Makeup required.
   RNO: GO TO Step 9.

9. Verify all exist:
   - NO RCPs operating
   - HPI flow in both HPI headers
   - Adequate total HPI flow per Figure 1 (Total Required HPI Flow).

Figure 1
Total Required HPI Flow



10. **GO TO** Step 89.

This event is complete when the SRO has transferred to the LOCA CD Tab or as directed by the Lead Examiner.

Op-Test No.: 1	Scenario No.: 1	Event No.: 7	Page 6 of 11

Event Description: **LBLOCA, 1A and 1B LPI pumps fail to start, 1A1 RCP will not trip with the switch, Main Turbine fails to trip**

Time	Position	Applicant's Actions or Behavior
		Crew response:
		LOSCM Tab (Cont)
	SRO	89. Open 1AS-40 while closing 1MS-47
	BOP/OATC	90. Verify HPI forced cooling in progress. **RNO:** Close 1RC-4.
		91. Close: • 1GWD-17 • 1HP-1 • 1HP-2 • 1RC-3
		92. Verify either: • Core superheated • Rx vessel head level at 0”. **RNO: GO TO** Step 94.
		93. **GO TO** ICC tab. Page 26
		94. **IAAT** BWST level is ≤ 19’, **THEN** initiate Encl 5.12 (ECCS Suction Swap to RBES).
		CAUTION If TDEFDWP is being used for SG feed, reducing SG pressure below ~ 250 psig can result in reduced pumping capability.
		95. Maintain SG pressure < RCS pressure utilizing either: • TBVs • ADVs
		96. Verify any SG available for feeding/steaming.
		97. Initiate Encl 5.16 (SG Tube to Shell ΔT Control).
		98. Verify indications of SGTR exist. **RNO: GO TO** Step 101.

This event is complete when the SRO has transferred to the LOCA CD Tab or as directed by the Lead Examiner.

Op-Test No.: 1	Scenario No.: 1	Event No.: 7	Page 7 of 11

Event Description: **LBLOCA, 1A and 1B LPI pumps fail to start, 1A1 RCP will not trip with the switch, Main Turbine fails to trip**

Time	Position	Applicant's Actions or Behavior
		Crew response: **LOSCM Tab (Cont)**
	SRO BOP/OATC	101. Verify HPI forced cooling in progress. **RNO: GO TO** Step 103. **NOTE** If in boiler condenser cooling, the CETCs may have a saw tooth pattern, sometimes increasing and sometimes decreasing. The overall trend should be used to make this determination. 103. Verify CETCs trend decreasing. **RNO: GO TO** LOHT tab. 104. Verify primary to secondary heat transfer is excessive. **RNO: GO TO** Step 106. 106. Verify indications of SGTR $\geq$ 25 gpm. **RNO: GO TO** Step 108. 108. Verify required RCS makeup flow within normal makeup capability. **RNO: GO TO** LOCA CD tab. Page 32

This event is complete when the SRO has transferred to the LOCA CD Tab or as directed by the Lead Examiner.

Op-Test No.: 1	Scenario No.: 1	Event No.: 7	Page 8 of 11

Event Description: **LBLOCA, 1A and 1B LPI pumps fail to start, 1A1 RCP will not trip with the switch, Main Turbine fails to trip**

Time	Position	Applicant's Actions or Behavior
		Crew response:
		LOCA COOLDOWN Tab
	SRO	1. **IAAT** BWST level is ≤ 19', **THEN** initiate Encl 5.12 (ECCS Suction Swap to RBES).
	BOP/OATC	2. Verify ES actuated.
		3. **GO TO** Step 7.
		4. Verify two LPI pumps operating. **RNO: IF** any HPI pump is operating, **AND** LPI/HPI piggyback is aligned, **THEN** maximize total LPI flow < 3100 gpm by throttling HPI flow.
		5. Notify Unit 3 to start the following: • 3A Outside Air Booster Fan • 3B Outside Air Booster Fan
	CT-2	6. Start the following: **(should already be started in Encl. 5.1)** Page 44 • A Outside Air Booster Fan • B Outside Air Booster Fan
		7. Perform the following: • Ensure all RBCUs in low speed. • Open 1LPSW-18 • Open 1LPSW-21 • Open 1LPSW-24
		8. Initiate Encl 5.35 (Containment Isolation).
		9. Start all RB Aux fans.
		10. **IAAT** either of the following exists: • LPI FLOW TRAIN A plus LPI FLOW TRAIN B ≥ 3400gpm • Only one LPI header in operation with header flow ≥ 2900 gpm **THEN GO TO** Step 11.

This event is complete when the SRO has transferred to the LOCA CD Tab or as directed by the Lead Examiner.

Op-Test No.: 1 Scenario No.: 1 Event No.: 7 Page 9 of 11

Event Description: **LBLOCA, 1A and 1B LPI pumps fail to start, 1A1 RCP will not trip with the switch, Main Turbine fails to trip**

Time	Position	Applicant's Actions or Behavior
		Crew response: **<u>Rule 2 LOSCM</u>**
	SRO BOP/OATC	1. **IAAT** <u>all</u> exist: • Any SCM $\leq 0\ ^{o}F$ • Rx power $\leq$ 1% • $\leq$ 2 minutes elapsed since loss of SCM **THEN** perform Steps 2 and 3. 2. Stop <u>all</u> RCPs. ***1A1 RCP will not trip using the handswitch*** **RNO**: 1. Place 1TA AUTO/MAN switch in MAN. 2. Place 1TB AUTO/MAN switch in MAN. 3. Open 1TA SU 6.9 KV FDR. 4. Open 1TB SU 6.9 KV FDR. 3. Notify CR SRO of RCP status. 4. Verify Blackout exists. **RNO: GO TO** Step 6. 6. Open: • 1HP-24 • 1HP-25 7. Start <u>all available</u> HPI umps. 8. **GO TO** Step 13. 13. Open: • 1HP-26 • 1HP-27 14. Verify at least two HPI pumps are operating using two diverse indications. 15. **IAAT** $\geq$ 2 HPI pumps operating, **AND** HPI flow in <u>any</u> header is in the Unacceptable Region of Figure 1 **THEN** perform Steps16-21. **RNO: GO TO** Step 17

This event is complete when the SRO has transferred to the LOCA CD Tab or as directed by the Lead Examiner.

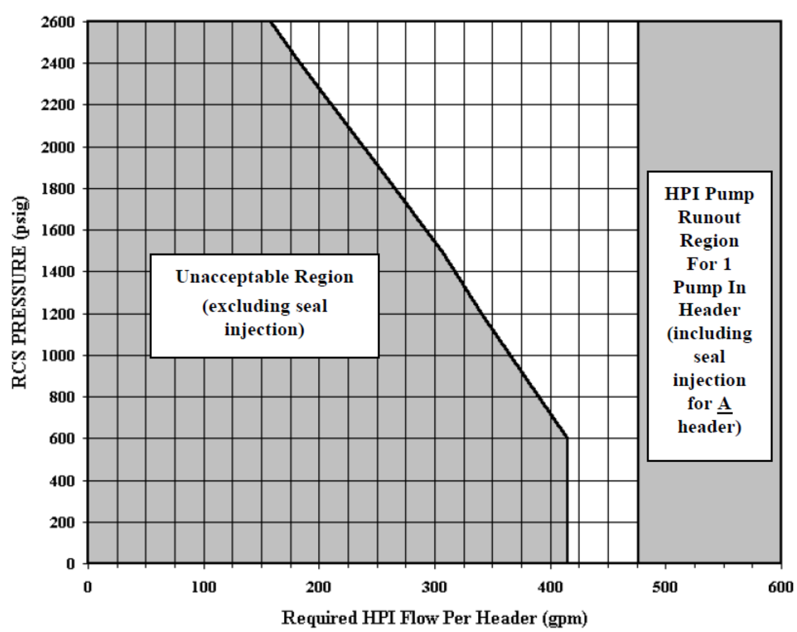
Op-Test No.: 1 Scenario No.: 1 Event No.: 7 Page 10 of 11

Event Description: **LBLOCA, 1A and 1B LPI pumps fail to start, 1A1 RCP will not trip with the switch, Main Turbine fails to trip**

Time	Position	Applicant's Actions or Behavior
		Crew response:
		<u>Rule 2 LOSCM (Cont)</u>
	SRO BOP/OATC	16. Open in the <u>affected</u> header:

	1A Header		1B Header
	1HP-410		1HP-409

Figure 1
Required HPI Flow Per Header



17. **IAAT** flow limits are exceeded,

Pump Operation	Limit
1HPI pump/hdr	475 gpm (incl. seal injection for <u>A</u> hdr)
1A & 1B HPI pumps operating with 1HP-409 open	Total flow of 950 gpm (incl. seal injection)

THEN perform Steps 18-20.
RNO: GO TO Step 21.

18. Place Diverse HPI in BYPASS.

This event is complete when the SRO has transferred to the LOCA CD Tab or as directed by the Lead Examiner.

Op-Test No.: 1 Scenario No.: 1 Event No.: 7 Page 11 of 11

Event Description: **LBLOCA, 1A and 1B LPI pumps fail to start, 1A1 RCP will not trip with the switch, Main Turbine fails to trip**

Time	Position	Applicant's Actions or Behavior
		Crew response:
	SRO	**<u>Rule 2 LOSCM (Cont)</u>**
	BOP/OATC	19. Perform <u>both</u>: • Place ES CH 1 in MANUAL. • Place ES CH 2 in MANUAL.
		20. Throttle HPI to maximize flow ≤ flow limit.
		21. Notify CR SRO of HPI status.
		22. Verify RCS pressure > 550 psig.
		23. **IAAT** either exists: • LPI FLOW TRAIN A <u>plus</u> LPI FLOW TRAIN B ≥ 3400 gpm • <u>Only one</u> LPI header in operations with header flow ≥ 2900 gpm **THEN GO TO** Step 24. **RNO: GO TO** Step 35.
		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.
		25. Notify crew that performance of Rule 3 is **NOT** required due to LBLOCA.
		26. **WHEN** directed by CR SRO, **THEN EXIT**.

This event is complete when the SRO has transferred to the LOCA CD Tab or as directed by the Lead Examiner.

EXAMINER NOTE

At any time during this scenario the operator may choose to use Enclosure 5.5 to maintain RCS inventory control. See excerpt below.

ENCLOSURE 5.5

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 (cont.)

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
6. I**AAT** 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 (cont.)

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.

Page 4 of 8

ENCLOSURE 5.5 (cont.)

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
10. **IAAT** LDST level **CANNOT** be maintained, **THEN** perform Step 11.	__ **GO TO** Step 132.
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 (cont.)

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 (cont.)

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 (cont.)

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 (cont.)

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.	

• • • END •

Enclosure 5.1
ES Actuation

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.

Step 1 table:

	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

Enclosure 5.1
ES Actuation

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.	__ **GO TO** Step 73.
8. __ Verify any RCP operating.	__ **GO TO** 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.	**GO TO** 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.	

Enclosure 5.1
ES Actuation

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 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}

18. **IAAT** any LPI pump is operating against a shutoff head, **THEN** at the CR SRO's discretion, stop affected LPI pumps. {6, 22}	
19. **IAAT** RCS pressure is < LPI pump shutoff head, **THEN** perform Steps 20 - 21.	**GO TO** 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.

Enclosure 5.1
ES Actuation

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
22. **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 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.	CT-1
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	CT-2
28. Notify Unit 3 to start: __ 3A OUTSIDE AIR BOOSTER FAN __ 3B OUTSIDE AIR BOOSTER FAN	

Enclosure 5.1
ES Actuation

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.	__ **GO TO** Step 36.
34. __ Close 2LPSW-139.	
35. __ Verify total LPSW flow to Unit 2 LPI coolers ≤ 6000 gpm.	__ Reduce LPSW to Unit 2 LPI coolers to obtain total LPSW flow ≤ 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.	

Enclosure 5.1
ES Actuation

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	__ **GO TO** 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.	**GO TO** Step 46.

<u>NOTE</u>

RBCU transfer to low speed will NOT occur until 3 minute time delay is satisfied.

45. Verify all 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.

Enclosure 5.1
ES Actuation

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
46. **IAAT** ES channels 7 & 8 have actuated, **THEN** perform Steps 47 - 48.	**GO TO** Step 49.
47. 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.
48. __ 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.
49. Notify U2 CR SRO that SSF is inoperable due to OTS1-1 open.	
50. Ensure any 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**.	

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.

OP/1/A/1102/004 Page 1 of 3

Enclosure 4.3

1. Initial Conditions

_____ 1.1 Review Limits and Precautions.

2. Procedure

_____ 2.1 **IF** conditions permit, log the current quadrant power tilt and the position of the ΔT_C 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

Enclosure 4.3

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.

NOTE:	The Maximum Allowed Power Setpoint (P_{max}) 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.)

Enclosure 4.3

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.

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."

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	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**

ICC EP/**1**/A/1800/001

Parallel Actions Page 1 of 1

CONDITION	ACTIONS	
1. All 4160V SWGR de-energized after ICC tab is entered {13}	**GO TO** Blackout tab.	**BLACKOUT**
2. Inadvertent ES actuation occurred	Initiate AP/1/A/1700/042 (Inadvertent ES Actuation).	**ES**
3. Valid ES actuation has occurred or should have	Initiate Encl 5.1 (ES Actuation).	**ES**
4. 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**
5. Individual available to make notifications	• Announce plant conditions using PA system. • Notify OSM to reference the Emergency Plan and NSD 202 (Reportability). • Notify plant staff that Emergency Dose Limits are in affect using PA system.	**NOTIFY and EDL**

LOSCM

Parallel Actions

EP/**1**/A/1800/001
Page 1 of 1

CONDITION		ACTIONS	
1.	PR NIs ≥ 5% FP 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.	Inadvertent ES actuation occurred	Initiate AP/1/A/1700/042 (Inadvertent ES Actuation).	**ES**
5.	Valid ES actuation has occurred or should have	Initiate Encl 5.1 (ES Actuation).	**ES**
6.	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**
7.	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**
8.	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

1. CT-1 (BWOG CT-4) Initiate LPI.

   Starting the C LPI pump and providing flow into the RCS when in a “Superheated” condition. Not performing this action will result in fuel barrier failure.

2. CT-2 (BWOG CT-27) Initiate Control Room Outside Air Booster Fans

   Starting the Outside Air Booster Fans within 30 minutes of the LOCA. Not performing this action could result in Control Room habitability issues.

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: 900	100% Power	100% Power
RCS Leakage: +.025 gpm (No WCAP action level)	EFDW Backup: Yes	EFDW Backup: Yes
RBNS Rate: .01 gpm		

Technical Specifications/SLC Items (CR SRO)

Component/Train	OOS Date/Time	Restoration Required Date/Time	TS/SLC #
AMSAC/DSS Bypassed	Today / 06:30	7 Days	SLC 16.7.2 Condition A & B

Shift Turnover Items (CR SRO)

Primary

- SASS in MANUAL for I&E testing
- AMSAC/DSS Bypassed for I&E testing

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.
- Control 1B FDWPT with Motor Speed Changer
- The BOP is to remove 1B MFDWP from the Hand Jack per OP/1/A/1106/002 B Encl. 4.13 beginning at Step 2.1. AO is stationed at the 1B MFDWP.
- The National Weather Service has issued a severe thunderstorm watch, effective for the next 4 hours for an area including Stephens County, Georgia: and Oconee, Pickens, and Anderson Counties of South Carolina.

Reactivity Management (CR SRO)

RCS Boron: 89 ppmB	Gp 7 Rod Position: 90%	R2 Reactivity Management Controls established in Control Room

Human Performance Emphasis (OSM)

Procedure Use and Adherence

ILT46

Facility: **Oconee** Scenario No.: **2** Op-Test No.: 1

Examiners: ____________ Operators: ____________ **SRO**

____________ ____________ **OATC**

____________ ____________ **BOP**

Initial Conditions:

- Reactor Power = 50% Unit 2: 100%, Unit 3: 100%

Turnover:

- SASS in manual for I&E
- AMSAC/DSS bypassed
- 1A and 1C HWPs operating

Event No.	Malfunction No.	Event Type*	Event Description
0a	Pre-Insert		SASS in Manual
0b	Pre-Insert		AMSAC/DSS bypassed for I&E testing
0c	Override		AFIS Disabled
1	Override	C, BOP, SRO	1A HWP Casing Water Level Low
2	MPI150	I: OATC, SRO **(TS)**	PZR “A” RTD Fails LOW (TS)
3	MSS200	C, BOP, SRO **(TS)**	Vacuum Leak
4	MPI 281	I: OATC, SRO	ΔT_C Controller Fails HIGH (‘A’ Loop Hot)
5	MPS020	R: OATC, SRO **(TS)**	55 gpm Pri-Sec leak in 1B SG requires Manual S/D
6		N: BOP, SRO	Encl 5.19 Control of Plant Equipment During Shutdown for SGTR (Transfer unit auxiliaries)
7	MEL220	M: ALL	1TA and 1TB lockout (Lose all RCPs)
8	MSS380	M; ALL	1A MSLB – Outside of the RB
9			

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

Op-Test No.: 1 Scenario No.: 2 Event No.: 1 Page 1 of 1

Event Description: **1A HWP Casing Water Level Low**

Time	Position	Applicant's Actions or Behavior
	SRO/BOP	**Plant Response:** • 1SA-9/C-5 HWP A CASING WATER LEVEL LOW **Crew Response:** Refer to **ARG 1SA-9/C-5** 3.1 **IF** '1A' HWP is in operation, then immediately: • Start a standby HWP. • Trip '1A' HWP. • Bypass Powdex. • 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. 3.4 **IF** HWP is in standby mode **AND** this alarm is actuated, **DO NOT** start pump until alarm condition has been determined and corrected.

This event is complete when the 1A HWP is tripped and Powdex Bypassed, or as directed by the Lead Examiner.

Op-Test No.: 1 Scenario No.: 2 Event No.: 2 Page 1 of 2

Event Description: **PZR 'A' RTD Fails LOW**

Time	Position	Applicant's Actions or Behavior
	SRO/OATC	***Booth Cue: Call the BOP to request the following: "This is the WCC SRO, I am performing the KEY Locker PT. I cannot locate one of the Unit 1 SD Bypass keys. Will you go ensure no keys were left in the Unit 1 RPS cabinets.*** (This will help to ensure the OATC will take actions for the PZR RTD failure) **Plant Response:** Statalarms: • OAC (RC PZR level 1&3 mismatch) • OAC (RC PZR level 2&3 mismatch) • 1SA-02/C-3 (RC Pressurizer Level High/Low) Board indications: • PZR level 1 and 2 indicates ≈ 150 inches • PZR level 3 indicates ≈ 223 inches and slowly increasing **Crew Response:** Refer to **ARG 1SA-02/C-3 (RC Pressurizer Level High/Low)**: 3.1 Check alternate PZR level indications.. 3.2 Check for proper Makeup/Letdown flows and adjust to restore proper level. **Evaluator Note**: The RO may take 1HP-120 to MANUAL to control Pzr level. If so, they should place it in AUTO after the failure is addressed. 3.1 Refer to the following procedures as required: • AP/1/A/1700/002 (Excessive RCS Leakage) • AP/1/A/1700/014 (Loss of Normal HPI M/U and/or RCP SI) • AP/1/A/1700/032 (Loss of Letdown) 3.4 Refer to Technical Specification 3.4.9, Pressurizer **(does not apply)** 3.5 Refer to Technical Specification 3.3.8, PAM Instrumentation. • **Condition A applies** 3.6 Refer to OP/1/A/1105/014 Control Room Instrumentation Operation And Information.
		This event is complete when PZR level 3 has been selected, or as directed by the Lead Evaluator.

Op-Test No.: 1	Scenario No.: 2	Event No.: 2	Page 2 of 2
Event Description:	**PZR 'A' RTD Fails LOW**		

Time	Position	Applicant's Actions or Behavior
		Crew Response:
	SRO/OATC	**<u>OP/1/A/1105/014 Enclosure 4.11 (SASS Information)</u>**
		3.2 SASS (Smart Automatic Signal Selector) Manual Operation
		3.2.1 **<u>IF</u>** "MISMATCH" light is on and "TRIP 'A'" or "TRIP 'B'" light is on, a SASS trip has occurred.
		A. Controlling signal will be signal selected from CR keyswitch (for parameters in ICS Cabinet #8).
		B. Select valid signal as controlling signal by positioning CR keyswitch or pushbutton for Pzr level to valid signal (for parameters in ICS Cabinet #8).
		3.2.2 **IF** "MISMATCH" light is on, a mismatch has occurred
		A. Controlling signal will be signal selected from CR keyswitch (for parameters in ICS Cabinet #8).
		B. Select valid signal as controlling signal by positioning CR keyswitch or pushbutton for Pzr level to valid signal (for parameters in ICS Cabinet #8). (**Select Pzr Level #3**)
		3.2.3 Initiate a Work Request to repair faulty signal
		Note: The SRO may direct an RO to select Pzr Level #3 prior to referencing OP/1/A/1105/014
		Note: If the SRO has not addressed the TS for this event, continue to next event and ask the TS as a follow up question.
		This event is complete when PZR level 3 has been selected, or as directed by the Lead Evaluator.

Op-Test No.: 1 Scenario No.: 2 Event No.: 3 Page 1 of 2

Event Description: **Vacuum leak**

Time	Position	Applicant's Actions or Behavior
	SRO/BOP	**Plant Response:** • 1SA-3/A-6, Condenser Vacuum Low (25" Hg) **Crew response:** **1SA-3/A-6, Condenser Vacuum Low** **3.1** Refer to AP/1/A/1700/027 **AP/1/A/1700/027 (Loss of Condenser Vacuum)** 4.1 Announce AP entry using the PA system. 4.2 **IAAT** both of the following apply: • Condenser vacuum ≤ 22″ Hg • MODE 1 or 2 **THEN** trip the Rx. 4.3 Dispatch operators to perform the following: • Perform Encl 5.1 (Main Vacuum Pump Alignment) • Look for vacuum leaks 4.4 Ensure all available Main Vacuum Pumps operating (A, B, & C). ***Booth Cue: After all MVPs are running, using TIME COMPRESSION, call the Control Room to notify the operator that the Main Vacuum Pumps are aligned to Unit 1.*** 4.5 Ensure 1V-186 is closed. 4.6 Ensure Steam to Steam Air Ejector A, B, C > 255 psig. 4.7 Verify Steam Seal Header Press > 1.5 psig. 4.8 Ensure all available CCW pumps operating.
	SRO	***Examiner Note: When the 4th CCW Pump is started, the LPSW Leakage Accummulator will alarm on the OAC requiring entry into TS 3.7.7 Condition B (Restore in 7 days).***

This event is complete when SRO reaches Step 4.10 of AP/027, or as directed by the lead examiner.

Op-Test No.: 1 Scenario No.: 2 Event No.: 3 Page 2 of 2

Event Description: **Vacuum leak**

Time	Position	Applicant's Actions or Behavior
		Booth Cue: Call Control Room as the AO sent out to look for vacuum leaks and report that a leak was found on the 1B Main FDW Pump pumping trap sight glass. ***The leak will be removed after the control room directs the AO to isolate the sight glass.*** 4.9 Verify Condensate flow ≥ 2300 gpm 4.10 **WHEN** condenser vacuum is stable, **AND** Encl 5.1 (Main Vacuum Pump Alignment) is complete, **THEN EXIT** this procedure ***Booth Cue: IF/when asked about the status of Encl. 5.1, respond that using time compression, Encl. 5.1 is complete.***

This event is complete when SRO reaches Step 4.10 of AP/027, or as directed by the lead examiner.

Op-Test No.: 1 Scenario No.: 2 Event No.: 4 Page 1 of 3

Event Description: **ΔT_C Controller Fails HIGH ('A' Loop hot)**

Time	Position	Applicant's Actions or Behavior
	SRO/OATC	**Plant Response:** • FDW flow will ratio incorrectly based on the failure • "A" FDW flow will increase causing "A" loop T_C to decrease. • "B" FDW flow will decrease causing "B" loop T_C to increase. • This will cause actual ΔT_C to increase (become more negative). Failure to adjust FDW flow will result in QPT. • 1SA-02/B-5, RC Cold Leg Diff. Temperature High, will actuate if actual ΔT_C increases to ± 5°F • 1SA-02/B-9 MS STM GEN 'A' LEVEL High/Low will actuate when SG Operating Level is ≥ 86% **Crew Response:** Crew should perform Plant Transient Response (PTR) • Diagnose the ΔT_C failure by observing the ΔT_C meter on 1UB1. It should return to zero but is staying at + 3.5 degrees. • Take the Diamond and Feedwater Masters to MANUAL and re-ratio feedwater using the Loop T_C meters and/or OAC (RCS01) to return actual ΔT_C to near zero. SRO may direct the BOP to reference Statalarm 1SA-02/B-5 (RC Cold Leg Diff Temperature High) SRO will refer to **AP/28 (ICS Instrument Failures)** **AP/28** 4.1 Provide control bands as required (per OMP 1-18 Attach 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 °F. • Current SG Outlet Pressure $\pm$ 10 PSIG • Delta Tc 0 °F $\pm$ 2 °F. 4.2 Initiate notification of the following: • OSM to reference OMP 1-14 • Emergency Plan • STA

This event is complete when the SRO reaches the WHEN step (4) in Section 4F, or as directed by the Lead Evaluator.

Op-Test No.: 1 Scenario No.: 2 Event No.: 4 Page 2 of 3

Event Description: **ΔT_C Controller Fails HIGH ('A' Loop hot)**

Time	Position	Applicant's Actions or Behavior
	SRO/OATC	**Crew Response:** **<u>AP/28 (Cont)</u>** 4.3 Verify a power transient ≥ 5% has occurred. 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 4.6 **GO TO** the applicable section per the following table: (√ | **Section** | **Failure**) (| 4F | Delta T_C) **AP/28 Section 4F, Delta Tc Failure** **<u>NOTE</u>** • This section applies to Delta T_C controller failures. T_C input signal failures are addressed in Section 4A The following may occur when an ICS Delta T_C controller fails: • Delta T_C controller may re-ratio loop FDW flows • Possible ICS RUNBACK 1. Ensure the following in HAND: • 1A FDW MASTER • 1B FDW MASTER • DELTA T_C

This event is complete when the SRO reaches the WHEN step (4) in Section 4F, or as directed by the Lead Evaluator.

Op-Test No.: 1 Scenario No.: 2 Event No.: 4 Page 3 of 3

Event Description: **ΔT_C Controller Fails HIGH ('A' Loop hot)**

Time	Position	Applicant's Actions or Behavior
	SRO/OATC	**Crew Response:** **<u>AP/28 (Cont)</u>** **<u>CAUTION</u>** <u>Total</u> feedwater flow should be maintained constant while individual loop flows are adjusted to establish the desired ΔTc. Maintaining total flow constant will prevent unwanted changes in reactor power 2. Re-ratio feedwater flow, as required, to establish desired DELTA T_C while maintaining total feedwater flow constant 3. Notify SPOC to perform the following: Investigate <u>and</u> repair the failed Delta T_C controller ***Booth Cue: When notified to investigate and repair the failed ΔT_C controller, respond as SPOC and state that the ΔT_C controller will be repaired as soon as possible.*** 4. **WHEN** notified by SPOC that DELTA T_C controller has been repaired, **THEN GO TO** OP/1/A/1102/004 A Encl (Placing ICS Stations To Auto) **NOTE: ICS will remain in manual for the remainder of the scenario.**

This event is complete when the SRO reaches the WHEN step (4) in Section 4F, or as directed by the Lead Evaluator.

Op-Test No.: 1 Scenario No.: 2 Event No.: 5 Page 1 of 2

Event Description: **55 gpm Pri-Sec Leak in 1B SG Requires Manual S/D (TS)**

Time	Position	Applicant's Actions or Behavior
		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 ≅ 55 gpm.
		Crew response:
		EXAMINER NOTE: Direct entry into the SGTR Tab is SGTL ≥ 25 gpm.
		SGTR Parallel Actions (page 37)
	SRO/BOP/ OATC	Announce plant conditions; Notify OSM to reference Eplan and NSD 202; Notify plant staff Emergency Dose Limits (EDLs) in effect.
		EOP SGTR TAB 1. Verify Rx tripped. **RNO:** 1. Maintain Pzr level 220″ - 260″ by initiating Encl 5.5 (Pzr and LDST Level Control). **(page 28)** 2. **GO TO** Step 10. 10 **IAAT** Pzr level decreasing with all available HPI, **AND** Rx power is > 18%, **THEN** perform the following: A. Trip the Rx. B. **GO TO** IMA tab. 11. Verify all: • Rx power > 40% • 1RIA-59 operable • 1RIA-60 operable
		EXAMINER NOTE: Crew determines that SGTL rate is ≅ 55 gpm. EDLs are in effect
		12. Determine leak rate using: • 1RIA-59 • 1RIA-60 13. Notify OSM of SGTR leak rate.

This event is completed when > 10% power reduction has occurred, or when directed by the lead examiner.

Op-Test No.: 1   Scenario No.: 2   Event No.: 5   Page 2 of 2

Event Description: **55 gpm Pri-Sec Leak in 1B SG Requires Manual S/D**

Time	Position	Applicant's Actions or Behavior
		EOP SGTR TAB (Cont)
	SRO/BOP	14. Verify ICS capable of power reduction in AUTO. **RNO:** 1. Initiate manual power reduction to < 15%. 2. **GO TO** Step 16.
		NOTE Encl 5.19 (Control of Plant Equipment During Shutdown for SGTR) will swap auxiliaries.
		16. Initiate Encl 5.19 (Control of Plant Equipment During Shutdown for SGTR). Page 12
		17. **WHEN** both exist: • Reactor power is ≈ 15% FP • Unit auxiliaries have been transferred **THEN** continue.
		EXAMINER NOTE: The Tech Spec for this SGTR is TS 3.4.13 for leakage >150 gpd. Condition B applies (Mode 3 within 12 hours and Mode 5 within 36 hours)
		BOOTH CUE: Ensure the OATC has reduced Reactor Power >10% AND the BOP has transferred auxiliaries prior to initiating the next event (Timer 7)
		18. Depress turbine TRIP pushbutton. 19. Verify all TURBINE STOP VALVES closed. 20. Open: • PCB 20 • PCB 21 21. Verify Generator Field Breaker open. 22. Verify EXCITATION is OFF. 23. Verify TBVs controlling SG pressure as expected. 24. Reduce Rx power to ≤ 5% FP.

This event is completed when > 10% power reduction has occurred, or when directed by the lead examiner.

Op-Test No.: 1 Scenario No.: 2 Event No.: 6 Page 1 of 3

Event Description: **Control of Plant Equipment During Shutdown for SGTR (Encl 5.19)**

Time	Position	Applicant's Actions or Behavior
	BOP	**EOP Enclosure 5.19** 1. Perform the following: A. Monitor RIAs to identify all SGs with a tube rupture: • 1RIA-16 • 1RIA-17 • 1RIA-59 when Rx power > 40% • 1RIA-60 when Rx power > 40% B. Inform CR SRO of results. 2. Place 1TA AUTO/MAN transfer switch in MAN. 3. Place 1TB AUTO/MAN transfer switch in MAN. 4. Close 1TA SU 6.9 KV FDR. 5. Close 1TB SU 6.9 KV FDR. 6. Place MFB1 AUTO/MAN transfer switch in MAN. 7. Place MFB2 AUTO/MAN transfer switch in MAN. 8. Close $E1_1$ MFB1 STARTUP FDR. 9. Close $E2_1$ MFB2 STARTUP FDR. 10. Notify CR SRO that unit auxiliaries have been transferred. 11. Start: • TURBINE TURNING GEAR OIL PUMP • 1A through 1E TURBINE BRNG OIL LIFT PUMPs • TURBINE MOTOR SUCTION PUMP 12. Start: • A OUTSIDE AIR BOOSTER FAN • B OUTSIDE AIR BOOSTER FAN

This event is completed when Unit Auxiliaries have been transferred, or when directed by the lead examiner.

Op-Test No.: 1 Scenario No.: 2 Event No.: 6 Page 2 of 3

Event Description: **Control of Plant Equipment During Shutdown for SGTR (Encl 5.19)**

Time	Position	Applicant's Actions or Behavior
	BOP	**EOP Enclosure 5.19 (Cont)** 13. Notify Unit 3 to start: • 3A OUTSIDE AIR BOOSTER FAN • 3B OUTSIDE AIR BOOSTER FAN 14. Stop: • 1A MSRH DRN PUMP • 1B MSRH DRN PUMP 15. Place in manual and close: • 1FDW-53 • 1FDW-65 16. Place in DUMP: • 1HD-37 • 1HD-52 17. Perform the following: • Place 1A FDWP SEAL INJECTION PUMP switch to START. • Place 1B FDWP SEAL INJECTION PUMP switch to START. • Start 1A FDWP AUXILIARY OIL PUMP. • Start 1B FDWP AUXILIARY OIL PUMP. 18. **WHEN** Rx power is $\leq$ 80%, **THEN** stop: • 1E1 HTR DRN PUMP • 1E2 HTR DRN PUMP 19. 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.

This event is completed when Unit Auxiliaries have been transferred, or when directed by the lead examiner.

Op-Test No.: 1 Scenario No.: 2 Event No.: 6 Page 3 of 3

Event Description: **Control of Plant Equipment During Shutdown for SGTR (Encl 5.19)**

Time	Position	Applicant's Actions or Behavior

	BOP	**EOP Enclosure 5.19 (Cont)**
		20. 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.
		21. **WHEN** core thermal power is < 65% FP, **THEN** continue.
		22. **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:
		  • FWP B FLOW MINIMUM (1SA-16/A-3)
		  • FWP B FLOW BELOW MIN (1SA-16/A-4)
		THEN trip 1B Main FDW Pump.
		23. **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:
		  • FWP A FLOW MINIMUM (1SA-16/A-1)
		  • FWP A FLOW BELOW MIN (1SA-16/A-2)
		THEN trip 1A Main FDW Pump.
		24. Notify RP to survey both MS lines for radiation.
		25. **WHEN** load is ≤ 450 MWe, **THEN** continue.
		26. Verify 1C COND BOOSTER PUMP operating.
		27. Stop:
		• 1A COND BOOSTER PUMP
		• 1B COND BOOSTER PUMP
		28. Place the control switch for one shutdown CBP to AUTO.

This event is completed when Unit Auxiliaries have been transferred, or when directed by the lead examiner.

Op-Test No.: 1 Scenario No.: 2 Event No.: 7 Page 1 of 5

Event Description: **1TA and 1TB Lockout causes a loss of RCPs**

Time	Position	Applicant's Actions or Behavior
		Plant Response: 1TA and 1TB lockout will occur. This will cause a loss of 6900V power to the RCPs. RPS will trip the reactor. **Crew Response**: Recognizes the reactor has tripped (< 3 RCP's operating with Reactor power >2%. (OMP 1-18 Att. A), therefore performs Immediate Manual Actions of the EOP.
	SRO OATC	3.1 Depress REACTOR TRIP pushbutton. 3.2 Verify reactor power < 5% FP and decreasing. 3.3 Depress turbine TRIP pushbutton. 3.4 Verify all turbine stop valves closed. 3.5 Verify RCP seal injection available.
	BOP	The SRO will direct the BOP to perform a Symptoms Check **(OMP 1-18)** • Reactivity Control ➢ Power Range NIs < 5% and decreasing • ICC/Loss of Subcooling Margin (SCM) ➢ If any SCM ≤ 0°F, perform Rule 2 • Loss of Heat Transfer (LOHT) ➢ Loss of Main and Emergency FDW (including unsuccessful manual initiation of EFDW) • Excessive Heat Transfer (EHT) ➢ Uncontrolled Main Steam Line(s) pressure decrease • **Steam Generator Tube Rupture** ➢ CSAE off-gas alarms, process RIAs (RIA-40, 59, 60), area RIAs (RIA-16/17) ***When IMAs and the Symptom Check are complete, the SRO will transfer to the Subsequent Actions Tab.***

This event is complete when the SRO transfers to the SGTR tab, or as directed by the lead examiner.

Op-Test No.: 1   Scenario No.: 2   Event No.: 7   Page 2 of 5

Event Description: **1TA and 1TB Lockout causes a loss of RCPs**

Time	Position	Applicant's Actions or Behavior
		Crew Response: **<u>Subsequent Actions Tab</u>** ***When reviewing the Parallel Actions page for Subsequent Actions*** Page 36***, the SRO will recognize that a SGTR still exists and transfer back to the* SGTR Tab.**
	SRO/BOP/ OATC	**<u>SGTR Tab</u>** 1. Verify Rx tripped. 2. Maintain Pzr level 140” – 180” [175” – 215” acc] by initiating Encl 5.5 (Pzr and LDST Level Control). 3. Ensure Parallel Actions Page reviewed. **<u>NOTE</u>** The remainder of this page may be given to an RO. The Procedure Director may continue. 4. Start: • A OUTSIDE AIR BOOSTER FAN • B OUTSIDE AIR BOOSTER FAN 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 <u>all</u> 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.

This event is complete when the SRO transfers to the SGTR tab, or as directed by the lead examiner.

Op-Test No.: 1 Scenario No.: 2 Event No.: 7 Page 3 of 5

Event Description: **1TA and 1TB Lockout causes a loss of RCPs**

Time	Position	Applicant's Actions or Behavior
		SGTR Tab (Cont)
	SRO/BOP/ OATC	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 (Operations of the ADVs). 33. **IAAT** all the following exist: • ALL SCMs > 0 ºF • ES Bypass Permit satisfied • RCS pressure controllable **THEN** perform Steps 34-35. **RNO: GO TO** Step 36. 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

This event is complete when the SRO transfers to the SGTR tab, or as directed by the lead examiner.

Op-Test No.: 1 Scenario No.: 2 Event No.: 7 Page 4 of 5

Event Description: **1TA and 1TB Lockout causes a loss of RCPs**

Time	Position	Applicant's Actions or Behavior
		SGTR Tab (Cont)
	SRO/BOP/ OATC	36. Verify any RCP operating. **RNO: GO TO** Step 38.
		NOTE If normal Pzr spray is available, efforts should be made to minimize core SCM $\leq$ 15 °F **IF** allowed by RCP NPSH requirements. If normal Pzr spray is **NOT** available, minimize core SCM as low as safely achievable.
		38. 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.
		39. **IAAT** RCS de-pressurization methods are inadequate in minimizing core SCM, **THEN** perform Step 40-42. ***Pzr spray will be inadequate with no RCPs operating which will require the use of the Pzr PORV to minimize core SCM.***
		NOTE BWST temperature should be used in determining Pzr spray nozzle DT. Computer point O1P3367 provides Pzr spray nozzle DT information.
		40. Verify Pzr spray nozzle DT $\geq$ 410 °F**.** ***DT will be greater than 410 °F.***

This event is complete when the SRO transfers to the SGTR tab, or as directed by the lead examiner.

Op-Test No.: 1 Scenario No.: 2 Event No.: 7 Page 5 of 5

Event Description: **1TA and 1TB Lockout causes a loss of RCPs**

Time	Position	Applicant's Actions or Behavior
		SGTR Tab (Cont)
	SRO/BOP/ OATC	41. Close • 1LWD – 1 • 1LWD – 2
		42. Cycle PORV as necessary.
		43. Verify 1SA-2/C-8 (AFIS HEADER A INITIATED) lit. **RNO:** Select OFF for both digital channels on AFIS HEADER A.
		44. Verify 1SA-2/D-8 (AFIS HEADER B INITIATED) lit. **RNO:** Select OFF for both digital channels on AFIS HEADER B.
		45. Verify RCS temperature > 532 ^oF.
		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.
		46. 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].
		47. **WHEN** SG pressure is 835 – 845 psig, **THEN** adjust SG pressure as necessary to maintain an RCS temperature band of 525 ^oF – 532 ^oF.
		48. **IAAT** any affected SG approaches overfill: • Any SCM $\leq$ 0 ^oF: LOSCM setpoint • All SCMs > 0 ^oF: 285” [315”] XSUR **THEN** perform Steps 49-51.

This event is complete when the SRO transfers to the SGTR tab, or as directed by the lead examiner.

Op-Test No.: 1 Scenario No.: 2 Event No.: 8 Page 1 of 8

Event Description: **1A MSLB, Outside the RB**

Time	Position	Applicant's Actions or Behavior
		Plant response: • Steam pressure on 1A SG decreases • 1SA2/A9 (MS PRESSURE HIGH/LOW)
	SRO/BOP/ OATC	**Crew response**: When performing the symptom check per OMP 1-18 Att. C, an RO recognizes the 1A SG pressure decreasing uncontrollably, announces it to the CRS, performing **Rule 5 (Main Steam Line Break)**. Page 25 **Examiner Note: The SRO can transfer to the EHT tab by two different methods:** **1. The SRO can transfer directly to the EHT Tab via the SGTR Parallel Action page.** 2. **They could direct the ROs to perform IMAs and a Symptom Check. When they are complete, the SRO will transfer to the Subsequent Actions Tab. When in the Subsequent Action tab, the SRO will transfer to the EHT tab via the SA Parallel Action page.** **When in either Parallel Action page, the SRO should direct an RO to perform Encl. 5.1, ES Actuation if ES actuates.** Page 44 **EHT Tab** 1. Verify any SG pressure < 550 psig. ***It may or may not be at this point.*** **RNO:** 1. **IF** excessive heat transfer has been stopped, **THEN GO TO** Step 5. 2. **GO TO** Step 3. 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

This event is complete when the SRO reaches step 32 in the EHT tab, or as directed by the lead examiner.

Op-Test No.: 1 Scenario No.: 2 Event No.: 8 Page 2 of 8

Event Description: **1A MSLB, Outside the RB**

Time	Position	Applicant's Actions or Behavior
	SRO/BOP/ OATC	**EHT Tab (Cont)**

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 ^{o}F, **THEN** perform Steps 7 and 8.

7. Throttle HPI per Rule 6 (HPI). Page 64

8. Verify letdown in service.

9. Verify any SG has an intact secondary boundary (intact SG).

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

This event is complete when the SRO reaches step 32 in the EHT tab, or as directed by the lead examiner.

Op-Test No.: 1 Scenario No.: 2 Event No.: 8 Page 3 of 8

Event Description: **1A MSLB, Outside the RB**

Time	Position	Applicant's Actions or Behavior
	SRO/BOP/ OATC	**EHT Tab (Cont)** 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 33. Initiate Rule 8 (Pressurized Thermal Shock (PTS)). Page 65 34. Verify both closed: • 1MS-24 • 1MS-33 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. • Notify RP to check for indications fo SGTR. 38. **IAAT** RCS boron is determined to be insufficient for adequate SDM, **THEN** initiate Encl 5.11 (RCS Boration).

This event is complete when the SRO reaches step 32 in the EHT tab, or as directed by the lead examiner.

Op-Test No.: **1** Scenario No.: **2** Event No.: **8** Page 4 of 8

Event Description: **1A MSLB, Outside the RB**

Time	Position	Applicant's Actions or Behavior

	SRO/BOP/ OATC	**EHT Tab (Cont)**
		
		39. **IAAT** all exist:
		• ES Bypass Permit satisfied
		• All SCMs > 0 ºF
		• RCS pressure controllable
		THEN perform Step 40.
		
		40. Bypass applicable ES:
		• To Bypass HPI
		  • Bypass HPI ES CH A, B, C
		  • Bypass Diverse HPI
		• To Bypass LPI:
		  • Bypass LPI ES CH A, B, C
		  • Bypass Diverse LPI
		
		41. 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.
		
		42. 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
		
		43. Verify any RCP operating.
		RNO: GO TO Step 45.
		
		45. Initiate Encl 5.16 (SG Tube-to-Shell ΔT Control). Page 66

This event is complete when the SRO reaches step 32 in the EHT tab, or as directed by the lead examiner.

Op-Test No.: **1** Scenario No.: **2** Event No.: **8** Page 5 of 8

Event Description: **1A MSLB, Outside the RB**

Time	Position	Applicant's Actions or Behavior
	SRO/BOP/ OATC	**EHT Tab (Cont)** 46. **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. ***[Power is not available]*** 47. **IAAT** all exist: • RBS actuated • RB pressure < 10 psig • 1RIA-57 **NOT** in alarm • 1RIA-58 **NOT** in alarm **THEN** stop both RBS pumps. 48. **IAAT** T_{cold} approaches 470°F, **AND** all RCPs are operating, **THEN** ensure < four RCPs are operating. 49. **IAAT** BWST level is ≤ 19', **THEN** initiate Encl 5.12 (ECCS Suction Swap to RBES). 50. Verify all SCMs > 0°F. 51. Verify indications of SGTR ≥ 25 gpm. 52. **GO TO** SGTR Tab (Page 16)

This event is complete when the SRO reaches step 32 in the EHT tab, or as directed by the lead examiner.

Op-Test No.: **1**	Scenario No.: **2**	Event No.: **8**	Page 6 of 8

Event Description: **1A MSLB, Outside the RB**

Time	Position	Applicant's Actions or Behavior
	BOP/ OATC ***CT-1****	**Rule 5 (Main Steam Line Break)** 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.

2. Verify 1 TD EFDW PUMP operating.

3. Verify 1 TD EFDW PUMP is feeding affected SGs.
   RNO: GO TO Step 5.

4. Perform the following:
   A. Stop 1 TD EFDW PUMP.
   B. Close the following on affected SGs:

	1A SG		1B SG
	1FDW-368		1FDW-369

   C. Start 1 TD EFDW PUMP.

This event is complete when the SRO reaches step 32 in the EHT tab, or as directed by the lead examiner.

Op-Test No.: **1** Scenario No.: **2** Event No.: **8** Page 7 of 8

Event Description: **1A MSLB, Outside the RB**

Time	Position	Applicant's Actions or Behavior
	BOP/ OATC	**Rule 5 (Cont)**
		5. Verify 1B SG is an affected SG. **RNO: GO TO** Step 7.
	CT-2	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 $\leq$ 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.

This event is complete when the SRO reaches step 32 in the EHT tab, or as directed by the lead examiner.

Op-Test No.: **1** Scenario No.: **2** Event No.: **8** Page 8 of 8

Event Description: **1A MSLB, Outside the RB**

Time	Position	Applicant's Actions or Behavior
	BOP/ OATC	**<u>Rule 5 (Cont)</u>** 13. **WHEN** CETCs have stabilized, **THEN** resume use fo Tc for RCS temperature control. 14. Ensure Rule 3 (Loss of Main or Emergency FDW) is in progress or complete. Page 38 15. Ensure Rule 8 (Pressurized Thermal Shock(PTS)) is in progress or complete. Page 65 16. **WHEN** directed by CR SRO, **THEN EXIT**.

This event is complete when the SRO reaches step 32 in the EHT tab, or as directed by the lead examiner.

EXAMINER NOTE

At any time during this scenario the operator may choose to use Enclosure 5.5 to maintain RCS inventory control. See excerpt below.

ENCLOSURE 5.5

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 (cont.)

<table>
<tr><th>ACTION/EXPECTED RESPONSE</th><th>RESPONSE NOT OBTAINED</th></tr>
<tr><td>6. IAAT 1C HPI PUMP is required,
THEN perform Steps 7 - 9.</td><td>__ GO TO Step 10.</td></tr>
<tr><td>7. Open:
• 1HP-24
• 1HP-25</td><td>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 8.
2. __ IF <u>only one</u> 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.</td></tr>
</table>

ENCLOSURE 5.5 (cont.)

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 (cont.)

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 (cont.)

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 (cont.)

	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 (cont.)

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 (cont.)

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.	

• • • 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	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 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**
12. Individual available to make notifications	• Announce plant conditions using PA system. • Notify OSM to reference the Emergency Plan and NSD 202 (Reportability). • Notify plant staff that Emergency Dose Limits are in affect using PA system.	**NOTIFY and EDL**

Rule 3
Loss of main or Emergency FDW

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
1. __ Verify loss of Main FDW/EFDW is due to Turbine Building Flooding.	**GO TO** Step 3.
2. __ **EXIT** this Rule.	
3. **IAAT NO** SGs can be fed with FDW (Main/CBP/Emergency), **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.	__ **GO TO** Step 7.
6. __ **GO TO** Step 37.	
7. Place in MANUAL and close: __ 1FDW-315 __ 1FDW-316	__ Notify CR SRO of failure.
8. Verify both: __ Any CBP operating __ TBVs available on an intact SG	__ **GO TO** Step 16.
9. Select OFF for both digital channels on AFIS HEADER A.	
10. Select OFF for both digital channels on AFIS HEADER B.	
11. Place Startup Block valve control switch for all intact SGs in OPEN: [ ] 1A SG: 1FDW-33 [ ] 1B SG: 1FDW-42	
12. Simultaneously position Startup Control valves 10 - 20% open on all intact SGs: [ ] 1A SG: 1FDW-35 [ ] 1B SG: 1FDW-44	

Rule 3
Loss of main or Emergency FDW

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
13. Perform the following: __ Place 1FDW-31 switch in CLOSE. __ Place 1FDW-40 switch in CLOSE. __ Close 1FDW-32. __ Close 1FDW-41.	
14. Verify Rule 4 (Initiation of HPI Forced Cooling) in progress.	**CAUTION** Until SGs are dry, lower SG pressure slowly to prevent overcooling. 1. __ Lower SG pressure in available SGs to ≈ 500 psig. 2. Control FDW flow to stabilize RCS P/T by throttling the following as necessary: • Startup Control valves • TBVs 3. Notify CR SRO that CBP feed is in progress. {22} 4. Place switches to OPEN: __ 1FDW-38 __ 1FDW-47 5. Place switches to CLOSE: __ 1FDW-36 __ 1FDW-45 6. __ **GO TO** Step 16.
15. Close: 1FDW-35 1FDW-44	1. **IF** 1FDW-35 fails open, **THEN** place 1FDW-33 control switch to CLOSE. 2. **IF** 1FDW-44 fails open, **THEN** place 1FDW-42 control switch to CLOSE.
16. __ Verify 1 TD EFDW PUMP is operable and available for manual start.	**GO TO** Step 18.
17. Dispatch an operator to perform Encl 5.26 (Manual Start of TDEFDWP). (**PS**)	

Rule 3
Loss of main or Emergency FDW

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
18. __ Verify cross-tie with Unit 2 is desired.	1. Dispatch an operator to open: 3FDW-313 (3A EFDW Line Disch To 3A S/G X-Conn) 3FDW-314 (3B EFDW Line Disch To 3B S/G X-Conn) 2. __ **GO TO** Step 20.
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)	
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.	Notify alternate unit to: A. Place both EFDW control valves in manual and closed. B. __ Start both MD EFDW pumps.
22. __ **WHEN** either exists: Operator is in position at 1FDW-313 Unit 1 TD EFDW PUMP has been manually started **THEN** continue.	

NOTE
Procedure must continue while cross connects are being opened.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
23. __ **IAAT** an operator is in position at 1FDW-313. **AND** Unit 1 TD EFDW PUMP is NOT Operating, **THEN** notify the operator to open: __1FDW-313 (1A EFDW Line Disch To 1A S/G X-Conn) __1FDW-314 (1B EFDW Line Disch To 1B S/G X-Conn)	__**GO TO** Step 24.

Rule 3
Loss of main or Emergency FDW

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
24. Verify <u>either</u> exists: HPI Forced Cooling is maintaining core cooling CBP feed providing SG feed	**NOTE** • Begin opening EFDW control valve when this step is reached. Flow to the SG will begin as soon as alternate unit valve is off closed seat <u>or</u> immediately if 1 TD EFDWP is operating. • 100 gpm could cause overcooling if adequate decay heat levels do **NOT** exist. 1. Establish a <u>maximum</u> of 100 gpm to each available <u>intact</u> SG using: 1FDW-315 (1A SG) 1FDW-316 (1B SG) 2. **WHEN** heat transfer is observed, **THEN** feed <u>and</u> steam SGs as necessary to stabilize T_C. 3. **IF** SSF event in progress, **AND** SSF event occurred while in MODE 1 <u>or</u> 2, **THEN** feed SGs per Rule 7 (SG Feed Control) Table 1 guidance. 4. __ **IF** SSF event **NOT** in progress, **AND** T_C > 550°F, **THEN** <u>initiate</u> cool down to ≤ 550°F by feeding <u>and</u> steaming <u>intact</u> SGs at a rate that prevents RCS saturation using <u>either</u>: __ TBVs __ ADVs 5. Notify CR SRO of the following: __ SG feed status. __ Rule 3 actions are continuing. 6. __ **GO TO** Step 26.
25. __ **WHEN** <u>either</u> exists: __ Unit 1 TD EFDW PUMP running Alignment complete from alternate unit. {22} **THEN** notify CR SRO of the following: A. __ Source of EFDW availability. B. __ Rule 3 actions are continuing.	

Rule 3
Loss of main or Emergency FDW

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
26. **IAAT** CBPs were feeding the SGs, **AND** CBP feed has been lost, **THEN**: A. __ Position TBVs as desired by SRO. B. __ Close 1FDW-35. C. __ Close 1FDW-44.	
27. **IAAT** an EFDW valve **CANNOT** control in AUTO, **OR** manual operation of EFDW valve is desired to control flow/level, **THEN** perform Steps 28 - 32.	**GO TO** Step 33.
28. __ Place EFDW valve in MANUAL.	__ **GO TO** Step 31.
29. __ Control EFDW flow with EFDW valve in MANUAL.	**GO TO** Step 31.
30. __ **GO TO** Step 33.	
31. Notify CR SRO that Encl 5.27 (Alternate Methods for Controlling EFDW Flow) is being initiated. {22}	
32. Initiate Encl 5.27 (Alternate Methods for Controlling EFDW Flow).	
33. Verify <u>any</u> SCM ≤ 0°F.	**IF** overcooling, **OR** exceeding limits in Rule 7 (SG Feed Control), **THEN** throttle EFDW, as necessary.
34. Notify the alternate unit to: __ Monitor EFDWP parameters. __ Maintain UST level > 7.5'. Enter appropriate TS/SLC for EFDW valves closed in manual.	
35. **IAAT** Unit 1 EFDW is in operation, **THEN** initiate Encl 5.9 (Extended EFDW Operation).	
36. **WHEN** directed by CR SRO, **THEN EXIT**.	

Rule 3
Loss of main or Emergency FDW

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
37. **IAAT** an EFDW valve **CANNOT** control in AUTO, **OR** manual operation of EFDW valve is desired to control flow/level, **THEN** perform Steps 38 - 42.	**GO TO** Step 43.
38. __ Place EFDW valve in MANUAL.	__ **GO TO** Step 41.
39. __ Control EFDW flow with EFDW valve in MANUAL.	**GO TO** Step 41.
40. __ **GO TO** Step 43.	
41. Notify CR SRO that Encl 5.27 (Alternate Methods for Controlling EFDW Flow) is being initiated. {22}	
42. Initiate Encl 5.27 (Alternate Methods for Controlling EFDW Flow).	
43. Verify <u>any</u> SCM ≤ 0°F.	**<u>CAUTION</u>** ATWS events may initially require throttling to prevent exceeding pump limits and additional throttling once the Rx is shutdown to prevent overcooling. **IF** overcooling, **OR** exceeding limits in Rule 7 (SG Feed Control), **THEN** throttle EFDW, as necessary.
44. **IAAT** Unit 1 EFDW is in operation, **THEN** initiate Encl 5.9 (Extended EFDW Operation).	
45. **WHEN** directed by CR SRO, **THEN EXIT**.	

Enclosure 5.1
ES Actuation

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
1. Determine <u>all</u> ES channels that <u>should</u> have actuated based on <u>RCS pressure and RB pressure</u>:	

	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
2. Verify <u>all</u> ES channels associated with actuation setpoints have actuated.	**<u>NOTE</u>** Voter OVERRIDE extinguishes the TRIPPED light on the associated channels that have <u>auto</u> actuated. Pressing TRIP on channels previously actuated will reposition components that may have been throttled or secured by this Enclosure. Depress TRIP on <u>affected</u> ES logic channels that have **NOT** previously been actuated.
3. **IAAT** <u>additional</u> ES actuation setpoints are exceeded, **THEN** perform Steps 1 - 2.	
4. __ Place Diverse HPI in BYPASS.	__ Place Diverse HPI in OVERRIDE.
5. Perform <u>both</u>: Place ES CH 1 in MANUAL. Place ES CH 2 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 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.

Enclosure 5.1
ES Actuation

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.	__ **GO TO** Step 73.
8. __ Verify any RCP operating.	__ **GO TO** 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.	**GO TO** 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.	

Enclosure 5.1
ES Actuation

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}

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.	**GO TO** 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.

Enclosure 5.1
ES Actuation

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	

Enclosure 5.1
ES Actuation

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.	__ **GO TO** Step 36.
34. __ Close 2LPSW-139.	
35. __ Verify total LPSW flow to Unit 2 LPI coolers ≤ 6000 gpm.	__ Reduce LPSW to Unit 2 LPI coolers to obtain total LPSW flow ≤ 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.	

Enclosure 5.1
ES Actuation

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
39. Verify either: __ Three LPSW pumps operating Two LPSW pumps operating when Tech Specs only requires two operable	__ **GO TO** Step 41.
40. 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'.
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.	**GO TO** Step 46.

NOTE

RBCU transfer to low speed will NOT occur until 3 minute time delay is satisfied.

45. 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.

Enclosure 5.1
ES Actuation

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
46. **IAAT** ES channels 7 & 8 have actuated, **THEN** perform Steps 47 - 48.	**GO TO** Step 49.
47. 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.
48. __ 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.
49. Notify U2 CR SRO that SSF is inoperable due to OTS1-1 open.	
50. Ensure any 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**.	

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.	__ **GO TO** Step 62.
60. __ Close <u>2</u>LPSW-139.	
61. __ 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.
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 <u>all available</u> LPSW pumps.	
65. Verify <u>either</u>: __ Three LPSW pumps operating Two LPSW pumps operating when Tech Specs only requires two operable	__ **GO TO** Step 67.
66. 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'.
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 <u>any</u> 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**.	

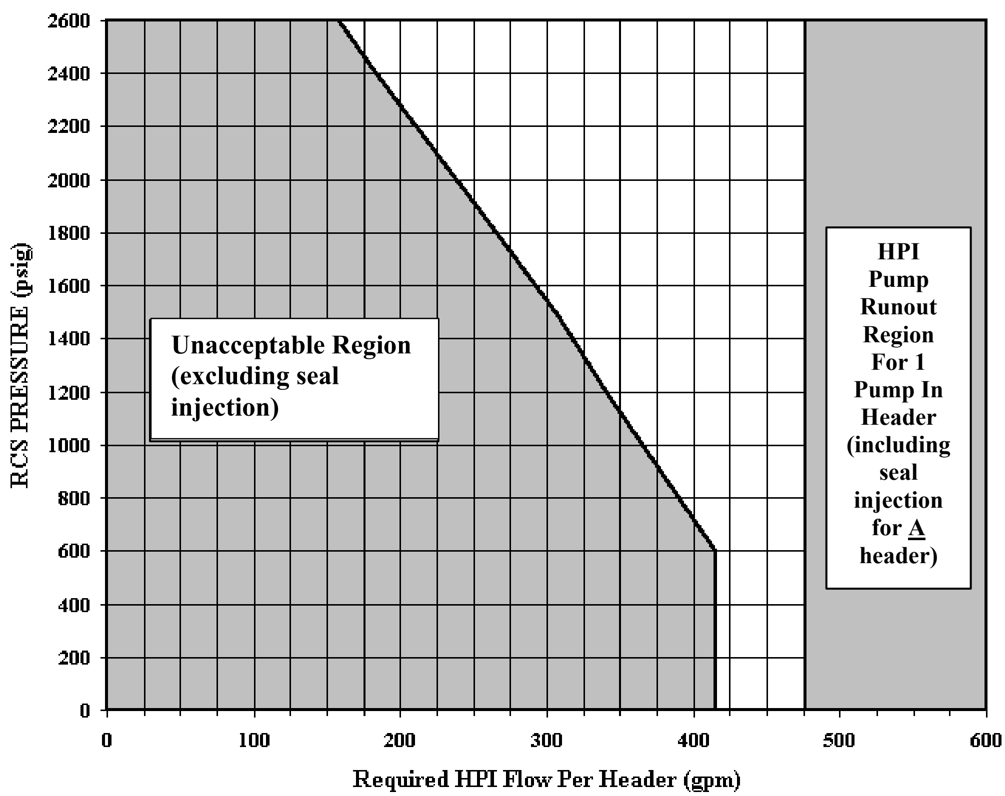
ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
73. Open: 1HP-24 1HP-25	1. **IF** both BWST suction valves (1HP-24 and 1HP-25) are closed, **THEN**: A. Start 1A LPI PUMP. B. Start 1B LPI PUMP. C. Open: __ 1LP-15 __ 1LP-16 __ 1LP-9 __ 1LP-10 __ 1LP-6 __ 1LP-7 D. **IF** two LPI Pumps are running only to 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 74. 2. **IF** only one 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 GO TO** 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.	__ **GO TO** 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 80 - 83.	**GO TO** 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 85.	**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.

87. **IAAT** any LPI Pump is operating against a shutoff head, THEN at the CR SRO's discretion, stop affected LPI Pumps.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
88. **IAAT** RCS pressure is < LPI pump shutoff head, **THEN** perform Steps 89 - 90.	**GO TO** 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.	__ **GO TO** 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 <u>all available</u> LPSW pumps.	
108. _ Verify <u>either</u>: __ Three LPSW pumps operating Two LPSW pumps operating when Tech Specs only requires two operable	__ **GO TO** Step 110.
109. 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'.
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.	**GO TO** Step 115.

<u>NOTE</u>

RBCU transfer to low speed will **NOT** occur until 3 minute time delay is satisfied.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
115. **IAAT** ES channels 7 & 8 have actuated, **THEN** perform Step 116 - 117.	**GO TO** 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.	__ **GO TO** Step 131.
129. __ Close <u>2</u>LPSW-139.	
130. __ 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.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
131.__ Close 1LPSW-139.	
132. Place in FAIL OPEN: __ 1LPSW-251 FAIL SWITCH __ 1LPSW-252 FAIL SWITCH	
133.__ Start <u>all available</u> LPSW pumps.	
134. Verify <u>either</u>: __ Three LPSW pumps operating Two LPSW pumps operating when Tech Specs only requires two operable	__ **GO TO** Step 136.
135. 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'.
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 <u>any</u> 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**.	

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.

Rule 8

Pressurized Thermal Shock (PTS) Page 1 of 1

NOTE

This rule is invoked under either of the following conditions:

- A cooldown below 400°F T_c at > 100 °F/hr has occurred.
- HPI has injected through an open or throttled open 1HP-26, 27, 409, 410 with all RCPs OFF.

- SCM must be minimized. The following methods may be used at the discretion of the CR SRO:
  - Throttling HPI per Rule 6 (HPI)
  - De-energizing Pzr heaters
  - Using Pzr normal spray
  - Using Pzr aux spray
  - Using PORV
  - Throttling LPI {22}
- Once RCS temperature is stable, a 1-hour hold of RCS temperature must be performed unless a LOCA or SGTR is in progress. Use T_c in loop with an operating RCP or use CETCs if **NO** RCPs are operating.
- Once invoked, SCM shall remain minimized until Engineering has performed an evaluation and determined that PTS restrictions **NO** longer apply. Starting RCPs and/or restoring cool down rates to normal values do **NOT** negate the need for this evaluation.

Enclosure 5.16
SG Tube to Shell ΔT Control

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

NOTE

- SG tube-to-shell ΔT is calculated by the OAC with points displayed on Loop P/T displays as indicated below:

1A SG DT	1B SG DT
Bottom of Loop 'A' P/T display	Bottom of Loop 'B' P/T display
S/G TUBE/SHELL DT	S/G TUBE/SHELL DT

- SG tube-to-shell ΔT limits:

Stress	OAC Indication
Tensile Stress Limit (Tubes colder than shell)	+130 ^{o}F
Compressive Stress (Tubes hotter than shell)	-70 ^{o}F

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
1.__ **IAAT** any SG tube to shell DT approaches either limit, **THEN** take appropriate action per the following:	__**GO TO** Step 76.

Limit Approached	Action
Tensile	**GO TO** Step 2
Compressive	**GO TO** Step 50

Enclosure 5.16
SG Tube to Shell ΔT Control

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

NOTE

- Cooling the SG shell faster than the tubes (RCS) relieves tensile stresses.
- As feeding or steaming of an affected SG is performed to relieve stresses, feeding and steaming of the unaffected SG may need to be reduced to prevent exceeding desired RCS cooldown rate and to maintain adequate shutdown margin.
- Maintaining adequate SDM takes precedence over tube-to-shell ΔT limits.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
2. __ Verify affected SG has an intact secondary boundary.	**GO TO** Step 5.
3. __ Steam affected SG to maintain tube-to-shell ΔT within limits.	
4. __ **GO TO** Step 49.	
5. __ Verify SGTR in progress.	__ **GO TO** Step 8.
6. Verify EFDW is available (can be aligned) from an alternate unit.	Perform the following: A. Contact TSC for further guidance. B. **EXIT** this enclosure.
7. **GO TO** Step 37.	
8. __ Verify EFDW available to affected SGs.	__ **GO TO** Step 16.
9. Place the following in MANUAL and close on all affected SGs:	

	1A SG		1B SG
	1FDW-315		1FDW-316

10. Open the following on all affected SGs:

	1A SG		1B SG
	1FDW-372		1FDW-382

Enclosure 5.16
SG Tube to Shell ΔT Control

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
11. __ Start MDEFDWP on each affected SG.	1. __ Open the following on all affected SGs: 2. **IF** TDEFWP is **NOT** feeding an unaffected SG, **THEN** close the following on unaffected SG: 3. __ Start TDEFDWP.
12. Clear personnel from area where steam release will occur.	

NOTE

- As feeding of an affected SG is performed to relieve stresses, feeding and steaming of the unaffected SG may need to be reduced to prevent exceeding desired RCS cooldown rate and to maintain adequate shutdown margin.
- Maintaining adequate SDM takes precedence over tube-to-shell ΔT limits.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
13. Throttle the following on each affected SG to establish ≈ 100 gpm flow:	
14. __ Throttle EFDW as necessary to maintain SG tube-to-shell ΔT within limits (+130 to -70°F).	
15. __ **GO TO** Step 49.	

Enclosure 5.16
SG Tube to Shell ΔT Control

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
16. Verify any of the following conditions exist: Main FDW pump available CBP available **AND** pressure in any affected SGs < 500 psig HWP available **AND** pressure in any affected SGs < 150 psig	1. Contact TSC for further guidance. 2. **EXIT** this enclosure.
17. Verify AFIS actuation has occurred (either statalarm on): AFIS HEADER A INITIATED (1SA-2/C-8) AFIS HEADER B INITIATED (1SA-2/D-8)	**GO TO** Step 25.
18. __ Verify steam line break on 1A SG.	__ **GO TO** Step 21.
19. Place control switches for the following in CLOSE: __ 1FDW-31 __ 1FDW-33	
20. Place the following in HAND and reduce VALVE DEMAND to zero: __ 1FDW-32 __ 1FDW-35	
21. __ Verify steam line break on 1B SG.	__ **GO TO** Step 24.
22. Place control switches for the following in CLOSE: __ 1FDW-40 __ 1FDW-42	
23. Place the following in HAND and reduce VALVE DEMAND to zero: __ 1FDW-41 __ 1FDW-44	

Enclosure 5.16
SG Tube to Shell ΔT Control

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
24. Select OFF for <u>both</u> Digital Channels 1&2 of AFIS on headers to be fed:	
25. __ Verify 1A SG approaching tube-to-shell ΔT limit.	**GO TO** Step 30.
26. Open the following: __ 1FDW-38 __ 1FDW-33	
27. Close the following: __ 1FDW-36 __ 1FDW-32 __ 1FDW-31	
28. Clear personnel from area where steam release will occur.	
29. Place 1FDW-35 in HAND and establish ≈ 100 gpm (0.05 x 10^6 lbm/hr) through aux FDW nozzles.	
30. __ Verify 1B SG approaching tube-to-shell ΔT limit.	**GO TO** Step 35.
31. Open the following: __ 1FDW-47 __ 1FDW-42	
32. Close the following: __ 1FDW-45 __ 1FDW-41 __ 1FDW-40	
33. Clear personnel from area where steam release will occur.	
34. Place 1FDW-44 in HAND and establish ≈ 100 gpm (0.05 x 10^6 lbm/hr) through aux FDW nozzles.	

Enclosure 5.16
SG Tube to Shell ΔT Control

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
NOTE • As feeding of an affected SG is performed to relieve stresses, feeding and steaming of the unaffected SG may need to be reduced to prevent exceeding desired RCS cooldown rate and to maintain adequate shutdown margin. • Maintaining adequate SDM takes precedence over tube-to-shell ΔT limits.	
35. __ Throttle Main FDW as necessary to maintain SG tube-to-shell ΔT within limits (+130 to -70°F).	
36. __ **GO TO** Step 49.	
37. __ Verify EFDW cross-connected with an alternate unit.	**GO TO** Step 39.
38. __ **GO TO** Step 46.	
39. Dispatch an operator to open the following on the affected SG: 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)	
40. __ Verify cross-tie with Unit 2 is desired.	1. Locally open the following: 3FDW-313 (3A EFDW Line Disch To 3A S/G X-Conn) (T-1, 10' S of M-52, 12' up) 3FDW-314 (3B EFDW Line Disch To 3B S/G X-Conn) (T-1, 12' S of M-43, 12' up) 2. __ **GO TO** Step 45.
41. Locally open the following: 2FDW-313 (2A EFDW Line Disch To 2A S/G X-Conn) (T-1, 5' N of M-39, 12' up) 2FDW-314 (2B EFDW Line Disch To 2B S/G X-Conn) (T-1, 2' N of M-31, 6' up)	

Enclosure 5.16
SG Tube to Shell ΔT Control

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
42. **IAAT** it is determined that cross-connecting EFDW from an alternate unit **CANNOT** be performed, **THEN** perform Steps 43 and 44.	**GO TO** Step 45.
43. __ Contact TSC for further guidance.	
44. __ **EXIT** this enclosure.	

• • • END • • •

Enclosure 5.16
SG Tube to Shell ΔT Control

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
45. **WHEN** the EFDW cross-connect valve is open on affected SG (1FDW-313 or 1FDW-314), **THEN** notify alternate unit CR to perform the following: Place both alternate unit EFDW control valves in manual and closed. __ Start an EFDWP. __ Notify Unit 1 of pump start. __ Monitor EFDWP parameters. __ Maintain UST level > 7.5'.	
46. **WHEN** alternate unit EFDWP is started, **THEN** clear personnel from area where steam release will occur.	

NOTE

- As feeding of an affected SG is performed to relieve stresses, feeding and steaming of the unaffected SG may need to be reduced to prevent exceeding desired RCS cooldown rate and to maintain adequate shutdown margin.
- Maintaining adequate SDM takes precedence over tube-to-shell ΔT limits.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
47. Throttle the following on each affected SG to establish ≈ 100 gpm flow:	
48. __ Throttle EFDW as necessary to maintain SG tube-to-shell ΔT within limits (+130 to -70°F).	
49. __ **WHEN** directed by CR SRO, **THEN EXIT** this enclosure.	

• • • END • • •

Enclosure 5.16
SG Tube to Shell ΔT Control

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

NOTE

- Compressive stresses can be relieved by either warming the shell (for intact SGs) or cooling the RCS.
- As feeding or steaming of an affected SG is performed to relieve stresses, feeding and steaming of the unaffected SG may need to be reduced to prevent exceeding desired RCS cooldown rate and to maintain adequate shutdown margin.
- Maintaining adequate SDM takes precedence over tube-to-shell ΔT limits.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
50. __ Verify affected SG has an intact secondary pressure boundary.	1. **WHEN** the ability to cool down the RCS with an unaffected SG exists, **THEN** continue in this enclosure. 2. **WHEN** adequate SDM exists to allow RCS cooldown, **THEN** establish cooldown rate using unaffected SG to maintain the following: • tube-to-shell ΔT within limits • cooldown rates within TS limits • adequate shutdown margin
51. __ Verify EFDW available to affected SGs.	__ **GO TO** Step 58.
52. Place the following in MANUAL and close on all affected SGs:	
53. Open the following on all affected SGs:	

Step 52:

	1A SG		1B SG
	1FDW-315		1FDW-316

Step 53:

	1A SG		1B SG
	1FDW-372		1FDW-382

Enclosure 5.16
SG Tube to Shell ΔT Control

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
54. __ Start MDEFDWP on <u>each</u> <u>affected</u> SG.	1. __ Open the following on <u>all</u> <u>affected</u> SGs: ☐ 1A SG: 1FDW-368 / ☐ 1B SG: 1FDW-369 2. **IF** TDEFWP is **NOT** feeding an <u>unaffected</u> SG, **THEN** close the following on <u>unaffected</u> SG: ☐ 1A SG: 1FDW-368 / ☐ 1B SG: 1FDW-369 3. __ Start TDEFDWP.
55. Throttle the following on <u>each</u> <u>affected</u> SG to establish ≈ 100 gpm flow: ☐ 1A SG: 1FDW-315 / ☐ 1B SG: 1FDW-316	

<u>NOTE</u>

- As feeding of an <u>affected</u> SG is performed to relieve stresses, feeding and steaming of the <u>unaffected</u> SG may need to be reduced to prevent exceeding desired RCS cooldown rate and to maintain adequate shutdown margin.
- Maintaining adequate SDM takes precedence over tube-to-shell ΔT limits.

56. __ Throttle EFDW as necessary to maintain SG tube-to-shell ΔT within limits (+130 to -70°F).	
57. __ **GO TO** Step 76.	

Enclosure 5.16
SG Tube to Shell ΔT Control

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
58. Verify any of the following conditions exist: Main FDW pump available CBP available **AND** pressure in any affected SGs < 500 psig HWP available **AND** pressure in any affected SGs < 150 psig	1. Contact TSC for further guidance. 2. **EXIT** this enclosure.
59. Verify AFIS actuation has occurred (either statalarm on): AFIS HEADER A INITIATED (1SA-2/C-8) AFIS HEADER B INITIATED (1SA-2/D-8)	**GO TO** Step 67.
60. __ Verify steam line break on 1A SG.	__ **GO TO** Step 63.
61. Place control switches for the following in CLOSE: __ 1FDW-31 __ 1FDW-33	
62. Place the following in HAND and reduce VALVE DEMAND to zero: __ 1FDW-32 __ 1FDW-35	
63. __ Verify steam line break on 1B SG.	__ **GO TO** Step 66.
64. Place control switches for the following in CLOSE: __ 1FDW-40 __ 1FDW-42	
65. Place the following in HAND and reduce VALVE DEMAND to zero: __ 1FDW-41 __ 1FDW-44	

Enclosure 5.16
SG Tube to Shell ΔT Control

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
66. Select OFF for <u>both</u> Digital Channels 1&2 of AFIS on headers to be fed: 		A Header		B Header
__	DIG. CH 1 OFF	__	DIG. CH 1 OFF
__	DIG. CH 2 OFF	__	DIG. CH 2 OFF		
67. __ Verify 1A SG approaching tube-to-shell ΔT limit.	**GO TO** Step 71.
68. Open the following: __ 1FDW-38 __ 1FDW-33	
69. Close the following: __ 1FDW-36 __ 1FDW-32 __ 1FDW-31	
70. Place 1FDW-35 in HAND and establish ≈ 100 gpm (0.05 x 10^6 lbm/hr) through aux FDW nozzles.	
71. __ Verify 1B SG approaching tube-to-shell ΔT limit.	**GO TO** Step 75.
72. Open the following: __ 1FDW-47 __ 1FDW-42	
73. Close the following: __ 1FDW-45 __ 1FDW-41 __ 1FDW-40	
74. Place 1FDW-44 in HAND and establish ≈ 100 gpm (0.05 x 10^6 lbm/hr) through aux FDW nozzles.	

Enclosure 5.16
SG Tube to Shell ΔT Control

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

NOTE

- As feeding of an affected SG is performed to relieve stresses, feeding and steaming of the unaffected SG may need to be reduced to prevent exceeding desired RCS cooldown rate and to maintain adequate shutdown margin.
- Maintaining adequate SDM takes precedence over tube-to-shell ΔT limits.

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
75. __ Throttle Main FDW as necessary to maintain SG tube-to-shell ΔT within limits (+130 to -70°F).	
76. **WHEN** directed by CR SRO, **THEN EXIT** this enclosure.	

CRITICAL TASKS

1. CT-1 (BWOG CT-17) Isolate the SG that is overcooling the RCS (Manually actuate AFIS)

2. CT-2 (BWOG CT-11) Control SG Pressure (adjust TBVs/ADVs) to: Maintain RC temperature constant or maintain appropriate Cooldown 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: 50%	Mode: 1	Mode: 1
Gross MWE: 455	100% Power	100% Power
RCS Leakage: .024 gpm	EFDW Backup: Yes	EFDW Backup: Yes
RBNS Rate: .01 gpm		

Technical Specifications/SLC Items (CR SRO)

Component/Train	**OOS Date/Time**	**Restoration Required Date/Time**	**TS/SLC #**
SSF	Yesterday 0000	6 Days	TS 3.10.1 A B C D E

Shift Turnover Items (CR SRO)

Primary

- SASS in Manual for I&E
- AMSAC/DSS Bypassed

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.
- Holding power at 50% per the dispatcher.

Reactivity Management (CR SRO)

RCS Boron: 74 ppmB	Gp 7 Rod Position: 58%	R2 Reactivity management controls established in the Control Room per SOMP 01-02

Human Performance Emphasis (OSM)

Procedure Use and Adherence

ILT46

Facility: **Oconee** Scenario No.: **3** Op-Test No.: **1**

Examiners: ________________________ Operators: ________________________**SRO**

________________________ ________________________**OATC**

________________________ ________________________**BOP**

Initial Conditions:

- Reactor power = 0.02%; below POAH Unit 2: 100%, Unit 3: 100%

Turnover:

- Unit 1 Startup in progress; BOL; not after refueling
- Startup procedure at step 3.36 (OP/1/A/1102/001 Encl. 4.7)
- Increase Reactor power to 6 -7%
- Letdown flow is 70 gpm per Chemistry request

Event No.	Malfunction No.	Event Type*	Event Description
0a			
1		R, OATC, SRO	Increase reactor power to 6 -7%
2	MPS061	C, BOP, SRO (**TS**)	1A Letdown Cooler Leak
3	Override	C: BOP, OATC, SRO(**TS**)	Inadvertent ES Channel 2 actuation
4	Override	C: BOP, SRO **(TS)**	1A RBCU high vibration, secure 1A and start 1B RBCU
5	MCR070 MCR024	C: OATC, SRO	Group 1 Rods drop into core requiring Manual Rx Trip Stuck Control rod
6	MEL090 MEL180	M: ALL	Switchyard Isolate KHU-2 lock out
7	MEL020	M: ALL	Blackout due to Loss of second Keowee Unit (KHU-1) Recover power from CT-5

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

Op-Test No.: 1 Scenario No.: 3 Event No.: 1 Page 1 of 2

Event Description: **Increase reactor power to 6 - 7%**

Time	Position	Applicant's Actions or Behavior
	SRO/OATC	**Crew response:** **<u>OP/1/A/1102/001 (Controlling Procedure for Unit Startup), Encl. 4.7, Step 3.36</u>** **NOTE:** POAH is normally achieved from 0.05 to 0.15% power on Wide Range Indications. 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. Wide Range indications are used since Source Range NIs saturate. 3.36 Begin reactor power increase to 0.5 - 1.0% at ≤ 0.5 DPM SUR. 3.37 **<u>WHEN</u>** above POAH, <u>begin</u> reactor power increase to 2.5 -3.5%. 3.38 **<u>WHILE</u>** power increases, <u>begin</u> 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 **<u>WHEN</u>** at 2.5% - 3.5% Power, perform the following: • Place REACTOR MASTER to "AUTO". • Place DIAMOND to "AUTO". • 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). • Review mechanical maneuvering rates and allowable ramp rates in PT/0/A/1103/020 (Power Maneuvering Guidelines). 3.41 – 3.42 Already completed.

Event is complete when ICS is placed in AUTO <u>and CTP is 6-7%</u> or when directed by the Lead Examiner.

Op-Test No.: 1	Scenario No.: 3	Event No.: 1	Page 2 of 2
Event Description: **Increase reactor power to 6 - 7%**			

Time	Position	Applicant's Actions or Behavior
	SRO/OATC	3.43 **<u>WHILE</u>** power change is in progress, monitor the following indications: • Appropriate ranged NIs • Neutron error • RCS Loop ΔT and FDW Flow • OAC Point O1E2129 and O1E2130 3.44 Begin power increase to 6% - 7% per Encl. 4.16 (CTP Adjustments) (**See page 46**)

Event is complete when ICS is placed in AUTO <u>and CTP is 6-7%</u> or when directed by the Lead Examiner.

Op-Test No.: 1 Scenario No.: 3 Event No.: 2 Page 1 of 7

Event Description: **1A Letdown Cooler Leak**

Time	Position	Applicant's Actions or Behavior
	SRO/ BOP	**Plant Response:** **Statalarms:** • 1SA-08/B-9 (PROCESS MONITOR RADIATION HIGH) • 1SA-09/D-1 (COMPONENT COOLING SURGE TANK HIGH/LOW) **Crew Response:** **<u>1SA-08/B-9</u>** 3.1.1 Determine radiation monitors in alarm. 3.1.2 **IF** radiation monitoring data from PMC is **NOT** in service, refer to OP/1/A/1103/026, (Loss of Sorrento Radiation Monitor). ***NOTE TO EXAMINER: Steps 3.2 through 3.11 are IF statements for which RIA is in alarm. In this case, the crew determines the radiation monitor alarming is 1RIA-50, so step 3.4 applies*** 3.4 **IF** any of the following RIAs have valid alarms, **GO TO <u>AP/18 (Abnormal Release of Radioactivity).</u>** [RIA table below] **<u>AP/18</u> (Can be performed by Unit 2 if AP/2 has been entered)** 4.1 Perform the following: At the discretion of the CRS, make a PA announcement of the event including any necessary precautions to be observed. Notify Shift Manager to reference the following: • RP/0/B/1000/001 (Emergency Classification). • NSD-202 (Reportability) • OMP 1-14 (Notifications)

	RIA
	RIA – 31
	1RIA – 35
	1RIA - 39
	1RIA - 41
	1RIA - 42
	1RIA – 45/46
	1RIA – 49A
x	1RIA - 50

This event is complete when 1A Letdown cooler has been isolated or as directed by the lead examiner.

Op-Test No.: 1	Scenario No.: 3	Event No.: 2	Page 2 of 7
Event Description: **1A Letdown Cooler Leak**			

Time	Position	Applicant's Actions or Behavior
	SRO /BOP	**Crew Response:** **<u>AP/18 (cont)</u>** 4.2 **GO TO** appropriate sections for any monitors in High or Alert alarm: ***NOTE TO EXAMINER: Crew should go to Section 4I for 1RIA-50.*** | | 4I | 1RIA-50 | **Section 4I** 1 Verify either of the following: • CC SURGE TANK increasing ≥ 5″/hour • CC SURGE TANK off-scale high 2. __ Initiate AP/2 (Excessive RCS Leakage). ***Examiner Note: Crew may enter AP/2 directly because the following entry condition is met: "Reactor Coolant leakage into CC system at ≥ 5"/hour on CC Surge Tank (≈ 0.65 gpm) or CC Surge Tank level off-scale high"*** **<u>AP/2 Excessive RCS Leakage</u>** **Immediate Actions** 3.1 Verify HPI operating. 3.2 **IAAT** RC makeup flow is > 100 gpm, **AND** Pzr level is decreasing, **THEN** close 1HP-5. 3.3 **IAAT** all the following exist: • HPI flow is > 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. **Subsequent Actions** **<u>NOTE</u>** Other than a SGTR, 1HP-26 should NOT need be open with the Rx critical. 4.1 Initiate Pzr and LDST level makeup using Unit 1 EOP Encl 5.5 (Pzr and LDST Level Control), as necessary. Page 27

This event is complete when 1A Letdown cooler has been isolated or as directed by the lead examiner.

Op-Test No.: 1	Scenario No.: 3	Event No.: 2	Page 3 of 7
Event Description: **1A Letdown Cooler Leak**			

Time	Position	Applicant's Actions or Behavior
	SRO /BOP	**Crew Response:** **AP/2 (Cont)** 4.2 Announce AP entry using the PA system. **NOTE** "LPI DHR in service" means that prior to the event the unit was shutdown with the decay heat drop line aligned for decay heat removal operation. 4.3 **IAAT** LPI DHR in service, **AND** RCS leakage > LDST makeup capability, **THEN GO TO** AP/26 (Loss of Decay Heat Removal). **(N/A)** 4.4 Initiate the following notifications: __ OSM to reference the following: • RP/0/B/1000/001 (Emergency Classification) • OMP 1-14 (Notifications) • Encl 5.9 (Oversight Guidelines) __ STA __ RP 4.5 Monitor the following trends to determine leak area (AB or RB) and trend for degradation: • "T6 AP02" • "T6 WASTE" • **RIAs** 4.6 Verify specific leak location is identified. **RNO**: Notify WCC SRO to initiate Encl. 5.2 (Primary Leak Check) and of the leak area (AB or RB), if known. 4.7 Initiate Encl 5.1 (Leak Rate Determination). Page 9 ***Examiner Note: This will calculate RCS leakage based on CC surge tank level increase and is a very gross calculation since there is no OAC point for CC surge tank level and therefore control room gage must be used.*** 4.8 **WHEN** leak area/failure is identified, **THEN GO TO** applicable step that best fits leak area/failure: | | CC System | ↑ 1RIA-50 ↑ CC Surge Tank level | 4.16 | 4.16 Verify all of the following: • CC Surge Tank level increasing at ≥ 5″/ hour (≅0.65 gpm) or level is off-scale high • 1RIA-50 in alarm or increasing
This event is complete when 1A Letdown cooler has been isolated or as directed by the lead examiner.		

Op-Test No.: 1 Scenario No.: 3 Event No.: 2 Page 4 of 7

Event Description: **1A Letdown Cooler Leak**

Time	Position	Applicant's Actions or Behavior
	SRO /BOP	**Crew Response:** **AP/2 (Cont)** **NOTE** CC Surge Tank is hard piped to overflow to LAWT Chemicals from the CC system will rapidly exhaust demineralizers used to process LAWT water. Radwaste has limited storage capability and a Rx shutdown may be required if the leak **CANNOT** be isolated. 4.17 **IAAT** CC Surge Tank level is off-scale high, **THEN** notify Radwaste that the CC Surge Tank has overflowed to the LAWT. **NOTE** Closing 1CC-7 and 1CC-8 will contain the RCS leak in the RB. Relief valves on the CC system will lift inside the RB when 1CC-7 and 1CC-8 are closed. 1CC-7 and 1CC-8 should be closed prior to letting RC to CC system leak fill the LAWT above the Hi/Hi OAC alarm (72" on O1A1352(Low Activity Waste Tank Level)). Flashing of the CC system may be indicated by CRD flow low or fluctuating, CC flow low or fluctuating, and RB Sump Level increase. 4.18 **IAAT** RCS leakage is flashing the CC system, **OR** threatens to overflow the LAWT, **THEN** perform the following: ***No flashing indicated*** A. Trip Rx. B. Close 1HP-5 C. Close the following: • 1CC-7 • 1CC-8 • 1CC-3 • 1CC-4 • 1CC-5 • 1CC-6 D. Initiate AP/32 (Loss of Letdown) E. **GO TO** Step 4.24. **NOTE** RCS to CC leakage may be indicated by one RCP cooler outlet temperature increasing more than the others (use historical temperature trend) near the time of increase on 1RIA-50. 4.19 Verify leakage indicated by change in RCP cooler outlet temperatures (Turn-on code "GD AP02"): ***No leakage indicated*** **RNO GO TO** Step 4.24

This event is complete when 1A Letdown cooler has been isolated or as directed by the lead examiner.

Op-Test No.: 1 Scenario No.: 3 Event No.: 2 Page 5 of 7

Event Description: **1A Letdown Cooler Leak**

Time	Position	Applicant's Actions or Behavior
	SRO /BOP	**Crew Response:**

AP/2 (Cont)

NOTE

RCS leakage to CC in the letdown coolers may be indicated by a cooler outlet temperature increasing more than the other cooler. Due to CC system setup, letdown cooler CC outlet temperatures may be different. A historical OAC temperature trend may be required to determine if leakage exists and if actions taken are successful in leak isolation. If leaking cooler **CANNOT** be identified, the coolers will be isolated one at a time starting with the 1A Letdown Cooler.

4.24 Monitor letdown cooler outlet temperatures to determine which cooler is leaking (Turn-on code "GD AP02"):

- O1A0065 (LETDOWN COOLER 1A CC OUTLET TEMP)
- O1A0066 (LETDOWN COOLER 1B CC OUTLET TEMP)

4.25 **GO TO** the appropriate step to isolate affected cooler.

	Letdown Cooler to be Isolated	GO TO Step
	1A	4.26
	1B	4.33
	Unknown	4.26

4.26. Verify 1B Letdown Cooler is isolated.

RNO: 1. Isolate the 1A Letdown Cooler by performing the following:

A. Close 1CC-1/1HP-1

B. Close 1HP-3

2. **GO TO** Step 4.31

4.31. Verify the leak isolation was successful:

- CC Surge Tank level stable if 1CC-7 and 1CC-8 open
- Decrease in RCS leakage

4.32. **GO TO** Step 4.44.

4.44. Verify both the following are closed;

- 1CC-7
- 1CC-8

RNO: GO TO Step 4.46.

4.46. **WHEN** conditions permit, **THEN EXIT** this procedure.

This event is complete when 1A Letdown cooler has been isolated or as directed by the lead examiner.

Op-Test No.: 1 Scenario No.: 3 Event No.: 2 Page 6 of 7

Event Description: **1A Letdown Cooler Leak**

Time	Position	Applicant's Actions or Behavior
	SRO /BOP	**Crew Response:** **AP/2 Encl 5.1 (Leak Rate Determination)** 1. Stabilize RCS Temperature. 2. Notify WCC to secure all primary draining/RB washdown evolutions if applicable. **NOTE** Depending on leak location, leakage may NOT be detected by all the formulas. One or more of the following methods may be necessary to determine RCS leak rate. 3. Calculate leak rate using the following, as required: • Calculation of RCS Volume Loss: Leak Rate = ________ + ________ - ________ - ________ = ________ MU SI LD TSR Where: MU = makeup Flow SI = Seal Inlet Hdr Flow LD = Letdown Flow TSR = Total Seal Return Flow • LDST Level Change: Leak Rate = (LDST level change) x (31 gal/inch) / (minutes) + BTP Flowrate (gpm) Leak Rate = (__ inches) x 31 gal/inch / ______minutes + ______gpm = ________gpm • HAWT/LAWT Level Change: (Turn-on code "LWD") Leak Rate = (Change in HAWT/LAWT lvl) x (18 gal/inch) / (minutes) =(____inches) x 18 gal/inch =______gpm • RBNS Level Change Leak Rate = (Change in RBNS level) x (15 gal/inch) / (minutes) = (__ inches) x 15 gal/inch / ____ minutes = ____gpm • RCS Leakage Calculation per PT/1/A/0600/010 (Reactor Coolant Leakage) • Calculation of RCS Volume Loss: Leak Rate = Makeup Flow rate with stable level = ____gpm

This event is complete when 1A Letdown cooler has been isolated or as directed by the lead examiner.

Op-Test No.: 1	Scenario No.: 3	Event No.: 2	Page 7 of 7
Event Description: **1A Letdown Cooler Leak**			

Time	Position	Applicant's Actions or Behavior
	SRO /BOP	**Crew Response:** **AP/2 Encl 5.1 (Cont)**

NOTE

Pressurizer	23.94 gal/inch
Quench Tank:	34.94 gal/inch
BWST:	7608 gal/foot
SFP (Unit 1 & 2)	1512 gal/ 0.1 foot
SFP/FTC (Unit 1&2)	2300 gal/inch
Corer Flood Tank:	5 gal/ 0.01foot
RB Normal Sump:	15 gal/inch
LDST:	31.3 gal/inch
CC Surge Tank Level:	7.8 gal/inch
MWHUT:	See OP/0.A/1108/001 (Curves and Gen Info)

- Tank Level Change:
  Leak Rate = $\frac{\text{(Change level) x (Tank volume/height)}}{\text{(minutes)}} = \frac{(\quad) \text{ x } (\quad)}{\_\_\_\_ \text{minutes}} = \_\_\_\_ \text{gpm}$

4. Notify OSM and SRO of calculated leak rate.

Examiner Note:* *TS 3.4.13 RCS Operational Leakage will apply until the 1A Letdown Cooler is isolated (Cond. A, Reduce leakage to within limits in 4 hours).

This event is complete when 1A Letdown cooler has been isolated or as directed by the lead examiner.

Op-Test No.: 1	Scenario No.: 3	Event No.: 3	Page 1 of 5

Event Description: **Inadvertent ES Channel 2 Actuation (TS)**

Time	Position	Applicant's Actions or Behavior
		Plant response: 1SA-1/B-10 ES 2 Trip 1SA-16/B-2 EL CT-4 SB Bus 2 Breaker Closed 2SA-17/A-5 KEOWEE STATALARM PANEL ALARM 2SA-17/C-1 KHU 1 EMERGENCY START INITIATED 2SA-18/C-1 KHU 2 EMERGENCY START INITIATED 1SA-6/A-5, B-5, C-5, D-5, RC Pump Seal Cavity Press Hi/Low (**≈ 1 min later**) 1SA-6/D-7, E-5, E-6, E-7 RC Pump Seal Return Temp High Both Keowee Hydro Units Emergency Start ***EXAMINER NOTE: Over time, rods may withdraw in response to BWST water injecting into the core.*** ***The SRO should enter TS 3.4.9 if PZR level increases to > 260". The BOP may use Enclosure 5.5 for inventory control.*** Page 27
	SRO/ BOP OATC	**Crew Response:** The SRO will initiate **AP/1/A/1700/042 Inadvertent ES Actuation** 4.1 Verify any of the following have inadvertently actuated: __ Diverse HPI (**not actuated**) __ ES Channel 1 (**not actuated**) __ ES Channel 2 4.2 Perform the following on all inadvertently actuated system(s): __ Ensure DIVERSE HPI BYPASS is in BYPASS (**does not apply**) __ Ensure ES CH-1 is in MANUAL (**does not apply**) __ Ensure ES CH-2 is in MANUAL 4.3 Throttle HPI, as required, to maintain desired Pzr level 4.4 Verify any of the following have inadvertently actuated: __ ES Channel 5 (**not actuated**) __ ES Channel 6 (**not actuated**) **RNO:** 1. **IF** ES Channel 1, ES Channel 2, or Diverse HPI have inadvertently actuated, **AND** it is desired to restore letdown, **THEN** initiate AP/42 Encl 5.2 (Letdown Restoration) Page 14 2. **GO TO** Step 4.10 4.10 Close the following: 1HP-24 1HP-25

This event is complete when the SRO has referred to TS at step 4.25, or as directed by the Lead Examiner.

Op-Test No.: 1 Scenario No.: 3 Event No.: 3 Page 2 of 5

Event Description: **Inadvertent ES Channel 2 Actuation**

Time	Position	Applicant's Actions or Behavior
	SRO/ BOP OATC	**AP/1/A/1700/042 (cont)** **NOTE:** If personnel are available, progression should continue while Encl 5.1 (Required Operator Actions) is in progress. 4.11 Ensure AP/42 Encl 5.1 (Required Operator Actions) is in progress Page 13 4.12 Verify any of the following have inadvertently actuated: __ Diverse LPI (**not actuated**) __ ES Channel 3 (**not actuated**) __ ES Channel 4 (**not actuated**) **RNO: GO TO** Step 4.17 4.17 Verify the Rx is critical **CAUTION:** Do NOT add demin water to counter the boration until RCS boron concentration stabilizes to prevent a positive reactivity event. **NOTE:** ICS in Auto means ICS is in control of Tave and Rx power. 4.18 Verify ICS in Auto **RNO**: 1. IF either of the following exists: • Tave decreasing outside control band • Rx Power decreasing outside control band **THEN GO TO** Step 4.20 2. **GO TO** Step 4.21. 4.21 Verify any of the following have inadvertently actuated: __ ES Channel 1 (**not actuated**) __ Diverse HPI (**not actuated**) **RNO: GO TO** Step 4.24 4.24 Notify SPOC to investigate and repair the cause of the inadvertent ES actuation, as necessary. 4.25 Initiate logging TS/SLC Entry/Exit, as applicable, IAW Encl 5.4 (TS/SLC Requirements) **See page 15 for detailed TS information** 4.26 **WHEN** all of the following exist: __ Reason for inadvertent ES Channel or Diverse HPI/LPI actuation has been resolved __ ES Channel or Diverse HPI/LPI reset is desired __ OSM concurs **THEN** continue

This event is complete when the SRO has referred to TS at step 4.25, or as directed by the Lead Examiner.

Op-Test No.: 1	Scenario No.: 3	Event No.: 3	Page 3 of 5
Event Description: **Inadvertent ES Channel 2 Actuation**			

Time	Position	Applicant's Actions or Behavior
	SRO/ BOP OATC	**Crew Response:** **AP/1/A/1700/042 <u>Enclosure 5.1</u> Required Operator Actions** 1 Initiate announcement of AP entry using the PA system **<u>NOTE</u>:** If channels are bypassed <u>or</u> in override, 1SA-1/A-10 (ES 1 Trip) <u>and</u> 1SA-1/B-10 (ES 2 Trip) will be off even though the channel may have actuated.. 2 Verify <u>any</u> of the following have <u>inadvertently actuated</u>: __ Diverse HPI **(not actuated)** __ ES Channel 1 **(not actuated)** __ ES Channel 2 3 Open the following: __ 1HP-20 __ 1HP-21 4 Open the following for operating RCPs: __ 1HP-228 (1A1) __ 1HP-226 (1A2) __ 1HP-232 (1B1) __ 1HP-230 (1B2) 5 Verify <u>any</u> of the following have <u>inadvertently actuated</u>: __ ES Channel 7 **(not actuated)** __ ES Channel 8 **(not actuated)** **RNO: GO TO** Step 9 9 Perform the following: A. Open the following to restore RB RIAs: __ 1PR-7 __ 1PR-8 __ 1PR-9 __ 1PR-10 B. From the ENABLE CONTROLS screen on the RIA View Node, perform the following: 1. Select OFF for RB RIA sample pump 2. Start the RB RIA sample pump 10. Verify <u>any</u> of the following have <u>inadvertently actuated</u>: __ Diverse HPI __ ES Channel 1 **RNO: GO TO** Step 12 12. **EXIT** this enclosure

This event is complete when the SRO has referred to TS at step 4.25, or as directed by the Lead Examiner.

Op-Test No.: 1	Scenario No.: 3	Event No.: 3	Page 4 of 5
Event Description: **Inadvertent ES Channel 2 Actuation**			

Time	Position	Applicant's Actions or Behavior
	SRO/ BOP OATC	**Crew Response:** **AP/1/A/1700/042 <u>Enclosure 5.2</u> Letdown Restoration** 1 Verify a CC pump operating 2 Verify letdown is isolated 3 Close 1HP-5 4. Verify it is desired to place <u>both</u> letdown coolers in service **(it is desired to place only the 1B cooler in service)** **RNO:** 1. __ **IF** desired to place the 1A Letdown Cooler in service, **THEN** open the following: A. 1HP-1 B. 1HP-3 ***Examiner Note: 1A L/D cooler has leak and should not be placed in service.*** 2. __ **IF** desired to place the 1B Letdown Cooler in service, **THEN** open the following: A. 1HP-2 B. 1HP-4 3. __ **GO TO** Step 6. 6. Close 1HP-6 7. Close 1HP-7 8. Verify letdown temperature < 135°F 9. Open 1HP-5 10. Adjust 1HP-7 for ≈ 20 gpm letdown 11. **WHEN** letdown temperature < 130°F, **THEN** place LETDOWN HI TEMP INTLK BYP switch in NORMAL. 12. Open 1HP-6 13. Adjust 1HP-7 to control desired letdown flow 14. **IAAT** it is desired to <u>bleed</u> letdown flow to 1A BHUT, **THEN** perform the following: A. Open the following: __ 1CS-26 __ 1CS-41 B. Position 1HP-14 to BLEED C. Notify SRO 15. **IAAT** letdown <u>bleed</u> is **NO** longer desired, **THEN** position 1HP-14 to NORMAL 16. **WHEN** SRO approves, **THEN EXIT** this enclosure

This event is complete when the SRO has referred to TS at step 4.25, or as directed by the Lead Examiner.

Op-Test No.: 1 Scenario No.: 3 Event No.: 3 Page 5 of 5

Event Description: **Inadvertent ES Channel 2 Actuation**

Time	Position	Applicant's Actions or Behavior
	SRO	**Crew Response:** **AP/1/A/1700/042 <u>Enclosure 5.4</u> (TS/SLC Requirements)** **Any ES Channel** • TS 3.3.7 (Engineered Safeguards Protective System (ESPS) Digital Automatic Actuation Logic Channels) due to the automatic actuation logic being blocked if any ES channel is in MANUAL or ES Voters in OVERRIDE **Condition "A". 1 hour completion time.** • TS 3.3.5 (Engineered Safeguards Protective System (ESPS) Analog Instrumentation) due to inoperable ES instrumentation **N/A** • TS 3.5.4 (Borated Water Storage Tank (BWST)) BWST level **N/A** **ES Channel 1 or 2** • TS 3.4.15 (RCS Leakage Detection Instrumentation) due to Rx Bldg RIAs being out of service (**Applies until RIAs are returned to service**.) **Condition B (24 hours for grab samples) (30 days)** • TS 3.10.1 (Standby Shutdown Facility(SSF)) for SSF inoperability due to the SSF power loss (ES Channel 1 only) **N/A** • TS 3.4.9 (Pressurizer) if PZR level is > 260″ (**Applies if Pzr exceeds 260".) Condition A (1 hour)** ***EXAMINER NOTE: If the crew decides they meet the entry conditions for AP/39 they may trip the reactor based on the below direction.*** **<u>AP/1/A/1700/039</u>, Unintentional Boration** **CAUTION** Do **NOT** add demin water to counter the boration until RCS boron concentration stabilizes to prevent a positive reactivity event. 4.1 Announce AP entry using PA system. 4.2 **IAAT** CTP < 6%, **THEN** perform the following: A. Trip the Rx. B. **GO TO** Unit 1 EOP.

This event is complete when the SRO has referred to TS at step 4.25, or as directed by the Lead Examiner.

Op-Test No.: 1 Scenario No.: 3 Event No.: 4 Page 1 of 1

Event Description: **1A RBCU High Vibration, secure 1A and start 1B RBCU**

Time	Position	Applicant's Actions or Behavior
		Plant response: OAC alarm: • High Vibration 1A RBCU **Crew response:** • Refer to OAC ARG • BOP will attempt to reset vibration alarm (Panel 1AB3). (**It will not reset**) • BOP will secure the 1A RBCU • Contact engineering
	BOP	
		Booth cue: Using time compression as OSM & engineering request that 1B RBCU be started in HIGH SPEED. SRO should refer to TS 3.6.5, Reactor Building Spray and Cooling Trains. Condition B: Restore to operable within 7 days
	SRO	**<u>OP/1/A/1104/015 Enclosure 4.3 (RBCU Operation)</u>** **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 <u>Begin</u> monitoring RB pressure absolute pressure. (OAC Turn On 1RBPA). 4.3 **<u>IF</u>** personal inside containment, announce over plant page that starting RBCU. **NOTE**: Starting RBCUs can affect the following: RBCU bearing temperatures, RBCU vibration, RBNS levek, 1RIA-47 level, RB pressure / temperature. 4.4 Place desired switch to "HIGH or LOW": ***1B RBCU should be placed in HIGH*** ○ 1A RBCU ○ 1B RBCU ○ 1C RBCU **NOTE**: When changing LPSW flows, RB pressure will change as RB temperature changes. Each RBCU must have <u>></u> 550 gpm Inlet flow or <u>></u> 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)

This event is complete when 1B RBCU is started, or as directed by the Lead Examiner.

Op-Test No.: 1 Scenario No.: 3 Event No.: 5 Page 1 of 2

Event Description: **Group 1 Rods drop into core requiring Manual Rx Trip with 1 Stuck CR**

Time	Position	Applicant's Actions or Behavior
		Plant Response: Group 1 control rods will drop into the core which will cause Reactor power to decrease. **Crew Response**: Perform Licensed Operator memory item from OMP 1-18 Attachment A.
	OATC	3.1 **IAAT** more than one control rod is dropped or misaligned > 9”, **THEN** trip the Rx. The OATC should manually trip the reactor
	SRO/OATC ***CT-1***	The SRO will direct the OATC to perform Immediate Manual Actions: **(EOP)** • Depress REACTOR TRIP pushbutton • Verify reactor power < 5% FP and decreasing • Depress turbine TRIP pushbutton. • Verify all turbine stop valves closed • Verify RCP seal injection available

	SRO/BOP	The SRO will direct the BOP to perform a Symptoms Check **(OMP 1-18)**
		• Reactivity Control
		  ➢ Power Range NIs < 5% and decreasing
		• ICC/Loss of Subcooling Margin (SCM)
		  ➢ If any SCM ≤ 0°F, perform Rule 2
		• Loss of Heat Transfer (LOHT)
		  ➢ Loss of Main <u>and</u> Emergency FDW (including unsuccessful manual initiation of EFDW)
		• Excessive Heat Transfer (EHT)
		  ➢ Uncontrolled Main Steam Line(s) pressure decrease
		• Steam Generator Tube Rupture
		  ➢ CSAE off-gas alarms, process RIAs (RIA-40, 59, 60), area RIAs (RIA-16/17)

This event is complete when RCS pressure and temperature are stable following the reactor trip, or when directed by the Lead Examiner.

Op-Test No.: 1 Scenario No.: 3 Event No.: 5 Page 2 of 2

Event Description: **Group 1 Rods drop into core requiring Manual Rx Trip with 1 Stuck CR**

Time	Position	Applicant's Actions or Behavior
	SRO/BOP OATC	**Subsequent Actions** 4.1 Verify all control rods in Groups 1–7 fully inserted. **(One CR withdrawn)** **RNO:** 1. Open 1HP-24 1HP-25 2. Secure makeup to LDST 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 ADVs) ***Examiner Note: Subsequent Actions continues on page 19.***

This event is complete when RCS pressure and temperature are stable following the reactor trip, or when directed by the Lead Examiner.

Op-Test No.: 1	Scenario No.: 3	Event No.: 6	Page 1 of 2
Event Description:	**Switchyard Isolate and KHU-2 Lockout**		

Time	Position	Applicant's Actions or Behavior
		Plant Response: Switchyard isolation occurs KHU-1 starts and re-energizes busses through CT-1 **Crew Response:** The SRO may direct the ROs to re-perform a Symptoms Check. **From the Subsequent Action Parallel Action page Page 35, the SRO should direct an RO to perform AP-11, Recovery from Loss of Power. Page 44, and continue in the Subsequent Actions tab.**
	SRO/ BOP OATC	4.1 Verify all control rods in Groups 1–7 fully inserted. **(One CR withdrawn)** **RNO:** 1. Open 1HP-24 1HP-25 2. Secure makeup to LDST 4.2 Verify Main FDW in operation. **(Main FDW will trip ~ 90 seconds after power is lost. If the MFW pumps have tripped when this step has been reached, the RNO will be performed).** **RNO:** 1. Ensure Rule 3 (Loss of Main or Emergency FDW) is in progress or complete. Page 36 2. **GO TO** Step 4.5 4.3 Verify <u>either</u> : • 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 <u>any</u> 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 <u>affected</u> SGs using <u>either</u> : __ TBVs __ Dispatch <u>two</u> operators to perform Encl 5.24 (Operation of ADVs)

This event is complete when Rule 3 is complete or when directed by the Lead Examiner.

Op-Test No.: 1 Scenario No.: 3 Event No.: 6 Page 2 of 2

Event Description: **Switchyard Isolate and KHU-2 Lockout**

Time	Position	Applicant's Actions or Behavior
	SRO/ BOP OATC	**Subsequent Actions Tab (Cont)** 4.10 Verify 1RIA-40 operable with CSAE OFF-GAS BLOWER operating. **RNO: GO TO** Step 4.12 4.12 Verify abnormal RCS leakage existed prior to reactor trip. **RNO: GO TO** Step 4.14 4.14 Verify both are closed: 1MS-17 1MS-26 4.15 Verify ES is required. **RNO:** 1. Initiate Encl 5.5 (Pzr and LDST Level Control). Page 27 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. **RNO:** 1. Ensure Rule 3 (Loss of Main or Emergency FDW) in progress or complete. Page 36 2. Ensure SG levels approaching proper setpoint per Rule 7 (SG Feed Control). 3. **GO TO** Step 4.28.

This event is complete when Rule 3 is complete or when directed by the Lead Examiner.

Op-Test No.: 1	Scenario No.: 3	Event No.: 7	Page 1 of 6

Event Description: **Blackout due to Loss of second Keowee Unit (KHU-1)**
Recover power from CT-5

Time	Position	Applicant's Actions or Behavior
		Plant Response: When KHU-1 trips, a blackout will occur.
	SRO/ BOP OATC	**Crew Response:** SRO should transfer to the Blackout Tab via the Parallel Action (Foldout) page. Announce plant conditions using PA system Notify OSM to reference E-plan and NSD 202
		EXAMINER NOTE: When the blackout occurs, RCP seal flow will be lost. The SRO should direct the BOP to perform AP/25 (Standby Shutdown Facility Emergency Operating Procedure). This is directed by performing the EOP Immediate Actions or as an OMP 1-18 Memory Item. **In either case, as the BOP attempts to leave the CR, he will be informed that Unit 2 will perform AP/25.**
		Blackout Tab: 1. Ensure Rule 3 (Loss of Main or Emergency FDW) is in progress or complete. Page 36 2. Verify two ROs available to perform Control Room actions. 3. Direct one operator to perform Encl 5.45 (PSW RCP Seals). **NOTE** During performance of Encl 5.38 (Restoration of Power), progression through the Blackout tab should continue. 4. Notify one RO to perform Encl 5.38 (Restoration of Power). Page 24

This event is complete when 1TC, 1TD or 1TE is re-energized or as directed by the Lead Examiner.

Op-Test No.: 1 Scenario No.: 3 Event No.: 7 Page 2 of 6

Event Description: **Blackout due to Loss of second Keowee Unit (KHU-1)**
Recover power from CT-5

Time	Position	Applicant's Actions or Behavior
	SRO/ BOP OATC	**<u>Enclosure 5.45, PSW RCP Seals</u>** **<u>NOTE</u>** PSW lights do not have lamp check; unexpected results could be an Indication of a burned out light bulb. 1. **IAAT** notified that PSW is **NO** longer required, **THEN GO TO** Step 11. **RNO: GO TO** Step 2. 2. Verify Unit 2 EOP Encl 5.42 (PSW Power Alignment) in progress or complete. 3. **WHEN** the Unit 1 PSW 4KV POWER AVAILABLE light lit, **THEN** perform steps 4-9. ***EXAMINER NOTE: Per the Shift Turnover Sheet, PSW 4KV power is unavailable. At this point, the SRO should continue progression through the BO tab.*** **<u>Blackout Tab (Cont.)</u>** 5. Verify <u>both</u>: • <u>Any</u> SG is being fed from main or emergency FDW. • SSF is available to feed SGs. 6. Verify both: • RCS temperature $\geq$ 540 ^{o}F • SSF is available to feed SGs 7. Feed and steam available SGs as necessary to stabilize RCS P/T **<u>NOTE</u>** • Feeding SGs with EFDW is desired above HPI Forced Cooling. Step 8 should be performed prior to re-performing Rule 3. • 100 gpm could cause overcooling if adequate decay heat levels do **NOT** exist.
This event is complete when 1TC, 1TD or 1TE is re-energized or as directed by the Lead Examiner.		

Op-Test No.: 1	Scenario No.: 3	Event No.: 7	Page 3 of 6

Event Description: **Blackout due to Loss of second Keowee Unit (KHU-1)**
Recover power from CT-5

Time	Position	Applicant's Actions or Behavior
	SRO/ BOP OATC	**<u>Blackout Tab (Cont.)</u>** 8. **IAAT** NO SGs are being fed, **AND** any source of EFDW (Unit 1 or another unit) becomes available, **THEN** perform Steps 9-13. **RNO: GO TO** Step 14. 14. **IAAT** the SSF is available to feed SGs, **AND** EFDW from any source is insufficient to maintain stable RCS P/T, **THEN** notify SSF operator that feeding SGs with SSF ASW is required (SSF CR x-2766). 15. **IAAT** power is restored to any of the following: • 1TC • 1TD • 1TE **THEN GO TO** Step 16. **RNO: GO TO** Step 21. ***EXAMINER NOTE: Power will be restored to 1TC/1TD/1TE from the performance of Encl 5.38 therefore, step 15 will eventually apply and steps 16-20 are included below.*** 16. Ensure Step 8 dispositioned appropriately. 17. Verify SSF activated. **<u>NOTE</u>** AP/11 (Recovery From Loss of Power) will transition seal injection from SSF to HPI. 18. Communicate status of SG feed and seal injection to SSF operator using x-2766, radio, or plant page. 19. Initiate AP/11 (Recovery from Loss of Power). Page 44 20. **GO TO** Subsequent Actions tab.

This event is complete when 1TC, 1TD or 1TE is re-energized or as directed by the Lead Examiner.

Op-Test No.: 1	Scenario No.: 3	Event No.: 7	Page 4 of 6

Event Description: **Blackout due to Loss of second Keowee Unit (KHU-1)**
Recover power from CT-5

Time	Position	Applicant's Actions or Behavior
	SRO/ BOP OATC	**Blackout Tab (Cont.)** 21. Verify Encl 5.38 (Restoration of Power) is complete. **RNO**: 1. Initiate Encl 5.38 (Restoration of Power) 2. **WHEN** either of the following has been determined: • Standby Bus #1 energized • Standby Bus #2 CANNOT be energized, **THEN** Continue. **Encl. 5.38, Restoration of Power** 1. Verify power has been restored. **RNO: GO TO** Step 3. 3. Place 1HP-31 in HAND and reduce demand to 0. 4. Close 1HP-21. 5. Verify any of the following energized: • MFB1 • MFB2 **RNO: GO TO** Step 8. 8. Verify CT-1 indicates ~ 4160 volts. **RNO: GO TO** Step 18. 18. Verify both Standby Bus #1 and Standby Bus #2 are de-energized (0 volts). 19. Verify both Keowee units operating. **RNO:** 1. Emergency start Keowee units: • KEOWEE EMER START CHANNEL A • KEOWEE EMER START CHANNEL B 2. **IF NO** Keowee units are operating, **THEN** perform the following: A. Notify Keowee operator to restore a Keowee unit to operable status. B. **GO TO** Step 38. 38. **IAAT** CT-5 indicates ~ 4160 volts, **THEN GO TO** Step 55.

This event is complete when 1TC, 1TD or 1TE is re-energized or as directed by the Lead Examiner.

Op-Test No.: 1	Scenario No.: 3	Event No.: 7	Page 5 of 6

Event Description: **Blackout due to Loss of second Keowee Unit (KHU-1)**
Recover power from CT-5

Time	Position	Applicant's Actions or Behavior
		Encl. 5.38, Restoration of Power (Cont)
		55. Place MFB1/2 AUTO/MAN switches in MAN Place Standby 1/2 AUTO/MAN switches in MAN
	SRO/ BOP OATC	56. Open the following breakers: • $N1_1$ MFB1 NORMAL FDR • $N2_1$ MFB2 NORMAL FDR • $E1_1$ MFB1 STARTUP FDR • $E2_1$ MFB2 STARTUP FDR
		57. Place the following switches in MAN: • CT4 BUS 1 AUTO/MAN • CT4 BUS 2 AUTO/MAN • CT5 BUS 1 AUTO/MAN • CT5 BUS 2 AUTO/MAN
		58. Open the following breakers: • SK1 CT4 STBY BUS 1 FEEDER • SK2 CT4 STBY BUS 2 FEEDER
		59. Close the following breakers: • SL1 CT5 STBY BUS 1 FEEDER • SL2 CT5 STBY BUS 2 FEEDER
		60. Place the following switches in AUTO: • CT5 BUS 1 AUTO/MAN • CT5 BUS 2 AUTO/MAN
		61. Verify Standby Bus #1 energized.
		62. Notify CR SRO in each unit where a blackout exists that Standby Bus #1 is energized.
	CT-2	63. Close the following breakers: • $S1_1$ STBY BUS 1 TO MFB1 • $S2_1$ STBY BUS 2 TO MFB2

This event is complete when 1TC, 1TD or 1TE is re-energized or as directed by the Lead Examiner.

Op-Test No.: 1 Scenario No.: 3 Event No.: 7 Page 6 of 6

Event Description: **Blackout due to Loss of second Keowee Unit (KHU-1)**
Recover power from CT-5

Time	Position	Applicant's Actions or Behavior
		Encl. 5.38, Restoration of Power (Cont)
	SRO/ BOP OATC	64. Verify any of the following energized: • 1TC • 1TD • 1TE 65. Notify Unit 1 CR SRO of status of 4160V SWGR.
		EXAMINER NOTE: IAAT Step 15 of the Blackout Tab is met.
		66. Verify Jocassee Hydro is being aligned to ONS. **RNO**: GO TO Step 68 67. Notify TCC that Jocassee Hydro is **NO** longer needed. 68. **Exit** this enclosure.

This event is complete when 1TC, 1TD or 1TE is re-energized or as directed by the Lead Examiner.

EXAMINER NOTE

At any time during this scenario the operator may choose to use Enclosure 5.5 to maintain RCS inventory control. See below.

ENCLOSURE 5.5

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 (cont.)

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.

Page3 of 8

ENCLOSURE 5.5 (cont.)

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 (cont.)

ACTION/EXPECTED RESPONSE		RESPONSE NOT OBTAINED
10.	**IAAT** LDST level **CANNOT** be maintained, **THEN** perform Step 11.	__ **GO TO** Step 132.
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 (cont.)

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.

21. Verify letdown line leak in East Penetration Room has occurred.	__ **GO TO** Step 23.
22. **GO TO** Step 35.	

ENCLOSURE 5.5 (cont.)

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 (cont.)

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 (cont.)

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.	

• • • END •

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	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**

Rule 3
Loss of Main or Emergency FDW

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
1. __ Verify loss of Main FDW/EFDW is due to Turbine Building Flooding.	**GO TO** Step 3.
2. __ **EXIT** this Rule.	
3. **IAAT NO** SGs can be fed with FDW (Main/CBP/Emergency), **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.	__ **GO TO** Step 7.
6. __ **GO TO** Step 37.	
7. Place in MANUAL and close: __ 1FDW-315 __ 1FDW-316	__ Notify CR SRO of failure.
8. Verify both: __ Any CBP operating __ TBVs available on an intact SG	__ **GO TO** Step 16.
9. Select OFF for both digital channels on AFIS HEADER A.	
10. Select OFF for both digital channels on AFIS HEADER B.	
11. Place Startup Block valve control switch for all intact SGs in OPEN: [ ] **1A SG**: 1FDW-33 — [ ] **1B SG**: 1FDW-42	
12. Simultaneously position Startup Control valves 10 - 20% open on all intact SGs: [ ] **1A SG**: 1FDW-35 — [ ] **1B SG**: 1FDW-44	

Rule 3
Loss of Main or Emergency FDW

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
13. Perform the following: __ Place 1FDW-31 switch in CLOSE. __ Place 1FDW-40 switch in CLOSE. __ Close 1FDW-32. __ Close 1FDW-41.	
14. Verify Rule 4 (Initiation of HPI Forced Cooling) in progress.	**CAUTION** Until SGs are dry, lower SG pressure slowly to prevent overcooling. 1. __ Lower SG pressure in <u>available</u> SGs to ≈ 500 psig. 2. Control FDW flow to stabilize RCS P/T by throttling the following as necessary: • Startup Control valves • TBVs 3. Notify CR SRO that CBP feed is in progress. {22} 4. Place switches to OPEN: __ 1FDW-38 __ 1FDW-47 5. Place switches to CLOSE: __ 1FDW-36 __ 1FDW-45 6. __ **GO TO** Step 16.
15. Close: 1FDW-35 1FDW-44	1. **IF** 1FDW-35 fails open, **THEN** place 1FDW-33 control switch to CLOSE. 2. **IF** 1FDW-44 fails open, **THEN** place 1FDW-42 control switch to CLOSE.
16. __ Verify 1 TD EFDW PUMP is <u>operable</u> and available for manual start.	**GO TO** Step 18.
17. Dispatch an operator to perform Encl 5.26 (Manual Start of TDEFDWP). (**PS**)	

Rule 3
Loss of Main or Emergency FDW

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
18. __ Verify cross-tie with Unit 2 is desired.	1. Dispatch an operator to open: 3FDW-313 (3A EFDW Line Disch To 3A S/G X-Conn) 3FDW-314 (3B EFDW Line Disch To 3B S/G X-Conn) 2. __ **GO TO** Step 20.
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)	
20. Dispatch an operator to 1FDW-313 <u>and</u> have them notify the CR when in position.	
21. Notify alternate unit to: A. Place <u>both</u> EFDW control valves in manual and closed. B. __ Start their TD EFDW PUMP.	Notify alternate unit to: A. Place <u>both</u> EFDW control valves in manual and closed. B. __ Start <u>both</u> MD EFDW pumps.
22. __ **WHEN** <u>either</u> exists: Operator is in position at 1FDW-313 Unit 1 TD EFDW PUMP has been manually started **THEN** continue.	

NOTE

Procedure must continue while cross connects are being opened.

23. __ **IAAT** an operator is in position at 1FDW-313, AND Unit 1 TD EFDW PUMP is **NOT** operating, **THEN** <u>notify</u> the operator to open: __1FDW-313 (1A EFDW Line Disch To 1A S/G X-Conn) __1FDW-314 (1B EFDW Line Disch To 1B S/G X-Conn)	**GO TO** Step 24

Rule 3
Loss of Main or Emergency FDW

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
24. Verify either exists: HPI Forced Cooling is maintaining core cooling CBP feed providing SG feed	**NOTE** • Begin opening EFDW control valve when this step is reached. Flow to the SG will begin as soon as alternate unit valve is off closed seat or immediately if 1 TD EFDWP is operating. • 100 gpm could cause overcooling if adequate decay heat levels do **NOT** exist.
	1. Establish a maximum of 100 gpm to each available intact SG using: 1FDW-315 (1A SG) 1FDW-316 (1B SG)
	2. **WHEN** heat transfer is observed, **THEN** feed and steam SGs as necessary to stabilize T_c.
	3. **IF** SSF event in progress, **AND** SSF event occurred while in MODE 1 or 2, **THEN** feed SGs per Rule 7 (SG Feed Control) Table 1 guidance.
	4. __ **IF** SSF event **NOT** in progress, **AND** $T_c > 550°F$, **THEN** initiate cool down to ≤ 550°F by feeding and steaming intact SGs at a rate that prevents RCS saturation using either: __ TBVs __ ADVs
	5. Notify CR SRO of the following: __ SG feed status. __ Rule 3 actions are continuing.
	6. __ **GO TO** Step 26.

Rule 3
Loss of Main or Emergency FDW

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
25. __ **WHEN** <u>either</u> exists: __ Unit 1 TD EFDW PUMP running Alignment complete from alternate unit. {22} **THEN** notify CR SRO of the following: A. __ Source of EFDW availability. B. __ Rule 3 actions are continuing.	
26. **IAAT** CBPs were feeding the SGs, **AND** CBP feed has been lost, **THEN**: A. __ Position TBVs as desired by SRO. B. __ Close 1FDW-35. C. __ Close 1FDW-44.	
27. **IAAT** an EFDW valve **CANNOT** control in AUTO, **OR** manual operation of EFDW valve is desired to control flow/level, **THEN** perform Steps 28 - 32.	**GO TO** Step 33.
28. __ Place EFDW valve in MANUAL.	__ **GO TO** Step 31.
29. __ Control EFDW flow with EFDW valve in MANUAL.	**GO TO** Step 31.
30. __ **GO TO** Step 33.	
31. Notify CR SRO that Encl 5.27 (Alternate Methods for Controlling EFDW Flow) is being initiated. {22}	
32. Initiate Encl 5.27 (Alternate Methods for Controlling EFDW Flow).	
33. Verify <u>any</u> SCM ≤ 0°F.	**IF** overcooling, **OR** exceeding limits in Rule 7 (SG Feed Control), **THEN** throttle EFDW, as necessary.
34. Notify the alternate unit to: __ Monitor EFDWP parameters. __ Maintain UST level > 7.5'. Enter appropriate TS/SLC for EFDW valves closed in manual.	

Rule 3
Loss of Main or Emergency FDW

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
35. **IAAT** Unit 1 EFDW is in operation, **THEN** initiate Encl 5.9 (Extended EFDW Operation).	
36. **WHEN** directed by CR SRO, **THEN EXIT**.	
37. **IAAT** an EFDW valve **CANNOT** control in AUTO, **OR** manual operation of EFDW valve is desired to control flow/level, **THEN** perform Steps 38 - 42.	**GO TO** Step 43.
38. __ Place EFDW valve in MANUAL.	__ **GO TO** Step 41.
39. __ Control EFDW flow with EFDW valve in MANUAL.	**GO TO** Step 41.
40. __ **GO TO** Step 43.	
41. Notify CR SRO that Encl 5.27 (Alternate Methods for Controlling EFDW Flow) is being initiated. {22}	
42. Initiate Encl 5.27 (Alternate Methods for Controlling EFDW Flow).	
43. Verify <u>any</u> SCM ≤ 0°F.	**<u>CAUTION</u>** ATWS events may initially require throttling to prevent exceeding pump limits and additional throttling once the Rx is shutdown to prevent overcooling. **IF** overcooling, **OR** exceeding limits in Rule 7 (SG Feed Control), **THEN** throttle EFDW, as necessary.
44. **IAAT** Unit 1 EFDW is in operation, **THEN** initiate Encl 5.9 (Extended EFDW Operation).	
45. **WHEN** directed by CR SRO, **THEN EXIT**.	

Enclosure 5.9
Extended EFDW Operation

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: 1A 1FDW-315 1B 1FDW-316	
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.	

Enclosure 5.9
Extended EFDW Operation

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
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.	
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 CRS 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.
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. **Page 42**	
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)	

AP/11
Recovery From Loss of Power

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
4.1 Announce AP entry using OMP 1-18 Placard.	
4.2 **IAAT** all exist: __1KI energized __Pzr level > 80” [180”acc] __Pzr heaters are desired **THEN** ensure PZR heaters in AUTO.	
4.3 Verify load shed of inverters was performed per Unit 1 EOP Encl (Load Shed of Inverters During SBO).	**GO TO** Step 4.9.
4.9 Verify load shed has initiated as indicated by either of the following statalarms on: __1SA-15/D-4 (EL LOAD SHED CHNL A LOGIC INITIATE) __1SA-14/D-4 (EL LOAD SHED CHNL B LOGIC INITIATE)	
4.10 Verify load shed is complete as indicatd by LOAD SHED COMPLETE on any ES Channel (Channel 1 or 2).	
4.11 Verify breakers closed: __1TC INCOMING FDR BUS 1 __1TC INCOMING FDR BUS 2 __1TD INCOMING FDR BUS 1 __1TD INCOMING FDR BUS 2 __1TE INCOMING FDR BUS 1 __1TE INCOMING FDR BUS 2	1.__Notify CRS to have SPOC investigate and repair. 2.__Continue
4.12 Verify 1SA-15/E-6 (EL SWYD ISOLATION CONFIRMED CHNL A LOGIC) is <u>OFF</u>.	**GO TO** Step 4.15.
4.13 Verify 1SA-14/E-6 (EL SWYD ISOLATION CONFIRMED CHNL B LOGIC) is <u>OFF</u>.	**GO TO** Step 4.15.

AP/11
Recovery From Loss of Power

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
4.14 GO TO step 4.17.	
4.15 Verify any Oconee unit receiving power from its normal source (1T, 2T, 3T).	**GO TO** Step 4.17.
4.17 Verify load shed was initiated as indicated by either of the following statalarms on: __1SA-15/D-4 (EL LOAD SHED CHNL A LOGIC INITIATE) __1SA-14/D-4 (EL LOAD SHED CHNL B LOGIC INITIATE)	**GO TO** Step 4.22.
4.18 Verify ES has occurred..	**GO TO** Step 4.20.
4.20 Simultaneously press RESET on both of the following pushbuttons to reset Main Feeder Bus Monitor Panel Load Shed Circuitry: • MFB UNDERVOLTAGE CHANNEL 1 RESET • MFB UNDERVOLTAGE CHANNEL 2 RESET	1.__Notify CRS to have SPOC investigate and repair. 2.__Continue
4.21 Verify load shed was initiated as indicated by either of the following statalarms on: __1SA-15/D-4 (EL LOAD SHED CHNL A LOGIC INITIATE) __1SA-14/D-4 (EL LOAD SHED CHNL B LOGIC INITIATE)	1. Locally PERFORM the following at MFB MONITOR RERLAY PANEL BUS 1 and MFB MONITOR RELAY PANEL BUS 2 (Unit 1 Cable Room): Simultaneously press RESET on both of the following pushbutons to reset Main Feeder Bus Monitor Panel Load Shed Circuitry: __MFB UNDERVOLTAGE CHANNEL 1 RESET __MFB UNDERVOLTAGE CHANNEL 2 RESET 2. **WHEN** <u>both</u> of the following exist: __1SA-15/D-4 (EL LOAD SHED CHNL A LOGIC INITIATE) off __1SA-14/D-4 (EL LOAD SHED CHNL B LOGIC INITIATE) off **THEN** continue procedure.

Enclosure 4.16
CTP Adjustments

OP/**1**/A/1102/001
Page 1 of 2

1. Limits And Precautions

1.1 Unit 1 shall be operated within Guidelines For Operation of SOMP 01-02 (Reactivity Management). (R.M.)

1.2 Intentional positive Reactivity additions will be made by only one method at a time. (R.M.)

1.3 For unexplained/undesired Rx power or Reactivity changes, Rx power increases shall be stopped and Reactivity change evaluated by SRO. {27} (R.M.)

1.4 SRO shall evaluate all Reactivity Management decisions. {27} (R.M.)

1.5 During Unit heatup and evolutions having potential to affect Reactivity, increased monitoring of Source Range NIs shall be conducted. (R.M.)

1.6 Unit shall be maintained within guidelines of COLR (Core Operating Limits Report) for the following: (R.M.)

- Axial Power Imbalance
- Quadrant Power Tilt
- CRD Position Limits

1.7 When **NOT** changing Rx power, RATE SET shall be set to 0.0 to prevent unanticipated Rx power change rates if ICS goes into Track. (R.M.)

1.8 NI calibration shall **NOT** be performed between 17% and 20% Core Thermal Power (CTP). This is due to increased vulnerabilities and magnitude of power change when transitioning from Low Level Limits to ICS flow control. {74} (R.M.)

1.9 NIs calibrations shall be performed per guidance in OP/1/A/1102/004 (Operation At Power). (R.M.)

2. Initial Conditions

_____ 2.1 Verify REACTOR MASTER in "AUTO".

_____ 2.2 Verify DIAMOND in "AUTO".

_____ 2.3 **IF** expected power change < 1%, ensure R2 reactivity management controls established in Control Room for power change per SOMP 01-02 (Reactivity Management). (R.M.) {105}

_____ 2.4 **IF** expected power change ≥ 1%, ensure R1 reactivity management controls established in Control Room for power change per SOMP 01-02 (Reactivity Management). (R.M.) {105}

Enclosure 4.16
CTP Adjustments

OP/1/A/1102/001
Page 2 of 2

3. Procedure (R.M.) {67}

_____ 3.1 **WHILE** enclosure is in progress, monitor the following indications: {105}

- Appropriate ranged NIs
- Neutron error
- FDW Flow (curve for "Expected Feedwater Flow Per Header Vs Reactor Power" is in OP/0/A/1108/001)

_____ 3.2 **IF AT ANY TIME** hold in power is desired, ensure "HOLD" selected. {61}

_____ 3.3 **IF AT ANY TIME** hold in power **NOT** required, ensure "HOLD" is **NOT** selected. {61}

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 Guidelines)
- _____ **IF** in progress, PT/0/A/0811/001 (Power Escalation Test)
- _____ **IF** available, Maneuvering Plan
- _____ Core Operating Limits Report for CRD Groups 5-8 position limits, Core Power Imbalance limits, and Quadrant Power Tilt limits,

_____ 3.4.2 Ensure "HOLD" is selected. {61}

_____ 3.4.3 Ensure selected "%/MIN" or "%/HR" on "RATE SET" pushbutton.

_____ 3.4.4 Ensure desired rate selected on "RATE SET" thumbwheels.

_____ SRO _____ 3.4.5 Ensure rate selected is within above limits.

_____ 3.4.6 Insert desired CTPD SET using "INCREASE/DECREASE" pushbuttons.

_____ SRO _____ 3.4.7 Ensure CTPD SET is within above limits.

_____ 3.4.8 Ensure "HOLD" is **NOT** selected. {61}

_____ 3.4.9 **WHEN** desired CTP is achieved, select 0.0 on RATE SET thumbwheels.

CRITICAL TASKS

1. CT-1, Trip the reactor when CR Grp 1 drops into the core. Failure to trip the reactor allows operation in an unanalyzed condition.

2. CT-2 (BWOG CT-8), Electrical power alignment.
   Restore Power from CT-5. Failure to restore power affects ability of various ECCS equipment.

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: 0.02%	Mode: 1	Mode: 1
Gross MWE: N/A	100% Power	100% Power
RCS Leakage: 0.024 gpm	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 (< 85%)	Yesterday 0000	6 Days	TS 3.10.1 A B C D E

Shift Turnover Items (CR SRO)

Primary

- Tave = 536°F

- Startup procedure at step 3.36 (OP/1/A/1102/001, Enclosure 4.7)
- Increase Reactor power to 6 -7%
- Stop after completing step 3.44 and wait for a maneuvering plan from reactor engineering
- Unit 2 CRS has oversight during the power increase

- Maintain Letdown flow < 70 gpm per Chemistry request.

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.

- 1AS-35 throttled per Secondary Chemist to provide steam to E heaters for secondary O2 removal.

- Temporary OAC alarms for FDW Loop A/B Composite Valve Demand set at 9.8% per SU Procedure.

- PSW 4KV Power is unavailable.

Reactivity Management (CR SRO)

RCS Boron = 1680 ppmb	Rod position Gp 6, 72 % WD	R1 Reactivity management controls established in the Control Room per SOMP 01-02

Human Performance Emphasis (OSM)

Procedure Use and Adherence

REGION II
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

CRO-113

Perform Control Rod Movement PT for Group 1

CANDIDATE ____

EXAMINER ____

REGION II
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

Task:

Perform Control Rod Movement PT for Group 1

Alternate Path:

No

Facility JPM #:

New

K/A Rating(s):

System: 001
K/A: G2.2.2
Rating: 4.6/4.1

Task Standard:

Perform Control Rod Movement PT for Group 1 in accordance with PT/1/A/0600/015 Encl. 13.2 (Control Rod Movement at Power)

Preferred Evaluation Location: Simulator __X__ In-Plant ______

Preferred Evaluation Method: Perform __X___ Simulate ____

References:

PT/1/A/0600/015 Encl. 13.2 (Control Rod Movement at Power)

OP/1/A/1102/004 A (ICS Operation)

Validation Time: 10 minutes

Time Critical: NO

==

Candidate: ____ NAME

Time Start: _______________

Time Finish: _______________

Performance Rating: SAT ______ UNSAT ______

Performance Time _________

Examiner: ______________________________ NAME ____________________________________ SIGNATURE /________ DATE

==

COMMENTS

SIMULATOR OPERATOR INSTRUCTIONS:

1. **RECALL** snap 215
2. Go to **RUN** and acknowledge alarms
3. Go to **FREEZE**
4. Ensure Control Room reactivity rope in place
5. GO to **RUN** when directed by lead examiner

Tools/Equipment/Procedures Needed:

PT/1/A/0600/015 Encl. 13.2 (Control Rod Movement at Power)

OP/1/A/1102/004 A (ICS Operation)

READ TO OPERATOR

DIRECTION TO TRAINEE:

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 at 100% power

PT/1/A/0600/015 (Control Rod Movement) in progress for Group 1 ONLY.

Enclosure 13.2 (Control Rod Movement At Power) complete up to Step 3.3.

INITIATING CUE:

The CRS directs you to complete Encl. 13.2 (Control Rod Movement PT) for Group 1 beginning at Step 3.3.

START TIME: _______

NOTE: When operating switches on Diamond, maintain switch depressed until light indication changes state. STEP 1: Step 3.3 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. STANDARD: The candidate will: • *Depress the SEQ/SEQ OR pushbutton and verify the SEQ OR light is lit • *Depress the SRO BYPASS switch and verify the light is lit • Verify the RUN light is lit • Verifies the SINGLE SELECT SWITCH selected to ALL. Continue to Step 3.4 COMMENTS:	***CRITICAL STEP** ___ SAT ___ UNSAT
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. STEP 2: Step 3.4 **IF AT ANY TIME** any CRD Group 1-6 reaches 95% during insertion, stop inserting associated group. (R.M.) STANDARD: Monitor CRD Group 1-6 position and stop inserting if any reach 95%. Continue to Step 3.5 COMMENTS:	___ SAT ___ UNSAT

STEP 3: Step 3.5 Perform the following to test CRD Group 1: (R.M.) 3.5.1 Ensure GROUP SELECT SWITCH to 1. STANDARD: Rotate the GROUP SELECT SWITCH to 1. Continue to Step 3.5.2 COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT
STEP 4: Step 3.5.2 Ensure Group 1 CONTROL ON lights are ON. (PI panel) STANDARD: Determine that the Group 1 CONTROL ON lights are ON. (PI panel) Continue to Step 3.5.3 COMMENTS:	___ SAT ___ UNSAT

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. STEP 5: Step 3.5.3 Perform the following: 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. STANDARD: A. Insert CRD Group 1 using the "Joy Stick" on the Diamond B. Monitor the 100% lights on the PI Panel and when they are OFF, stop insertion. C. Begin Group 1 withdraw to 100% using the "Joy Stick" on the Diamond. D. When the OUT LIMIT light on the Diamond is ON, maintain WITHDRAW until CRD TRAVEL "Out" light OFF. Continue to Step 3.5.4 COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT
STEP 6: Step 3.5.4 Verify all 100% lights are ON for Group 1. (PI Panel) STANDARD: Determine that all 100% lights are ON for Group 1. (PI Panel) Continue to Step 3.5.5 COMMENTS:	___ SAT ___ UNSAT

STEP 7: Step 3.5.5 Verify unit is stable. STANDARD: Monitor reactor power, Tave, and RCS pressure to determine that the unit is stable. Continue to Step 3.13 COMMENTS:	___ SAT ___ UNSAT
STEP 8: Step 3.13 Perform the following: (R.M.) • Ensure SEQ is ON. • Ensure GROUP SELECT SWITCH to OFF. • Ensure SAFETY RODS OUT BYPASS is OFF. STANDARD: Depress the SEQ/SEQ OR pushbutton and verify the SEQ light is lit Rotate the GROUP SELECT SWITCH to OFF. Depress the SRO BYPASS switch and verify the light is OFF. ***Cue: Another RO will complete this procedure.*** COMMENTS: **END TASK**	**CRITICAL STEP** ___ SAT ___ UNSAT

STOP TIME: ____________

CRITICAL STEP EXPLANATIONS:

STEP #	Explanation
1	Step is required to test CRD group 1.
3	Step is required to test CRD group 1.
5	Step is required to test CRD group 1.
8	Step is required to return system to normal.

CANDIDATE CUE SHEET
(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

INITIAL CONDITIONS:

Unit 1 at 100% power

PT/1/A/0600/015 (Control Rod Movement) in progress for Group 1 ONLY.

Enclosure 13.2 (Control Rod Movement At Power) complete up to Step 3.3.

INITIATING CUE:

The CRS directs to complete the Control Rod Movement PT for Group 1 beginning at Step 3.3.

REGION II
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

CRO-226

Re-establish RCP Seal Flow Using PSW System

CANDIDATE ____________________

EXAMINER ____________________

REGION II
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

Task:

Re-establish RCP Seals Using PSW System

Alternate Path:

No

Facility JPM #:

New

K/A Rating(s):

System: 004
K/A: A4.11
Rating: 3.4/3.3

Task Standard:

Re-establish RCP seal injection flow using EOP Enclosure 5.45 (PSW RCP Seals)

Preferred Evaluation Location: **Preferred Evaluation Method:**

Simulator __X__ In-Plant _____ Perform __X___ Simulate ____

References:

EOP Enclosure 5.45 (PSW RCP Seals)

Validation Time: 10 minutes **Time Critical:** NO

==

Candidate: ______________________________________ Time Start: _______________
NAME Time Finish: ______________

Performance Rating: SAT ______ UNSAT ______ Performance Time _________

Examiner: ______________________________ ___________________________________/________
NAME SIGNATURE DATE

==

COMMENTS

SIMULATOR OPERATOR INSTRUCTIONS:

1. **RECALL** snap 216
2. **IMPORT** CRO-226 sim files
3. Go to **RUN** and acknowledge alarms
4. Go to **FREEZE**
5. GO to **RUN** when directed by lead examiner

Tools/Equipment/Procedures Needed:

EOP Enclosure 5.45 (PSW RCP Seals)

READ TO OPERATOR

DIRECTION TO TRAINEE:

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:

SSF RCMU pump is OOS

Unit 1 tripped from 100% power due to a Switchyard Isolation

Blackout tab has been entered

Unit 2 EOP Encl. 5.42 (PSW Power Alignment) is complete

INITIATING CUE:

The CRS directs you to perform EOP Encl. 5.45 (PSW RCP Seals).

START TIME: _______

STEP 1: Step 1 **IAAT** notified that PSW is **NO** longer required, **THEN GO TO** Step 11 STANDARD: Determine that PSW is required by referring to the cue sheet. Continue to Step 1 RNO COMMENTS:	___ SAT ___ UNSAT
STEP 2: Step 1 RNO **GO TO** Step 2 STANDARD: **GO TO** Step 2 COMMENTS:	___ SAT ___ UNSAT
STEP 3: Step 2 Verify Unit 2 EOP Encl. 5.42 (PSW Power Alignment) in progress of complete. STANDARD: Determine that Encl. 5.42 is complete by referring to the cue sheet. Continue to Step 3 COMMENTS:	___ SAT ___ UNSAT

STEP 4: Step 3 **WHEN** the Unit 1 PSW 4KV POWER AVAILABLE light is lit, **THEN** perform step 4 – 9. STANDARD: Determine that the PSW 4KV POWER AVAILABLE light is lit located on 1EF7. Continue to Step 4 COMMENTS:	___ SAT ___ UNSAT
NOTE There is a 40 second time delay in the swap from Normal to PSW power on HPIPs. STEP 5: Step 4 Verify 1A PSW SELECTED HPI PUMP white light lit. STANDARD: Determine the 1A PSW SELECTED HPI PUMP white light lit located on 1EF7. Continue to Step 5 COMMENTS:	___ SAT ___ UNSAT
STEP 6: Step 5 Perform the following: • Place 1A HPI PUMP POWER TRANSFER to PSW. • **WHEN** the 1A HPI PUMP POWER TRANSFER amber light is on, **THEN GO TO** Step 8. STANDARD: Rotate the 1A HPI PUMP POWER TRANSFER to PSW located on 1EF7. After 40 seconds, determine that the amber light illuminates and then continue. **GO TO** Step 8. COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT

STEP 7:	Step 8 Verify one HPI pump aligned to PSW power.	___ SAT ___ UNSAT
STANDARD:	Determine that 1A HPI PUMP is aligned to PSW power by observing the 1A HPI PUMP POWER TRANSFER switch in the PSW position. Continue to Step 9	
COMMENTS:		
STEP 8:	Step 9 Place POWER TRANSFER switch to PSW on the following: • 1HP-24 • 1HP-26 • 1RC-159/1RC-160 • 1RC-157/1RC-158 • 1RC-155/1RC-156	**CRITICAL STEP** ___ SAT ___ UNSAT
STANDARD:	Place the above switches located on 1EF7 to the PSW position and verify that the associated amber lights illuminate. Continue to Step 10	
COMMENTS:		

NOTE RCP seals from PSW should only be used if normal HPI and the SSF RCMU pump can NOT supply seals. STEP 9: Step 10 **WHEN** it is determined that both, of the following are unable to supply RCP seals: • Normal HPI • SSF RCMU **THEN GO TO** Step 16. STANDARD: Determine that both Normal HPI (no power) and SSF RCMU (cue sheet) are NOT available to supply RCP seals. **GO TO** Step 16. COMMENTS:	___ SAT ___ UNSAT
STEP 10: Step 16 Open 1HP-24 STANDARD: Open 1HP-24 located on 1UB1 by placing the switch to open and verifying the red open light is lit and the green closed light goes out. Continue to Step 17 COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT
STEP 11: Step 17 Close 1HP-139 STANDARD: Close 1HP-139 located on 1UB1 by placing the switch to close and verifying the red open light goes out and the green closed light is lit. Continue to Step 18 COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT

NOTE ES may have actuated requiring manual control of HPI. STEP 12: Step 18 Verify 1HP-26 closed STANDARD: Determine that 1HP-26 is closed by observing that the 1HP-26 green closed light is lit. The OAC may also be used to determine the position of 1HP-26. Continue to Step 19 COMMENTS:	___ SAT ___ UNSAT
NOTE 1HP-120 may be operable and could supply makeup flow when the PSW HPIP is started.. STEP 13: Step 19 Ensure 1HP-120 in manual with demand at zero. STANDARD: Place 1HP-120 to manual and reduce demand to zero using the toggle switch. Continue to Step 20 COMMENTS:	___ SAT ___ UNSAT
NOTE HPI pump ammeter will not respond when HPI pump is powered from PSW. STEP 14: Step 20 Start an HPI Pump by positioning HPI PUMP START FROM PSW POWER to START. STANDARD: Place the HPI PUMP START FROM PSW POWER switch to START. Continue to Step 21 COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT

STEP 15: Step 21 Throttle 1HP-140 to obtain 30 – 35 gpm RCP Seal flow. STANDARD: Throttle 1HP-140 to obtain 30 – 35 gpm RCP Seal flow on the gauge located on 1UB1. Continue to Step 22 ***Cue: Inform candidate that another RO will continue with this procedure.*** COMMENTS: **END TASK**	**CRITICAL STEP** ___ SAT ___ UNSAT

STOP TIME: ____________

CRITICAL STEP EXPLANATIONS:

STEP #	Explanation
6	Step is required to power the 1A HPIP from PSW.
8	Step is required to power the valves from PSW.
10	Step is required to supply the HPIP suction from the BWST.
11	Step is required to prevent shocking the RCP seals.
14	Step is required to supply the RCP with seal flow.
15	Step is required to supply the RCP with seal flow.

CANDIDATE CUE SHEET
(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

INITIAL CONDITIONS:

SSF RCMU pump is OOS

Unit 1 tripped from 100% power due to a Switchyard Isolation

Blackout tab has been entered

Unit 2 EOP Encl. 5.42 (PSW Power Alignment) is complete

INITIATING CUE:

The CRS directs you to perform EOP Encl. 5.45 (PSW RCP Seals).

REGION II
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

CRO-306

ALIGN HPI/LPI PIGGYBACK MODE

CANDIDATE ____

EXAMINER ____

REGION II
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

Task:

Align HPI/LPI Piggyback Mode

Alternate Path:

Yes

Facility JPM #:

CRO-306

K/A Rating(s):

System: EPE 009
K/A: EK3.21
Rating: 4.2/4.5

Task Standard:

Steps of EOP Enclosure 5.12 are properly completed by the candidate to align HPI/LPI piggyback mode and total HPI flow is throttled to less than 750 gpm.

Preferred Evaluation Location:

Simulator __X__ In-Plant _____

Preferred Evaluation Method:

Perform __X___ Simulate ____

References:

EOP Enclosure 5.12, ECCS Suction Swap to RBES

Validation Time: 20 minutes

Time Critical: NO

==

Candidate: ____
NAME

Time Start: _________
Time Finish: ________

Performance Rating: SAT ______ UNSAT ______

Performance Time: _________

Examiner: ________________________________ ____________________________________/________
NAME SIGNATURE DATE

==

COMMENTS

SIMULATOR OPERATOR INSTRUCTIONS

1. **RECALL** Snap 217
2. **IMPORT** files for CRO-306
3. **ENSURE** SHOWDIG O1P1600 is on an OAC screen
4. When directed by the lead examiner, go to **RUN**

Tools/Equipment/Procedures Needed:

EOP Enclosure 5.12, ECCS Suction Swap to RBES

READ TO OPERATOR

DIRECTION TO TRAINEE

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 small break LOCA has occurred which is depleting the BWST.

The EOP is in progress.

IAAT Step 94 of the LOSCM tab directs the initiation of Enclosure 5.12, ECCS Suction Swap to RBES at 19’ in BWST.

INITIATING CUES

The Control Room SRO directs you to perform Enclosure 5.12, ECCS Suction Swap to RBES to align HPI/LPI piggyback mode.

START TIME: _______

STEP 1:	Step 1 Start: __ 1A LPI PUMP __ 1B LPI PUMP	***CRITICAL STEP** ___ SAT ___ UNSAT
STANDARD:	Candidate locates the controls for 1A and 1B LPI pumps on 1UB2 and determines that 1A and 1B LPI pumps are off by observing the white trip light illuminated and red close lights OFF. *Candidate rotates control switch to the CLOSE position for 1A **(Critical)** and 1B **(NOT Critical)** LPI pumps. The red CLOSE lights are observed to be on and the white TRIP light is observed to be off. Candidate observes the 1A LPIP amps are ≈ 20 amps and stable. Candidate determines the 1B LPIP did not start by no amps and the white TRIP light is still illuminated. Continues to Step 1 **RNO**	
COMMENTS:		
STEP 2:	Step 1 RNO 1. **IF NO** LPI pumps are operating, **THEN GO TO** step 85. 2. **IF** 1C LPI PUMP is operating, **THEN GO TO** step 87	___ SAT ___ UNSAT
STANDARD:	Candidate determines that neither of the above are satisfied and continues to step 2.	
COMMENTS:		

<u>STEP 3</u>: Step 2 Verify <u>either</u>: __ LPI FLOW TRAIN A <u>plus</u> LPI FLOW TRAIN B ≥ 3400 gpm __ <u>Only one</u> LPI header is operating, **AND** flow in that header is ≥ 2900 gpm <u>STANDARD</u>: Candidate locates LPI Flow Train A and B flow meters on 1UB1. Observes flow in both headers to be 0 gpm. Continues to Step 2 **RNO**. <u>COMMENTS</u>:	___ SAT ___ UNSAT
<u>STEP 4</u>: Step 2 **RNO** **GO TO** Step 4. <u>STANDARD</u>: Candidate goes to Step 4. <u>COMMENTS</u>:	___ SAT ___ UNSAT
<u>STEP 5</u>: Step 4 Verify three HPI pumps operating. <u>STANDARD</u>: Candidate locates HPI pump controls on 1UB1 and determines that all three HPI pumps are operating by observing the red ON lights illuminated and HPIP motor amps are stable. Continues to Step 5. <u>COMMENTS</u>:	___ SAT ___ UNSAT

STEP 6: Step 5

Stop 1B HPI PUMP.

CRITICAL STEP

___ SAT

___ UNSAT

STANDARD: Candidate locates the pump switch for the 1B HPI Pump on 1UB1 and stops the pump by rotating the switch to the OFF position.

Candidate verifies the red ON light goes out, the white OFF light is illuminated, and motor amps go to zero.

NOTE: Candidate may throttle HPI per rule 6 guidance (< 475 gpm) if flow in the 'A' HPI Header is ≥ 475 gpm.

Continues to Step 6.

COMMENTS:

STEP 7: Step 6

Simultaneously open:

__ 1LP-15
__ 1LP-16

CRITICAL STEP

___ SAT

___ UNSAT

STANDARD: Candidate locates 1LP-15 and 1LP-16 on 1UB2 and opens both valves simultaneously by taking each switch to the open position. Verify that the closed green light goes off and the red open light illuminates for each valve.

Continues to Step 7.

COMMENTS:

ALTERNATE PATH

STEP 8: Step 7

Verify two LPI pumps operating.

___ SAT

___ UNSAT

STANDARD: Candidate determines that ONLY the 1A LPI pump is operating by observing that the 1A LPIP has amps and red light indicate the breaker is closed while the 1B LPIP has no amps and the white TRIPPED light is illuminated..

Continues to Step 7 RNO which directs the candidate to Step 10.

COMMENTS:

STEP 9: Step 10 Maximize total LPI flow < 3100 gpm by throttling HPI flow. STANDARD: Candidate determines that there is 0 gpm LPI flow and since RCS pressure is above the shutoff head for the LPI pumps, LPI cannot inject and is therefore maximized. Continues to Step 11. COMMENTS:	___ SAT ___ UNSAT
STEP 10: Step 11 Limit total HPI flow to ≤ 750 gpm including seal injection STANDARD: Candidate sums HPI header flows and seal injection flow and determines that total HPI flow is > 750 gpm and throttles 1HP-26 and/or 1HP-27 to reduce total HPI flow to ≤ 750. Continues to Step 12. As left flows: "A" header ________ Seal Inj. ________ "B" header ________ COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT
STEP 11: Step 12 Place LDST LEVEL INTERLOCK switch in DISABLE. STANDARD: Candidate places LDST LEVEL INTERLOCK switch located on 1UB1 to DISABLE by taking the switch to the DISABLE position. Continues to Step 13. COMMENTS:	___ SAT ___ UNSAT

STEP 12:	Step 13 Position valve switches to close until valve travel is initiated: __ 1HP-23 __ 1HP-24 __ 1HP-25	**CRITICAL STEP** ___ SAT ___ UNSAT
STANDARD:	Candidate positions the following valve switches located on 1UB1 to close until valve travel is initiated: __ 1HP-23 __ 1HP-24 __ 1HP-25 Candidate recognizes valve travel has been initiated when the green close light illuminates. Continues to Step 14 after valve travel has been initiated for all three valves.	
COMMENTS:		
STEP 13:	Step 14 Simultaneously position valve switches to open until valve travel is initiated: __ 1HP-939 __ 1HP-940	**CRITICAL STEP** ___ SAT ___ UNSAT
STANDARD:	Candidate simultaneously positions the following valve switches located on 1UB2 to open until valve travel is initiated: __ 1HP-939 __ 1HP-940 Candidate recognizes valve travel has been initiated when the red open light illuminates. Continues to Step 15 after valve travel has been initiated for both valves.	
COMMENTS:		

STEP 14: Step 15 Verify either fully open: __ 1LPSW-4 __ 1LPSW-5 STANDARD: Candidate locates 1LPSW-4 and 1LPSW-5 on 1VB2 and determines that they are fully open by observing the red open light illuminated and green closed light OFF. Continues to Step 16. COMMENTS:	___ SAT ___ UNSAT
STEP 15: Step 16 Verify both open: __ 1LPSW-4 __ 1LPSW-5 STANDARD: Candidate locates 1LPSW-4 and 1LPSW-5 on 1VB2 and determines that they are both fully open by observing the red open light lit and green closed light OFF for both valves. Continue to step 17. COMMENTS:	___ SAT ___ UNSAT
STEP 16: Step 17 **GO TO** Step 24 STANDARD: Candidate proceeds to step 24 COMMENTS:	___ SAT ___ UNSAT

STEP 17: Step 24 Verify both: • Step 8 RNO was used to secure an LPI pump due to low flow conditions. • LPSW is aligned to cooler associated with stopped LPI pump. STANDARD: Candidate determines that both conditions are NOT met and goes to step 24 RNO which directs the candidate to Step 26. COMMENTS:	___ SAT ___ UNSAT
STEP 18: Step 26 **WHEN** BWST level is $\leq$ 9', AND RB level is rising, **THEN** continue in this enclosure. STANDARD: Candidate begins to monitor BWST level. ***CUE: Another operator will continue with this procedure.*** COMMENTS: **END OF TASK**	___ SAT ___ UNSAT

STOP TIME: ____________

CRITICAL STEP EXPLANATIONS

STEP #	Explanation
1	Step is required to start an LPI pump so LPI can supply suction to the HPI pumps.
6	Step is required to reduce number of HPI pumps to two.
7	Step is required to align a flow path from LPI pump discharge to HPI pump suction.
10	Step is required to ensure proper HPI pump operation
12	Step is required to isolate the suction flow path to the LPI pumps from the BWST and the LDST.
13	Step is required to prevent over pressurizing the LDST.

CANDIDATE CUE SHEET
(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

INITIAL CONDITIONS

A small break LOCA has occurred which is depleting the BWST.

The EOP is in progress.

IAAT Step 94 of the LOSCM tab directs the initiation of Enclosure 5.12, ECCS Suction Swap to RBES at 19’ in BWST.

INITIATING CUES

The Control Room SRO directs you to perform Enclosure 5.12, ECCS Suction Swap to RBES to align HPI/LPI piggyback mode.

REGION II
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

CRO-413

Initiate HPI Forced Cooling

CANDIDATE ______________________________

EXAMINER ______________________________

REGION II
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

Task:

Initiate HPI Forced Cooling

Alternate Path:

Yes

Facility JPM #:

CRO-019, CRO-020

K/A Rating(s):
System: EPE 074
K/A: EA1.08
Rating: 4.2/4.2

Task Standard:

Perform Rule 4 (Initiate HPI Forced Cooling).

Preferred Evaluation Location:

Simulator __X___ In-Plant _____

Preferred Evaluation Method:

Perform __X___ Simulate ____

References:
EOP Rule 3 (Loss of Main or Emergency FDW)
EOP Rule 4 (Initiate HPI Forced Cooling)
TCA #26, Initiate HPI Forced Cooling when required

Validation Time: 8 minutes

Time Critical: YES

==

Candidate: ____ Time Start: __________
NAME Time Finish: _________

Performance Rating: SAT ______ UNSAT ______ Performance Time: __________

Examiner: _______________________________ _____________________________________/________
NAME SIGNATURE DATE

==

COMMENTS

SIMULATOR OPERATOR INSTRUCTIONS:

1. **RECALL** Snap 218
2. **IMPORT** simulator files for CRO-413
3. Go to **RUN** when directed by lead examiner

<u>Tools/Equipment/Procedures Needed:</u>
EOP Rule 3 (Loss of Main or Emergency FDW)
EOP Rule 4 (Initiate HPI Forced Cooling)

<u>READ TO OPERATOR</u>

<u>DIRECTION TO TRAINEE:</u>

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.

<u>INITIAL CONDITIONS:</u>

- Unit 1 has tripped following a total loss of feedwater
- IMAs are complete
- The crew has been performing Rule # 3 (Loss of Main or Emergency FDW) to regain heat transfer
- CBP feed could not be established and efforts to restore steam generator heat transfer per Rule # 3 have <u>not</u> been successful
- You are at the step 22 “WHEN” step in Rule 3 (Loss of Main or Emergency FDW)

<u>INITIATING CUES:</u>

The CR SRO directs you to review outstanding IAAT’s.

This JPM is Time Critical

START TIME: _______

STEP 1: The candidate determines that it is necessary to perform Rule 4 based on IAAT in Rule 3 or in accordance with OMP 1-18 **STANDARD:** Candidate announces the initiation of Rule 4. ***Examiner Cue: If requested, provide concurrence (as CRS) for initiation of Rule 4.*** ***EXAMINER NOTE: This starts the 5 minute "Time critical" time clock.*** ***Time = ___________.*** COMMENTS:	___ SAT ___ UNSAT
STEP 2: Step 1 Verify any HPI pump can be operated. STANDARD: The candidate recognizes one HPI pump is in operation. COMMENTS:	___ SAT ___ UNSAT
STEP 3: Step 2 OPEN the following: • 1HP-24 • 1HP-25 STANDARD: The candidate: • Rotates 1HP-24 switch on 1UB1 to the OPEN position and observes that the red open light comes ON and the green closed light goes OFF. • Rotates 1HP-25 switch on 1UB1 to the OPEN position and observes that the red open light comes ON and the green closed light goes OFF. COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT

STEP 4: Step 3 Start all available HPI pumps STANDARD: The candidate: • Starts any non-running HPI pump by the control switches located on 1UB1. COMMENTS:	___ SAT ___ UNSAT
STEP 5: Step 4 OPEN the following: • 1HP-26 • 1HP-27 STANDARD: The candidate: • Rotates and holds 1HP-26 switch on 1UB1 to the OPEN position Candidate notes that 1HP-26 did not open by observing the green “CLOSED indication is still illuminated and the red “OPEN” light is extinguished. • Locates 1HP-27 ('1B' HP Injection) on 1UB1 and verifies red 'OPEN' indication is illuminated, and the green 'CLOSED' indication is extinguished,. ***Examiner Note: 1HP-26 is failed closed.*** COMMENTS:	___ SAT ___ UNSAT
STEP 6: Step 5 OPEN 1RC-4 STANDARD: The candidate locates 1RC-4 control switch on 1UB1 and verifies that the red "OPEN" indication is illuminated and the green "CLOSED" indication is extinguished. ***Examiner Note: This valve will already be open*** COMMENTS:	___ SAT ___ UNSAT

STEP 7: Step 6 VERIFY flow exists in any HPI header. STANDARD: The candidate locates HPI Flow Train A and B flow meters on 1UB1. Loop B flow is verified. COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT
STEP 8: Step 7 Perform the following: A. Place 1RC-66 SETPOINT SELECTOR to OPEN B. Depress 1RC-66 OPEN PERMIT pushbutton STANDARD: The candidate: • *Rotates 1RC-66 SETPOINT SELECTOR switch on 1UB1 to the OPEN position • *Depresses 1RC-66 OPEN PERMIT pushbutton on 1UB1 • Verifies PORV is open by verifying that the red "OPEN" indication is illuminated and the PORV Flow Statalarm (1SA18/A1) is in alarm. ***EXAMINER NOTE: This stops the 5 minute "Time Critical" time clock.*** ***Time = _____________.*** COMMENTS:	***CRITICAL STEP** ___ SAT ___ UNSAT
STEP 9: Step 8 Verify at least two HPI pumps operating. STANDARD: The candidate verifies that three HPI pumps are operating. COMMENTS:	___ SAT ___ UNSAT

STEP 10: Step 9

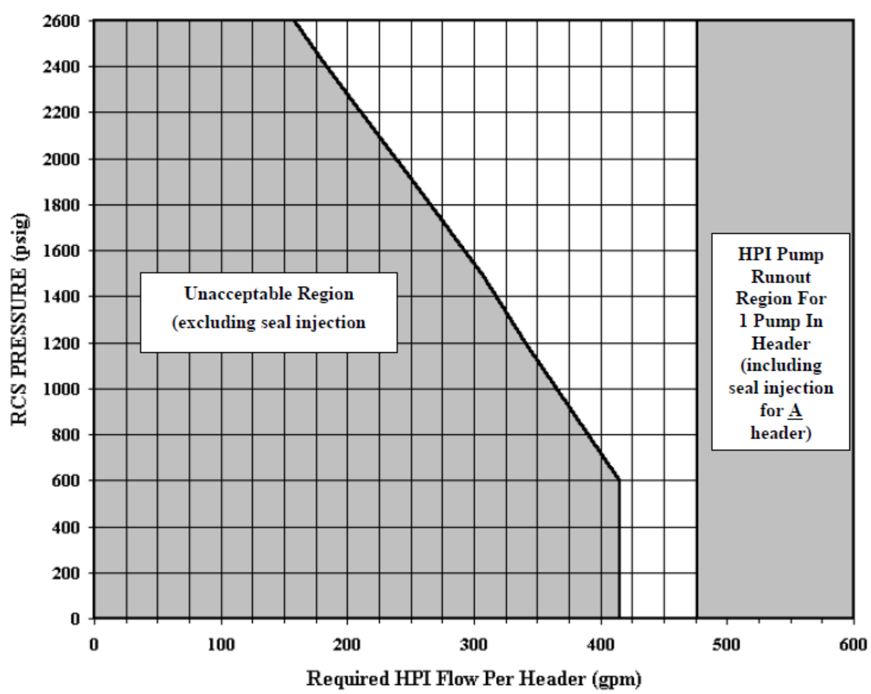
Verify flow in both HPI headers is in the acceptable region of Figure 1 (Required HPI Flow Per Header).

___ SAT

STANDARD: The candidate verifies HPI flow in the B HPI header is in the acceptable region of Figure 1 below, but that there is no flow in HPI header A, so he proceeds to step 9 **RNO**.

___ UNSAT

Figure 1
Required HPI Flow Per Header



Examiner Note: Since 1HP-26 failed closed earlier, there is no flow in HPI header A, so the candidate must go to the RNO to open 1HP-410.

COMMENTS:

ALTERNATE PATH: STEP 11: Step 9 **RNO** 1. **IF** 1A HPI header flow is unacceptable, **THEN** open 1HP-410. 2. **IF** 1B HPI header flow is unacceptable, **THEN** open 1HP-409. STANDARD: The candidate determines that 1A HPI header flow is unacceptable and opens 1HP-410. COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT
STEP 12: Step 10 Verify flow exists in any HPI header. STANDARD: The candidate locates HPI Flow Train A and B flow meters on 1UB1. Loop A and Loop B flow is verified. ***Examiner Note: This flow has already been verified in step 7*** COMMENTS:	___ SAT ___ UNSAT
STEP 13: Step 11 Perform the following: A. Place 1RC-66 SETPOINT SELECTOR to OPEN B. Depress 1RC-66 OPEN PERMIT pushbutton STANDARD: The candidate: • Rotates 1RC-66 SETPOINT SELECTOR switch on 1UB1 to the OPEN position • Depresses 1RC-66 OPEN PERMIT pushbutton on 1UB1 • Verifies PORV is open by verifying that the red "OPEN" indication is illuminated and the PORV Flow Statalarm (1SA18/A1) is in alarm. ***Examiner Note: This flow has already been verified in step 8*** COMMENTS:	___ SAT ___ UNSAT

STEP 14: Step 12 Verify > one RCP operating. STANDARD: Candidate determines that two RCPs are operating. COMMENTS:	___ SAT ___ UNSAT
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.** STEP 15: Step 13 Stop all but one RCP. STANDARD: The candidate stops ALL but one RCP by rotating their control switches to "OFF" position. COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT
STEP 16: Step 14 **IAAT** the following limits are exceeded **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) **THEN** throttle HPI to maximize flow ≤ flow limit. STANDARD: The candidate verifies header flows less than the limits in the table above. COMMENTS:	___ SAT ___ UNSAT

Table for Step 16:

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)

STEP 17: Step 15 De-energize all PZR heaters. STANDARD: The candidate: • Rotates the PZR heater bank #1 on 1UB1 switch to the "OFF" position. • Presses the OFF pushbutton controls for PZR heater banks 2, 3 and 4 on 1UB1 COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT
STEP 18: Step 16 Close 1HP-5 (LETDOWN ISOLATION) STANDARD: The candidate: • Rotates the switch for 1HP-5 on 1UB1 to the closed position. • Observes the red OPEN light go off and the green CLOSED light come on. COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT
STEP 19: Step 17 Close the following: • TBVs • 1FDW-35 • 1FDW-44 STANDARD: Take the TBVs to HAND and reduce demand to zero using the toggle switch Take 1FDW-35 and 1FDW-44 to HAND and reduce demands to zero using the toggle switches. COMMENTS:	___ SAT ___ UNSAT

STEP 20: Step 18 **IAAT** all HPI is lost, **THEN**: A. Stop all RCPs B. Position 1RC-66 SETPOINT SELECTOR to HIGH STANDARD: The candidate verifies HPI is available and operating and the IAAT step does not apply at this time. COMMENTS:	___ SAT ___ UNSAT
STEP 21: Step 19 **WHEN** directed by CR SRO, **THEN EXIT** this rule. STANDARD: The candidate announces that Rule 4 is complete with outstanding IAATs and returns the Cue sheet to the examiner indicating he has completed his JPM. COMMENTS: **END TASK**	___ SAT ___ UNSAT

STOP TIME: ____________

CRITICAL STEP EXPLANATIONS:

STEP #	Explanation
3	Step is required provide proper system alignment for HPI forced cooling flow
7	Step is required to verify HPI flow available for forced cooling.
8	Step is required to open the PORV to initiate HPI forced cooling through the core (TCA #26).
11	Step required to allow flow in both HPI headers
15	Step required to limit the heat input to the RCS
17	Step required to limit the heat input to the RCS
18	Step required to Reduce the amount of heat energy added to the RB Containment

CANDIDATE CUE SHEET
(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

INITIAL CONDITIONS:

- Unit 1 has tripped following a total loss of feedwater
- IMAs are complete
- The crew has been performing Rule # 3 (Loss of Main or Emergency FDW) to regain heat transfer
- CBP feed could not be established and efforts to restore steam generator heat transfer per Rule # 3 have not been successful
- You are at the step 22 “WHEN” step in Rule 3 (Loss of Main or Emergency FDW)

INITIATING CUES:

The CR SRO directs you to review outstanding IAAT’s.

This JPM is Time Critical

REGION II
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

CRO-415
ALIGN MDEFDWP SUCTION TO THE HOTWELL AND FEED THE STEAM GENERATORS

CANDIDATE ______________________________

EXAMINER ______________________________

REGION II
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

Task:

Align MDEFDWP Suction To The Hotwell And Feed The Steam Generators

Alternate Path:

No

Facility JPM #:

CRO-013

K/A Rating(s):

System: APE054
K/A: AA1.01
Rating: 4.5/4.4

Task Standard:

The MDEFDWPs are aligned to the Hotwell and providing flow to the SG's within limits prior to reaching a level of 1 foot in the UST.

Preferred Evaluation Location:

Simulator __X__ In-Plant _____

Preferred Evaluation Method:

Perform __X___ Simulate ____

References:

EP/1/A/1800/001 (Emergency Operating Procedure) Enclosure 5.9 (Extended EFDW Operation)

Validation Time: 15 minutes

Time Critical: NO

==

Candidate: ____ NAME

Time Start: _________
Time Finish: ________

Performance Rating: SAT ______ UNSAT ______

Performance Time: _________

Examiner: ______________________________ NAME

____________________________________/________ SIGNATURE DATE

==

COMMENTS

SIMULATOR OPERATOR INSTRUCTIONS:

1. **RECALL** Snap 222
2. **IMPORT** files for CRO-415
3. Go to **RUN**

Tools/Equipment/Procedures Needed:

EP/1/A/1800/001 (Emergency Operating Procedure) Enclosure 5.9 (Extended EFDW Operation)

READ TO OPERATOR

DIRECTION TO TRAINEE:

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 TDEFDWP is unavailable. Actions of the EOP have been completed. Enclosure 5.9 (Extended EFDW Operation) has been initiated per Rule 3 and is completed up to Step 120. Main FDW is not expected back for several hours. DW and CST makeup capability to the UST have been lost.

INITIATING CUES:

Procedure Director directs you to continue performance of Enclosure 5.9 (Extended EFDW Operation) beginning a Step 120.

START TIME: _______

STEP 1: Step 120 **WHEN** UST level is < 4' **THEN** dispatch two operators to perform Enclosure 5.24 (Operation of ADVs) in preparation for loss of vacuum. STANDARD: Monitors UST level and determines that level is less than four feet. Dispatches two operators to perform Enclosure 5.24 (Operation of ADVs) Continues to Step 121 COMMENTS:	___ SAT ___ UNSAT
STEP 2: Step 121 Verify power available to 1V-186 STANDARD: Determines that power is available to 1V-186 by observing valve position indication is illuminated. Continues to Step 122 **Booth cue: Fire Timer 1 to Reduce UST level to < 3 feet (75,000) over 30 seconds.** COMMENTS:	___ SAT ___ UNSAT

NOTE 1C-573 will be closed after vacuum is broken. STEP 3: Step 122 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. STANDARD: Dispatches AO to 1C-573 to take above actions. Continues to Step 123 ***Booth cue: Inform student that an AO has been dispatched*** COMMENTS:	___ SAT ___ UNSAT
STEP 4: Step 123 **WHEN** UST level is < 3 ' **THEN** continue. STANDARD: Monitors UST level and determines that level is less than three feet. Continues to Step 124 COMMENTS:	___ SAT ___ UNSAT
STEP 5: Step 124 Open 1V-186 STANDARD: Locate valve switch and rotate to open position and verifies red open light illuminates. Continues to Step 125 COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT

STEP 6: Step 125 Stop all main vacuum pumps. STANDARD: Verifies all three Main Vacuum Pumps are OFF Continues to Step 126 COMMENTS:	___ SAT ___ UNSAT
STEP 7: Step 126 Stop all CBPs. STANDARD: Stops all Condensate Booster Pumps by rotating the switches to the OFF position. Continues to Step 127 COMMENTS:	___ SAT ___ UNSAT
STEP 8: Step 127 Stop all HWPs. STANDARD: Stops all Hotwell Pumps by rotating the switches to the OFF position. Continues to Step 128 COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT

STEP 9: Step 128 Close the following: ▪ 1MS-47 ▪ 1AS-40 STANDARD: Rotates 1MS-47 switch in the closed direction. Verifies 1AS-40 green closed light on and the red open light off. Continues to Step 129 COMMENTS:	___ SAT ___ UNSAT
NOTE • 1C-573 is open unless Step 135 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. STEP 10: Step 129 **IAAT** UST level is < 1', **AND** 1C-573 (MD EFDWPs Suction From UST) is open, **THEN** perform Steps 130 - 131. STANDARD: Determine UST is above 1'. Perform **RNO**, **GO TO** Step 132 COMMENTS:	___ SAT ___ UNSAT
STEP 11: Step 132 Reduce MD EFDWP flow to < 440 gpm per pump. Notify crew of MDEFWP flow limit while aligned to hotwell. STANDARD: Verifies / Reduces MDEFWP flows to < 440 gpm Notifies crew of MDEFWP flow limit Continues to Step 133 COMMENTS:	___ SAT ___ UNSAT

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. STEP 12: Step 133 **WHEN** vacuum is broken. **THEN** continue. STANDARD: Determine vacuum is broken. Continues to Step 134 ***Booth cue: Approximately 2 minutes after 1V-186 is opened by the AO, inform the student that for exam purposes (using time compression) vacuum is broken.*** COMMENTS:	___ SAT ___ UNSAT
STEP 13: Step 134 **IAAT** MD EFDWPs are operating, **OR** available to operate, **THEN PERFORM** Steps 135 - 137. STANDARD: Determines the MD EFDWPs are operating. Continues to Step 135. COMMENTS:	___ SAT ___ UNSAT

STEP 14: Step 135 Locally close 1C-573 (MD EFDWPs Suction From UST) (T-1, SW of E-24, 8' above floor). STANDARD: Dispatch an AO to locally close 1C-573. Continues to Step 136 ***Booth cue: Close using Manual Valves & inform student that (using time compression) 1C-573 is closed.*** COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT
STEP 15: Step 136 Verify MD EFDWPs were stopped due to UST level < 1'. STANDARD: Determine that the MD EFDWPs were NOT stopped. Perform the **RNO**, **GO TO** Step 138. COMMENTS:	___ SAT ___ UNSAT
STEP 16: Step 138 Verify 1 TD EFDW PUMP operating. STANDARD: Determine the 1 TD EFDW PUMP is NOT operating. Perform the **RNO**, **GO TO** Step 142. COMMENTS:	___ SAT ___ UNSAT

<u>STEP 17</u>: Step 142 Locally close 1C-157 (TD EFDWP Suction From UST) (T-1/C-20). <u>STANDARD</u>: Dispatch an AO to locally close 1C-157. Continues to Step 143 ***Booth cue: Close using Manual Valves and inform student that (using time compression) 1C-157 is closed.*** <u>COMMENTS</u>:	___ SAT ___ UNSAT
<u>STEP 18</u>: Step 143 Open 1C-391. <u>STANDARD</u>: Rotates the switch in the open direction and verifies red open light lit and green closed light off. ***Cue: Inform candidate that another RO will continue in this procedure.*** <u>COMMENTS</u>: **END TASK**	___ SAT ___ UNSAT

STOP TIME: ____________

CRITICAL STEP EXPLANATIONS:

STEP #	Explanation
5	Condenser vacuum must be broken thus increasing the NPSH to the EFDWPs. This prevents EFDWP damage due to not meeting suction head requirements when Hotwell level is < 3 ft.
8	STOP all HWPs to prevent damage to the MDEFDWP by decreasing NPSH
14	Closing 1C-573 prevents air introduction into the pumps suction, thus preventing pump cavitation and possible pump damage.

CANDIDATE CUE SHEET
(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

INITIAL CONDITIONS:

The TDEFDWP is unavailable. Actions of the EOP have been completed. Enclosure 5.9 (Extended EFDW Operation) has been initiated per Rule 3 and is completed up to Step 120. Main FDW is not expected back for several hours. DW and CST makeup capability to the UST have been lost.

INITIATING CUES:

Procedure Director directs you to continue performance of Enclosure 5.9 (Extended EFDW Operation) beginning a Step 120.

REGION II
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

CRO-500

Restore RB Auxiliary Fan Coolers Following a Loss of LPSW

CANDIDATE ______________________________

EXAMINER ______________________________

REGION II
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

Task:

Restore RB Auxiliary Fan Coolers Following a Loss of LPSW

Alternate Path:

No

Facility JPM #:

CRO-500

K/A Rating(s):

System: 022
K/A: A4.04
Rating: 3.1*/3.2

Task Standard:

Restore RB Auxiliary Fan Coolers Following a Loss of LPSW per OP/1/A/1104/010 (LPSW) Encl. 4.16 (LPSW Shutdown and Return to Service RB Aux Coolers)

Preferred Evaluation Location:

Simulator __X__ In-Plant ____

Preferred Evaluation Method:

Perform __X__ Simulate ____

References:

OP/1/A/1104/010 (LPSW) Encl. 4.16 (LPSW Shutdown and Return to Service RB Aux Coolers)

Validation Time: 15 minutes

Time Critical: NO

===

Candidate: ____ Time Start: _________

NAME Time Finish: ________

Performance Rating: SAT ______ UNSAT ______ Performance Time: _________

Examiner: ______________________________ ____________________________________/________

NAME SIGNATURE DATE

===

COMMENTS

SIMULATOR OPERATOR INSTRUCTIONS:

1. **RECALL** Snap 219
2. Go to **RUN**
3. **ACKNOWLEDGE** Alarms

Tools/Equipment/Procedures Needed:

AP/24, Loss of LPSW

OP/1/A/1104/010 (LPSW) Encl. 4.16 (LPSW Shutdown and Return to Service RB Aux Coolers)

READ TO OPERATOR

DIRECTION TO TRAINEE:

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 Loss of LPSW has occurred

AP/24 (Loss of LPSW) is in progress

LPSW has been restored

The hydraulic restoration of this system has been performed.

Section 6 (Startup Alignment Of RB Aux Coolers) of OP/1/A/1104/010 Encl. 4.16 (LPSW Shutdown and Return to Service RB Aux Coolers) is not required to be performed.

INITIATING CUES:

The CRS directs you to OP/1/A/1104/010 Encl. 4.16 (LPSW Shutdown and Return to Service RB Aux Coolers) to return the RB Aux Coolers to service beginning at step 5.1.

START TIME: _______

STEP 1:	Step 5.1 Perform the following: • Ensure 1LPSW-1062 (RB AUX COOLERS RETURN CONTROL) Controller in Manual/Closed. • Position 1LPSW-1062 (RB AUX COOLERS RETURN CONTROL) Remote/Closed switch to Close. • Ensure 1LPSW-1054 (RB AUX COOLERS SUPPLY CONTROL) Controller in Manual/Closed. • Position 1LPSW-1054 (RB AUX COOLERS SUPPLY CONTROL) Remote/Closed switch to Close. • Ensure closed 1LPSW-1061 (RB AUX COOLERS RETURN BLOCK). • Ensure closed 1LPSW-1055 (RB AUX COOLERS SUPPLY BLOCK).	___ SAT ___ UNSAT
STANDARD:	Candidate performs the following (valves located on 1VB2): • Determine 1LPSW-1062 (RB AUX COOLERS RETURN CONTROL) Controller in Manual/Closed. • Position 1LPSW-1062 (RB AUX COOLERS RETURN CONTROL) Remote/Closed switch to Close. • Determine 1LPSW-1054 (RB AUX COOLERS SUPPLY CONTROL) Controller in Manual/Closed. • Position 1LPSW-1054 (RB AUX COOLERS SUPPLY CONTROL) Remote/Closed switch to Close. • Determine 1LPSW-1061 (RB AUX COOLERS RETURN BLOCK) is closed by observing green closed light illuminated and red open light off. • Determine 1LPSW-1055 (RB AUX COOLERS SUPPLY BLOCK) is closed by observing green closed light illuminated and red open light off.	
COMMENTS:		

STEP 2: Step 5.2 **IF** required, perform the following: • **IF** required, ensure hydraulic restoration of system has been performed. • **IF** required, ensure Section 6 (Startup Alignment Of RB Aux Coolers) has been performed. STANDARD: Determines that the hydraulic restoration of system has been performed and Section 6 (Startup Alignment Of RB Aux Coolers) is not required to be performed. (**from cue sheet**) ***Cue: If asked, refer the candidate to the Initial Conditions.*** COMMENTS:	___ SAT ___ UNSAT
STEP 3: Step 5.3 Perform the following: • Depress LPSW LOW PRESS DIG CH1 RESET. • Depress LPSW LOW PRESS DIG CH2 RESET. STANDARD: Depress the LPSW LOW PRESS DIG CH1 RESET and CH 2 RESET pushbuttons located on 1VB2. COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT

STEP 4:	Step 5.4 Perform the following: • Ensure open 1LPSW-1061 (RB AUX COOLERS RETURN BLOCK). • Ensure open 1LPSW-1055 (RB AUX COOLERS SUPPLY BLOCK).	**CRITICAL STEP** ___ SAT ___ UNSAT
STANDARD:	Open 1LPSW-1061 located on 1VB3 by taking the switch to the open position and verify the red open light illuminates and the green closed light goes off. Open 1LPSW-1055 located on 1VB3 by taking the switch to the open position and verify the red open light illuminates and the green closed light goes off.	
COMMENTS:		

NOTE: When placed in AUTO, 1LPSW-1054 begins ramping open slowly. 1LPSW-1054 will be full open in 16 minutes.	***CRITICAL STEP**

STEP 5: Step 5.5

Perform the following to fill/pressurize RB Aux Coolers:

- 5.5.1 Position 1LPSW-1054 (RB AUX COOLERS SUPPLY CONTROL) Remote/Closed switch to Remote.
- 5.5.2 Ensure 1LPSW-1054 (RB AUX COOLERS SUPPLY CONTROL) Controller setpoint at 100%.
- 5.5.3 Ensure 1LPSW-1054 (RB AUX COOLERS SUPPLY CONTROL) Controller in Automatic.
- 5.5.4 Verify 1LPSW-1054 (RB AUX COOLERS SUPPLY CONTROL) begins to ramp open.

___ SAT

___ UNSAT

STANDARD: Candidate will perform the following to fill/pressurize RB Aux Coolers (valves located on 1VB3):

- *5.5.1 Position 1LPSW-1054 (RB AUX COOLERS RETURN CONTROL) Remote/Closed switch to Remote.
- 5.5.2 Determine 1LPSW-1054 (RB AUX COOLERS RETURN CONTROL) Controller setpoint at 100% by selecting "S" on controller and verifying readout is 100%.
- *5.5.3 Place 1LPSW-1054 (RB AUX COOLERS RETURN CONTROL) Controller in Automatic depressing "A" on the controller.
- 5.5.4 Determine that 1LPSW-1054 (RB AUX COOLERS RETURN CONTROL) begins to ramp open by "ramping" flashing in display and selecting “V” on the controller and verifying that valve demand begins increasing towards 100%.

COMMENTS:

NOTE: When placed in AUTO, 1LPSW-1062 will have a two minute time delay then begin ramping open slowly. 1LPSW-1062 will be full open in 18 minutes (including time delay).	***CRITICAL STEP**

STEP 6: Step 5.6

Perform the following to establish flow through RB Aux Coolers:

- 5.6.1 Position 1LPSW-1062 (RB AUX COOLERS RETURN CONTROL) Remote/Closed switch to Remote.
- 5.6.2 Ensure 1LPSW-1062 (RB AUX COOLERS RETURN CONTROL) Controller setpoint at 100%.
- 5.6.3 Ensure 1LPSW-1062 (RB AUX COOLERS RETURN CONTROL) Controller in Automatic.

___ SAT

___ UNSAT

STANDARD: Candidate will perform the following to establish flow through RB Aux Coolers (valves located on 1VB2):

- *5.6.1 Position 1LPSW-1062 (RB AUX COOLERS RETURN CONTROL) Remote/Closed switch to Remote.
- 5.6.2 Determine 1LPSW-1062 (RB AUX COOLERS RETURN CONTROL) Controller setpoint at 100% by selecting "S" on controller and verifying readout is 100%.
- *5.6.3 Place 1LPSW-1062 (RB AUX COOLERS RETURN CONTROL) Controller in Automatic depressing "A" on the controller.

Cue: Inform candidate that another RO will complete Enclosure 4.16 and JPM is complete.

COMMENTS:

END TASK

STOP TIME: ____________

CRITICAL STEP EXPLANATIONS:

STEP #	Explanation
3	This step is required to establish flow through the controller.
4	This step is required to complete the LPSW flow path.
5	This step is required to establish flow through the controller.
6	This step is required to establish flow through the controller.

CANDIDATE CUE SHEET
(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

INITIAL CONDITIONS:

A Loss of LPSW has occurred

AP/24 (Loss of LPSW) is in progress

LPSW has been restored

The hydraulic restoration of this system has been performed.

Section 6 (Startup Alignment Of RB Aux Coolers) of OP/1/A/1104/010 Encl. 4.16 (LPSW Shutdown and Return to Service RB Aux Coolers) is not required to be performed.

INITIATING CUES:

The CRS directs you to OP/1/A/1104/010 Encl. 4.16 (LPSW Shutdown and Return to Service RB Aux Coolers) to return the RB Aux Coolers to service beginning at step 5.1.

REGION II
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

CRO-608

Synchronization With the Grid Following a Load Rejection

CANDIDATE ____

EXAMINER ____

REGION II
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

Task:

Synchronization With the Grid Following a Load Rejection

Alternate Path:

No

Facility JPM #:

CRO-601

K/A Rating(s):

System: 062
K/A: A4.07
Rating: 3.1*/3.1*

Task Standard:

The main generator is synchronized to the electrical grid using AP/1 (Unit Runback) and manually tripped by direction from an IAAT or due to exceeding vibration limits per procedure when high vibration occurs

Preferred Evaluation Location:

Simulator __X___ In-Plant ______

Preferred Evaluation Method:

Perform __X__ Simulate _____

References:

AP/1 (Unit Runback)

Validation Time: 10 minutes

Time Critical: No

===

Candidate: ____ Time Start: _________
NAME Time Finish: ________

Performance Rating: SAT ______ UNSAT ______ Performance Time: _________

Examiner: _______________________________ ____________________________________/________
NAME SIGNATURE DATE

===

COMMENTS

SIMULATOR OPERATOR INSTRUCTIONS:

1. **RECALL** Snap 220
2. **IMPORT** files for CRO-608
3. Place simulator in **RUN**

Tools/Equipment/Procedures Needed:

AP/001 (Unit Runback)

READ TO OPERATOR

DIRECTION TO TRAINEE:

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 initially operating at 40% power when PCB-20 (GENERATOR BREAKER) and PCB-21 (GENERATOR BREAKER) trip open due to a faulty relay

Unit is currently at ≈ 20% power

The faulty relay that initiated the load rejection has been repaired

AP/1 (Unit Runback) in progress up to Section 4C step 14

INITIATING CUES:

The CRS directs you to continue with AP/1 (Unit Runback) beginning at step 14 of Section 4C.

Auto Speed match is desired.

START TIME: _______

CAUTION Do **NOT** excite Generator > 19.95 KV. Generator winding damage may result. STEP 1: Step 14 Ensure VOLTAGE REGULATOR MODE in AUTO. STANDARD: Verify VOLTAGE REGULATOR MODE switch selected to AUTO on UB2. Continue to Step 15 COMMENTS:	___ SAT ___ UNSAT
STEP 2: Step 15 Notify SOC that Turbine generator is ready to be paralleled to system and that Voltage Regulator Mode is in AUTO. STANDARD: The CR phone is used to notify the SOC that Turbine generator is ready to be paralleled to system and that Voltage Regulator Mode is in AUTO. Continue to Step 16 COMMENTS:	___ SAT ___ UNSAT
STEP 3: Step 16 Place PCB-20 (GENERATOR BREAKER) synchronizing switch in ON. STANDARD: PCB-20 (GENERATOR BREAKER) synchronizing switch located on 1UB2 is placed in ON. Continue to Step 17 COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT

STEP 4: Step 17 Verify automatic SPEED MATCH is desired. STANDARD: Determine if automatic SPEED MATCH is desired. Continue to Step 18 ***Cue: If asked as the SRO, inform candidate that automatic SPEED MATCH is desired.*** COMMENTS:	___ SAT ___ UNSAT
STEP 5: Step 18 Select SPEED MATCH on SELECT SPEED TARGET. STANDARD: SPEED MATCH is selected on SELECT SPEED TARGET on the HMI Screen. Continue to Step 19 COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT
STEP 6: Step 19 **GO TO** Step 22. STANDARD: Candidate goes to Step 22. Continue to Step 22 COMMENTS:	___ SAT ___ UNSAT

STEP 7:	Step 22 Ensure slow clockwise rotation of the SYNCROSCOPE pointer.	___ SAT ___ UNSAT
STANDARD:	Verify SYNCROSCOPE pointer is in a slow clockwise rotation. Continue to Step 23	
COMMENTS:		
STEP 8:	Step 23 Using VOLTAGE ADJUST, adjust T1 OUTPUT VOLTS to match SWITCHYARD VOLTS when the SYNCHROSCOPE pointer is vertical.	___ SAT ___ UNSAT
STANDARD:	The candidate uses the VOLTAGE ADJUST located on 1UB2 to adjust T1 (Main Transformer) OUTPUT VOLTS to match SWITCHYARD VOLTS when the synchroscope pointer is vertical. Continue to Step 24	
COMMENTS:		
STEP 9:	Step 24 **WHEN** synchroscope pointer is ≈ 5° before vertical, **THEN** close PCB-20 (GENERATOR BREAKER).	**CRITICAL STEP** ___ SAT ___ UNSAT
STANDARD:	The synchroscope located on 1UB2 is monitored and when the pointer is ≈ 5° before vertical, PCB-20 (GENERATOR BREAKER) is closed by rotating the switch to the close position. The red CLOSED light illuminates and the white OPEN light extinguishes. Continue to Step 25	
Note: Main Turbine vibration (Bearing 11) will increase after PCB-20 is closed. **Note: Candidate should go to IAAT Step 6 when they determine that a Main Turbine operating limit is approached.**		
COMMENTS:		

STEP 10: Step 25 Place PCB-20 synchronizing switch in OFF. STANDARD: PCB-20 synchronizing switch located on 1UB2 is placed in OFF. Continue to Step 26 COMMENTS:	___ SAT ___ UNSAT
STEP 11: Step 26 Calculate desired generator load as follows: Current load + 35 MWe = Desired load STANDARD: Calculate desired load using formula above. Continue to Step 27 COMMENTS:	___ SAT ___ UNSAT
STEP 12: Step 27 Establish "desired load" calculated above by using one of the following: • LOAD REFERENCE DEMAND • TURBINE MASTER • TURBINE SPEED CHANGER STANDARD: The LOAD REFERENCE DEMAND (on HMI screen), the TURBINE MASTER (on 1UB1), or the TURBINE SPEED CHANGER (on 1UB2) is used to establish "desired load". **GO TO** Step 6. COMMENTS:	___ SAT ___ UNSAT

STEP 13:	Step 6 **IAAT** Main Turbine approaches operating limits per Encl. 5.3 (Main Turbine Operating Limits), **THEN GO TO** Step 7.	___ SAT
STANDARD:	Refer to per Encl. 5.3 (Main Turbine Operating Limits) and determine that Bearing 11 is approaching the operating limit of 8 mils.	___ UNSAT
COMMENTS:		
STEP 14:	Step 7 Verify Step 36 complete.	
STANDARD:	Determine that Step 36 is NOT complete. Continue to Step 7 **RNO**	___ SAT ___ UNSAT
COMMENTS:		
STEP 15:	Step 7 **RNO** • Trip Rx. • **GO TO** Unit 1 EOP.	***CRITICAL STEP** ___ SAT
STANDARD:	Manually trip the Unit 1 reactor by depressing the Reactor Trip pushbutton. Notify the CRS to **GO TO** Unit 1 EOP. ***It is critical that either the Reactor be tripped by the Step 7 RNO in this step or that the Main Turbine be directly tripped when 8 mils is exceeded per Enclosure 5.3 (Main Turbine Operating Limits).**	___ UNSAT
Cue: If this step performed, inform candidate that this JPM is complete.		
COMMENTS:		

STEP 16: Enclosure 5.3 Enclosure 5.3 (Main Turbine Operating Limits)of AP/1 contains Main Turbine Operating Limits. Step 8 directs that: If Alterex Bearing vibration (bearings 11 or 12) exceeds 8 mils at any speed, the turbine should be tripped immediately. STANDARD: IF Bearing 11 vibration exceeds 8 mils prior to tripping the Reactor in accordance with Step 7 RNO, the Main Turbine should be tripped immediately. ***It is critical that if Bearing 11 vibration reaches 8 mils prior to completing step 7 RNO that the Main Turbine be tripped. This step is NOT critical if the Reactor is tripped prior to bearing 11 reaching 8 mils** ***Cue: If this step performed, inform candidate that this JPM is complete.*** COMMENTS: **END TASK**	***CRITICAL STEP** ___ SAT ___ UNSAT

STOP TIME: ____________

CRITICAL STEP EXPLANATIONS:

STEP #	Explanation
3	Sync switch must be ON to satisfy the interlock close the PCB (generator output breaker)
5	This ensures that the generator picks up electrical load (MWs) when the generator output breaker is closed and prevents motoring the generator.
9	Required to tie generator to grid.
15	Either step 15 or step 16 are required to protect the Turbine Generator
16	Either step 15 or step 16 are required to protect the Turbine Generator

CANDIDATE CUE SHEET
(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

INITIAL CONDITIONS:

Unit 1 initially operating at 40% power when PCB-20 (GENERATOR BREAKER) and PCB-21 (GENERATOR BREAKER) trip open due to a faulty relay

Unit is currently at ≈ 20% power

The faulty relay that initiated the load rejection has been repaired

AP/1 (Unit Runback) in progress up to Section 4C step 14

INITIATING CUES:

The CRS directs you to continue with AP/1 (Unit Runback) beginning at step 14 of Section 4C.

Auto Speed match is desired.

REGION II
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

CRO-804

Place Reactor Building Purge in Operation

CANDIDATE ______________________________

EXAMINER ______________________________

REGION II
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

Task:

Place the Reactor Building Purge In Operation

Alternate Path:

Yes

Facility JPM #:

CRO-100

K/A Rating(s):

System: 029
K/A: A2.03
Rating: 2.7/3.1

Task Standard:

RB Purge is placed in operation in accordance with OP/1/A/1102/014 (RB Purge System) and the RB Purge Fan secured and valves closed following 1RIA-45 HIGH alarm.

Preferred Evaluation Location:

Simulator ___X___ In-Plant _______

Preferred Evaluation Method:

Perform __X___ Simulate ____

References:

OP/1/A/1102/014 (RB Purge System)

PT/0/A/0230/001 (Radiation Monitor Check)

AP/1/A/1700/018 (Abnormal Release of Radioactivity)

OP/1/A/6101/008 (Alarm Response Guide 1SA-08) B-9 and D-9

Validation Time: 15 min. **Time Critical:** NO

==

Candidate: ____
NAME

Time Start: _______________
Time Finish: ______________

Performance Rating: SAT ______ UNSAT ______

Performance Time: _________

Examiner: ______________________________ ____________________________________/_________
NAME SIGNATURE DATE

==

Comments

SIMULATOR OPERATOR INSTRUCTIONS

1. **RECALL** Snap 221
2. **IMPORT** files for CRO-804
3. Remove T/O tags from 1A/1B Aux Fan Switches
4. REPLACE AP/18 with clean copy
5. Go to **RUN**

Tools/Equipment/Procedures Needed
OP/1/A/1102/014 (RB Purge System) Encl. 4.1 (RB Purge Release)
AP/1/A/1700/018 (Abnormal Release of Radioactivity)

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

RCS temperature = 114°F

RCS pressure = 45 psig

No Gaseous or Liquid releases are in progress

RB Hatch is closed

Continuous release is NOT in progress

RB Purge startup is in progress using OP/1/A/1102/014 (RB Purge System), Encl. 4.1 (RB Purge Release)

INITIATING CUE
The CRS directs you to place the RB Purge in operation at 1/3 Station Limit using OP/1/A/1102/014 (RB Purge System) Encl. 4.1 (RB Purge Release) starting at Step 3.8.

START TIME: _______

<table>
<tr><td>
STEP 1: Step 3.8
Perform the following:
3.8.1. Ensure <u>one</u> of the following:
• 1A RB AUX FAN is Off.
• 1B RB AUX FAN is Off.
3.8.2. Ensure "T/O Sheet" Control Room Tag on 1A RB AUX FAN.
3.8.3. Ensure "T/O Sheet" Control Room Tag on 1B RB AUX FAN.
3.8.4. Ensure note on Turnover sheet: "If RB Purge Fan is operating, 1A RB Aux Fan or 1B RB Aux Fan should be off."

STANDARD: *Secure the 1A or 1B RB AUX FAN and place a "T/O Sheet" Control Room Tag on the 1A and 1B RB AUX FAN control room switches.
Note: Placing tags on the RB Aux Fan switches in NOT critical.

Candidate should state they would place note on Turnover sheet: "If RB Purge Fan is operating, 1A RB Aux Fan or 1B RB Aux Fan should be off."

Continue to Step 3.9

Examiner Cues:
If asked as the SRO, inform the candidate that the 1A RB Aux Fan should be secured.

When appropriate, inform candidate that note has been placed on Turnover sheet per 3.8.4.

COMMENTS:
</td><td>
*CRITICAL STEP

___ SAT

___ UNSAT
</td></tr>
<tr><td>
NOTE: Completion of Step 3.9 establishes an appropriate vent path during Fuel Movement Operations with any Transfer Tube open per the Shutdown Protection Plan. This prevents FTC and SFP level variations caused by differential pressures between RB and SFP.

STEP 2: Step 3.9 Perform the following:
3.9.1 - Open 1PR-1 (RB PURGE OUTLET (RB)).

STANDARD: Open 1PR-1 by rotating the switch located on 1AB3 to open and verifying that the red open light illuminates and the green closed light goes out. May verify 1PR-1 open on the OAC.

Continue to Step 3.9.2
COMMENTS:
</td><td>
CRITICAL STEP

___ SAT

___ UNSAT
</td></tr>
</table>

<u>STEP 3</u>:	Step 3.9.2 Open 1PR-2 (RB PURGE OUTLET (PR)).	**CRITICAL STEP**
<u>STANDARD</u>:	Open 1PR-2 by rotating the switch located on 1AB3 to open and verifying that the red open light illuminates and the green closed light goes out. May verify 1PR-2 open on the OAC. Continue to Step 3.9.3	___ SAT ___ UNSAT
<u>COMMENTS</u>:		
<u>STEP 4</u>:	Step 3.9.3 Ensure closed 1PR-3 (RB PURGE FLOW). (Bailey Controller)	
<u>STANDARD</u>:	Rotate 1PR-3 controller knob until the position indication indicates zero. Continue to Step 3.9.4	___ SAT ___ UNSAT
<u>COMMENTS</u>:		
<u>STEP 5</u>:	Step 3.9.4 Verify 1PR-3 closed using alternate indication.	
<u>STANDARD</u>:	Verify 1PR-3 is closed by observing the closed light is lit on the ES Component Status Panel or switch on 1VB2, or verifying 1PR-3 position on the OAC. Continue to Step 3.9.5	___ SAT ___ UNSAT
<u>COMMENTS</u>:		
<u>STEP 6</u>:	Step 3.9.5 **WHILE** RB Purge operating, monitor unit vent RIAs.	
<u>STANDARD</u>:	Candidate monitors unit vent RIAs. Continue to Step 3.9.6	___ SAT ___ UNSAT
<u>COMMENTS</u>:		

STEP 7: Step 3.9.6 Perform the following: **NOTE:** When 1PR-3 (RB PURGE OUTLET SWITCH) is positioned to open, 1PR-3 will remain in the closed position since 1PR-3 Bailey Controller is closed. A. Position 1PR-3 (RB PURGE OUTLET SWITCH) to open. B. Throttle > 60% open 1PR-3 (RB PURGE FLOW). (Bailey Controller) STANDARD: Position 1PR-3 (RB PURGE OUTLET SWITCH) to open on 1VB2. Rotate knob on the Bailey Controller for 1PR-3 until it indicates > 60% open on 1AB3. Continue to Step 3.10 COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT

STEP 8: Step 3.10 **IF** required to operate the RB Purge Fan, perform the following: 3.10.1 Perform **one** of the following: A. Perform the following: • *Open 1PR-4 (RB PURGE INLET) • *Open 1PR-5 (RB PURGE INLET (PR)) • *Open 1PR-6 (RB PURGE INLET (RB)) B. Ensure the following: (**these steps will be N/Aed**) • 1PR-4 (RB PURGE INLET) valve position interlock jumpered per IP/0/A/0161/004 (Outage Interlock Bypass For Purge Isolation Valves) • 1PR-5 (RB PURGE INLET (PR)) valve position interlock jumpered per IP/0/A/0161/004 (Outage Interlock Bypass For Purge Isolation Valves) • 1PR-6 (RB PURGE INLET (RB)) valve position interlock jumpered per IP/0/A/0161/004 (Outage Interlock Bypass For Purge Isolation Valves) • Open RB Equipment Hatch ***Examiner Cue: If asked, inform the candidate that there is no information regarding the purge valves on the turnover sheet.*** **NOTE:** Starting/Stopping RB Purge may cause SFP level changes. Entry into AP/1-2/A/1700/35 **NOT** required if SFP level changes are evaluated and stabilizes. There is ~ 20 second time delay to open the dampers before the Purge starts. 3.10.2 *Start RB Purge Fan. 3.10.3 Ensure 1PR-3 (RB PURGE FLOW) (Bailey Controller) adjusted to < recommended release rate. STANDARD: Open 1PR-4, 5, and 6 by rotating the switches located on 1AB3 to open and verifying that the red open lights are illuminated and the green closed lights go out. May verify 1PR-4, 5, and 6 open on the OAC. Start RB Purge Fan by placing the switch located on 1AB3 to start and verifying that the red on light illuminates. Adjust 1PR-3 (RB PURGE FLOW) (Bailey Controller) < recommended release rate as read on Chessell Misc. System Recorder 1 located on 1VB1. Continue to Step 3.11 **Note: After the RB Purge Fan is started, the HIGH alarm for 1RIA-45 will actuate. The associated interlock will not occur.** COMMENTS:	***CRITICAL STEP** ___ SAT ___ UNSAT

ATLERNATE PATH	**CRITICAL STEP**
The following Statalarms will actuate: • 1SA-08/D-9 (RM Reactor Building Purge Discharge Radiation Inhibit) • 1SA-08/B-9 (Process Monitor Radiation High) ***Examiner Cue: IF SRO is informed of the alarms actuating, inform the candidate that the SRO reply is to "Refer to the alarm response guides".*** ***Examiners Note: The candidate may refer to one or both ARGs. If 1SA-08/D-9 is selected, then STEP 9 will be performed and that will end the task. If 1SA08/B-9 is selected, then STEPs 10 - 13 will be performed and that will end the task. Either step 9 or step 13 is Critical but not both.***	___ SAT ___ UNSAT
<u>STEP 9</u>: Refer to **1SA-08/D-9** (RM Reactor Building Purge Discharge Radiation Inhibit) 3.1 Ensure auto action has taken place. 3.2 Observe Reactor Building RIAs and evacuate personnel as it becomes necessary. 3.3 Determine cause of inhibit and correct. <u>STANDARD</u>: Determine that the automatic actions have NOT taken place and using ARG guidance perform the following: • Stop the RB Purge Fan • Close 1PR-2 • Close 1PR-3 • Close 1PR-4 • Close 1PR-5 <u>COMMENTS</u>: **END OF TASK**	

STEP 10: Refer to **1SA-08/B-9** (Process Monitor Radiation High

3.1 Perform **one** of the following:
- 3.1.1. Determine radiation monitors in alarm.
- 3.1.2. **IF** Radiation Monitoring data from the PMC System is **NOT** in service, refer to OP/1/A/1103/026, (Loss of Sorrento Radiation Monitor).

> **NOTE:** Loss of power to a process monitor skid actuates the Process Monitor Fault alarm, causes the associated RIA to activate the High alarm, and actuates any associated interlocks from the High alarm. The actual RIA readout may indicate magenta with readings of negative values.

3.2 **IF** 1SA-08/B-10 (Process Monitor Fault) has occurred for the same monitor, **Go To** the ARG for 1SA-08/B-10 (Process Monitor Fault). {3}

3.3 **IF** 1RIA-40 alarms, Go To the appropriate procedure:
- < 25 gpm (36,000 gpd) - AP/1/A/1700/031 (Primary To Secondary Leakage)
- ≥ 25 gpm (36,000 gpd) - EP/1/A/1800/001 (Emergency Operating Procedure)

3.4 **IF** any of the following RIAs have valid alarms, **Go To** AP/1/A/1700/018 (Abnormal Release of Radioactivity).

√	**RIA**
	RIA-31
	1RIA-35
	1RIA-39
	1RIA-41
	1RIA-42
	1RIA-45, 46
	1RIA-49A
	1RIA-50
	1RIA-54

___ SAT

___ UNSAT

STANDARD: Determine 1RIA-45 is in HIGH alarm

Determine that Radiation Monitoring data from the PMC System is in service

Determine 1SA-08/B-10 (Process Monitor Fault) is NOT in alarm

Determine 1RIA-40 is NOT is alarm

Determine 1RIA-45 is in alarm and **Go To** AP/1/A/1700/018 (Abnormal Release of Radioactivity).

COMMENTS:

STEP 11: AP/1/A/1700/018 (Abnormal Release of Radioactivity)

Step 4.1 - Perform the following:

- At the discretion of the CRS, make a PA announcement of the event including any necessary precautions to be observed.
- Notify SM to reference the following:
  - RP/0/B/1000/001 (Emergency Classification).
  - NSD-202 (Reportability)
  - OMP 1-14 (Notifications)

STANDARD: Candidate makes announcement and notifies SM

Continue to Step 4.2

COMMENTS:

___ SAT

___ UNSAT

STEP 12 Step 4.2

GO TO appropriate sections for any monitors in High or Alert alarm:

√	**Section**	**Monitor**
	4A	RIA-31
	4B	1RIA-32
	4C	1RIA-35
	4D	1RIA-39
	4E	1RIA-41
	4F	1RIA-42
	4G	1RIA-45 or 46
	4H	1RIA-47, 1RIA-48, 1RIA-49, or 1RIA-49A
	4I	1RIA-50
	4J	1RIA-54

STANDARD: Candidate determines that 1RIA-45 is the alarming monitor and that he must proceed to Section 4G

Continue to Section 4G

COMMENTS:

___ SAT

___ UNSAT

STEP 13:	AP/1/A/1700/018 (Abnormal Release of Radioactivity) Section 4G Step 1 **IAAT** 1RIA-45 or 1RIA-46 reaches the High set point, **THEN** ensure automatic actions occurred: A. RB PURGE FAN secured. B. 1PR-2 closed. C. 1PR-3 closed. D. 1PR-4 closed. E. 1PR-5 closed.	**CRITICAL STEP** ___ SAT
STANDARD:	Determine 1RIA-45 is in High alarm and perform the following: • Stop the RB Purge Fan • Close 1PR-2 • Close 1PR-3 • Close 1PR-4 • Close 1PR-5	___ UNSAT
Cue: Another operator will continue with this procedure. COMMENTS:		
	END OF TASK	

TIME STOP: ________

CRITICAL STEP EXPLANATIONS

STEP #	Explanation
1	This step is required to prevent tripping 1XR incoming feeder breaker.
2	This step is required to establish RB Purge flow.
3	This step is required to establish RB Purge flow.
7	This step is required to establish desired RB Purge flow.
8	This step is required to start the RB Purge fan.
9 or 13	One of these steps is required to stop the RB Purge fan and isolate the RB.

CANDIDATE CUE SHEET
(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

INITIAL CONDITIONS

RCS temperature = 114°F

RCS pressure = 45 psig

No Gaseous or Liquid releases are in progress

RB Hatch is closed

Continuous release is NOT in progress

RB Purge startup is in progress using OP/1/A/1102/014 (RB Purge System), Encl. 4.1 (RB Purge Release)

INITIATING CUE

The CRS directs you to place the RB Purge in operation at 1/3 Station Limit using OP/1/A/1102/014 (RB Purge System) Encl. 4.1 (RB Purge Release) starting at Step 3.8.

REGION II
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

AO-300

Swapping In Service Seal Return Coolers

CANDIDATE ______________________________

EXAMINER ______________________________

REGION II
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

Task:

Swap In Service Seal Return Coolers from 3A to 3B

Alternate Path:

No

Facility JPM #:

AO-300

K/A Rating(s):

System: 002 (SF2)
K/A: A2.01
Rating: 4.3/4.4

Task Standard:

Seal Return Cooler 3B is in service and Seal Return Cooler 3A is isolated

Preferred Evaluation Location:

Simulator _____ In-Plant __X__

Preferred Evaluation Method:

Perform _____ Simulate __X__

References:

AP/3/A/1700/002 Excessive RCS Leakage
AP/3/A/1700/018 Abnormal Release of Radioactivity

Validation Time: 19 minutes

Time Critical: NO

==

Candidate: ____ Time Start: _________
NAME Time Finish: ________

Performance Rating: SAT ______ UNSAT ______ Performance Time: _________

Examiner: ______________________________ ____________________________________/________
NAME SIGNATURE DATE

==

COMMENTS

SIMULATOR OPERATOR INSTRUCTIONS:

None

Tools/Equipment/Procedures Needed:

AP/3/A/1700/002 (Excessive RCS Leakage)

READ TO OPERATOR

DIRECTION TO TRAINEE:

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 #3 is at 100% power

The CR crew has noticed a small RCS leak and has entered AP/3/A/1700/002 (Excessive RCS Leakage).

The CR crew has determined the leak to be in the Aux building and believe it is coming from the in service Seal Return Cooler due to a High Radiation Alarm on 3RIA-42 (RCW).

INITIATING CUES:

The Control Room Supervisor directs you to Swap Seal Return Coolers from 3A in service to 3B in service in accordance with AP/3/A/1700/002 (Excessive RCS Leakage) Enclosure 5.7. (Swapping In Service Seal Return Coolers).

START TIME: _______

STEP 1: Step 1 Verify it is desired to place the 3B Seal Return Cooler in service **AND** remove 3A Seal Return Cooler from service, STANDARD: Candidate confirms direction to swap Seal Return Coolers from 3A in service to 3B in service COMMENTS:	___ SAT ___ UNSAT
STEP 2: Step 2 Ensure 3RCW-179 Controller (3HPI-ML-0029) (3B Seal Return Temp Controller) set at 100°F. (A-1-Col P91) STANDARD: Locates controller in hallway on west wall and ensures the temperature setpoint is set at 100°F. COMMENTS:	___ SAT ___ UNSAT
STEP 3: Step 3 Perform the following (A-1-Waste Disposal Sample Hood Area): • Open 3RCW-177 (3B Seal Return Cooler Inlet). • Open 3RCW-180 (3B Seal Return Cooler Temp Cont Outlet) STANDARD: Ensures both valves are open by rotating their handwheels fully counterclockwise ***Cue: After the hand wheels are rotated counter clockwise, indicate the valves are at the hard stop.*** COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT

STEP 4: Step 4 Close 3RCW-181 (3B Seal Return Cooler Temp Cont Byp) (A-1-Waste Disposal Sample Hood Area). STANDARD: Closes 3RCW-181 by rotating its handwheel fully clockwise. ***Cue: After the hand wheel is rotated clockwise, indicate the valve is at the hard stop.*** COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT
STEP 5: Step 5 Perform the following (A-1-N End LPI Clr Rm): A. Close 3HP-75 (3B Seal Return Clr Inlet). B. Close 3HP-77 (3B Seal Return Clr Outlet). STANDARD: Closes 3HP-75 and 3HP-77 by rotating their handwheels fully clockwise. ***Cue: After the hand wheels are rotated clockwise, indicate the valves are at the hard stop.*** COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT
STEP 6: Step 6 Perform the following to drain 3B Seal Return Cooler (A-1-N End LPI Clr Rm): A. Open 3GWD-57 (3B Seal Return Cooler Vent). B. Open 3LWD-228 (RCP Seal Return Cooler B Drain). C. Open 3LWD-461 (RCP Seal Return Cooler Drain Block). STANDARD: Opens 3GWD-57, 3LWD-228, and 3LWD-461 by rotating their handwheels fully counterclockwise. ***Cue: After the hand wheels are rotated counter clockwise, indicate the valves are at the hard stop.*** COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT

STEP 7: Step 7 **WHEN** 3B Seal Return Cooler is drained, **THEN** continue. STANDARD: Applicant continues to next step ***EXAMINER CUE: Inform the candidate that HAWT level has stopped increasing.*** ***EXAMINER NOTE: Seal Return Coolers drain to the HAWT. To determine if when the cooler is drained, the candidate would either have to contact the control room to monitor for HAWT level or use the waste disposal panel indication of HAWT level which is located just north of the north exit of the room you are in.*** COMMENTS:	___ SAT ___ UNSAT
STEP 8: Step 8 Perform the following (A-1-N End LPI Clr Rm): • Close 3GWD-57 (3B Seal Return Cooler Vent). • Close 3LWD-228 (RCP Seal Return Cooler B Drain). • Close 3LWD-461 (RCP Seal Return Cooler Drain Block). STANDARD: Closes 3GWD-57, 1LWD-228, and 3LWD-461 by rotating their handwheels fully clockwise. ***Cue: After the hand wheels are rotated clockwise, indicate the valves are at the hard stop.*** COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT
NOTE 3B Seal Return Cooler volume is 43 gallons. STEP 9: Step 9 Notify CR to expect LDST to decrease ≅ 1.4" due to filling and venting the 3B Seal Return Cooler. STANDARD: Applicant simulates contacting the CR ***CUE: Once the applicant has simulated making the communication with the CR, inform him/her that the CR has been notified to expect the LDST to decrease ≅ 1.4".*** COMMENTS:	___ SAT ___ UNSAT

STEP 10: Step 10 Open 3HP-75 (3B Seal Return Clr Inlet) (A-1-N End LPI Clr Rm). STANDARD: Opens 3HP-75 by rotating its handwheel fully counterclockwise. ***Cue: After the hand wheel is are rotated counter clockwise, indicate the valve is at the hard stop.*** COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT
STEP 11: Step 11 Vent 3B Seal Return Cooler using 3GWD-57 (3B Seal Return Cooler Vent) (A-1-N End LPI Clr Rm). STANDARD: Cracks open 3GWD-57 (counterclockwise) until air is removed. When venting complete, rotates 3GWD-57 fully clockwise to the closed position ***CUE: If asked, inform the applicant that the 3B Seal Return Cooler has been vented (if not already described, examiner may ask applicant how he/she would know the cooler was properly vented (HAWT level)).*** COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT
STEP 12: Step 12 Open 3HP-77 (3B Seal Return Clr Outlet) (A-1-N End LPI Clr Rm). STANDARD: Opens 3HP-77 by rotating its handwheel fully counterclockwise. ***Cue: After the hand wheel is rotated counter clockwise, indicate the valve is at the hard stop.*** COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT

STEP 13: Step 13 Close 3HP-72 (3A Seal Return Cooler Inlet) (A-1-N End LPI Clr Rm). STANDARD: Closes 3HP-72 by rotating its handwheel fully clockwise. ***Cue: After the hand wheel is rotated clockwise, indicate the valve is at the hard stop.*** COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT
STEP 14: Step 14 Close 3HP-74 (3A Seal Return Cooler Outlet) (A-1-N End LPI Clr Rm). STANDARD: Closes 3HP-74 by rotating its handwheel fully clockwise. ***Cue: After the hand wheel are rotated clockwise, indicate the valves is at the hard stop.*** COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT
STEP 15: Step 15 Notify Control Room of the following: • 3A Seal Return Cooler is isolated. • Update Component Boron Concentration Log that 3B Seal Return Cooler placed in service. STANDARD: Applicant simulates contacting the CR ***CUE: Once the applicant has simulated making the communication with the CR, inform them that the CR has been notified that the 3A Seal Return Cooler has been isolated and the 3B Seal Return Cooler is in service.*** COMMENTS:	___ SAT ___ UNSAT

STEP 16:	Step 16 Verify it is desired to place the 3A Seal Return Cooler in service, **AND** remove the 3B Seal Return Cooler from service	___ SAT
STANDARD:	Candidate determines it is NOT desired and refers to RNO which says GO TO Step 31	___ UNSAT
COMMENTS:		
STEP 17:	Step 31 **WHEN** directed by Control Room, **THEN EXIT** this enclosure.	___ SAT
STANDARD:	Candidate exits enclosure and returns cue sheet to examiner.	
COMMENTS:		___ UNSAT

STOP TIME: ____________

CRITICAL STEP EXPLANATIONS:

STEP #	Explanation
3	Valves in cooling water supply to the 3B Seal Return Cooler.
4	Completes Valve lineup to valve in cooling water supply to the 3B Seal Return Cooler
5	Necessary to drain the 3B cooler
6	Drains the 3B cooler
8	Secures draining the 3B cooler.
10	Aligns seal return flow to the inlet of the 3B cooler in order to fill & vent the 3B cooler..
11	Venting the 3B Seal Return Cooler
12	Completes alignment of seal return flow through the 3B Seal Return Cooler.
13	Necessary to isolate the 3A Seal Return Cooler.
14	Completes isolation of the 3A Seal Return Cooler.

CANDIDATE CUE SHEET
(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

INITIAL CONDITIONS:

Unit #3 is at 100% power

The CR crew has noticed a small RCS leak and has entered AP/3/A/1700/002 (Excessive RCS Leakage).

The CR crew has determined the leak to be in the Aux building and believe it is coming from the in service Seal Return Cooler due to a High Radiation Alarm on 3RIA-42 (RCW).

INITIATING CUES:

The Control Room Supervisor directs you to Swap Seal Return Coolers from 3A in service to 3B in service in accordance with AP/3/A/1700/002 (Excessive RCS Leakage) Enclosure 5.7. (Swapping In Service Seal Return Coolers).

REGION II
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

AO-428

Unit 2 Plant Operator Actions for Extensive Damage Mitigation

CANDIDATE ____________________

EXAMINER ____________________

REGION II
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

Task:

Unit 2 Plant Operator Actions for Extensive Damage Mitigation

Alternate Path:

No

Facility JPM #:

New

K/A Rating(s):

System: APE054
K/A: AA1.01
Rating: 4.5/4.4

Task Standard:

Complete Unit 2 Plant Operator Actions for Extensive Damage Mitigation in accordance with AP/46 Encl. 5.2 (Plant Operator Actions for Extensive Damage)

Preferred Evaluation Location:

Simulator __X__ In-Plant ____

Preferred Evaluation Method:

Perform __X__ Simulate ____

References:

AP/46 Encl. 5.2 (Plant Operator Actions for Extensive Damage)

Validation Time: 20 minutes

Time Critical: NO

==

Candidate: ____
NAME

Time Start: _______________
Time Finish: ______________

Performance Rating: SAT ______ UNSAT ______

Performance Time _________

Examiner: ______________________________ ____________________________________/________
NAME SIGNATURE DATE

==

COMMENTS

SIMULATOR OPERATOR INSTRUCTIONS:

None

Tools/Equipment/Procedures Needed:

AP/46 Encl. 5.2 (Plant Operator Actions for Extensive Damage)

READ TO OPERATOR

DIRECTION TO TRAINEE:

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 operating at 100% power

A catastrophic event occurs

AP/46 (Extensive Damage Mitigation) is initiated

IMAs have been completed

INITIATING CUE:

The procedure director directs you to perform AP/46 Encl. 5.2 (Unit 2 Plant Operator Actions for Extensive Damage Mitigation)

START TIME: _______

STEP 1: Step 1 Ensure Rx Trip by opening 600V CRD breakers on the following: • 2X9-5C (U-2 CRD NORM FDR BKR) (U2 Equipment Rm) • 1X1-5B (U-2 CRD ALTERNATE POWER SUPPLY) (T-3/Dd-27) STANDARD: Locate the breakers above and determine that the breakers are open by observing the open light lit on each breaker. Continue to Step 2 ***Cue: When each breaker is located indicate that it is open.*** COMMENTS:	___ SAT ___ UNSAT
STEP 2: Step 2 Locally verify TDEFWP running. STANDARD: Determine that TDEFDW pump is operating by observing that 1MS-93 is open and the pump has discharge pressure. Continue to Step 3 ***Cue: When at the TDEFDW pump indicate that 1MS-93 is open and discharge pressure is 900 psig.*** COMMENTS:	___ SAT ___ UNSAT

<u>STEP 3</u>: Step 3 Throttle U2 TDEFWP spindle, as needed, to maintain 1180-1220 psig TDEFWP discharge pressure (2PG-54, 2TDEFDW PUMP DISCH. PRESS.) (T-1/D-35). <u>STANDARD</u>: The U2 TDEFWP spindle is turned counter – clockwise until discharge pressure is between 1180 and 1220 psig. Continue to Step 4 ***Cue: When the U2 TDEFWP spindle is turned counter – clockwise indicate that discharge pressure has increased to approximately 1200 psig.*** <u>COMMENTS</u>:	**CRITICAL STEP** ___ SAT ___ UNSAT
<u>STEP 4</u>: Step 4 **IAAT** SG level indication becomes available, **THEN** throttle TDEFWP flow, using spindle on top of TDEFWP, to stabilize intact SG levels to: • 240″ to 260″ with RCPs off • 30″ with RCPs on <u>STANDARD</u>: Determine that SG level indication is not available and continue. Continue to Step 5 ***Cue: Inform candidate that SG level indication is not available.*** <u>COMMENTS</u>:	___ SAT ___ UNSAT
<u>STEP 5</u>: Step 5 **IAAT** trip of TDEFWP is directed by operator at SSF, **THEN** trip TDEFWP. <u>STANDARD</u>: Determine step does NOT apply and continue. Continue to Step 6 <u>COMMENTS</u>:	___ SAT ___ UNSAT

STEP 6: Step 6 Locally open 2V-186 (MAIN CONDENSER VACUUM BREAKER) (T-3, catwalk at 2C2 waterbox). STANDARD: Locate 2V-186 on the catwalk of 2C2 water box. Close the valve by engaging the handwheel with the lever and rotate the handwheel clockwise until it reaches a hard stop. Continue to Step 7 ***Cue: After handwheel is rotated counter-clockwise indicate the valve is at the hard stop.*** COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT
STEP 7: Step 7 Throttle U2 TDEFWP spindle, as needed, to maintain 1180-1220 psig TDEFWP discharge pressure (2PG-54, 2TDEFDW PUMP DISCH. PRESS.) (T-1/D-35). STANDARD: Determine that TDEFDWP discharge pressure is within the range and an adjustment is not required. Continue to Step 8 ***Cue: Indicate that discharge pressure is approximately 1200 psig.*** COMMENTS:	___ SAT ___ UNSAT

STEP 8: Step 8 Locally open 2C-391 (TD EFDWP SUCTION FROM HOTWELL) (T-1/C-36). STANDARD: Locate and open 2C-391. Continue to Step 9 ***Cue: After handwheel is rotated counter-clockwise indicate the valve is at the hard stop.*** COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT
STEP 9: Step 9 Locally close 2C-157 (TD EFDWP SUCTION FROM UST) (T-1, N of C-36). STANDARD: Locate and close 2C-157. Continue to Step 10 ***Cue: After handwheel is rotated counter clockwise indicate the valve is at the hard stop.*** COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT

STEP 10: Step 10 Locally open the following: • 2C-188 (Hotwell Emerg Makeup #1 Control Bypass) (T-1, W of E-31). • 2C-912 (UST Riser To HW Emerg Makeup #2 Auto Isol Bypass) (T-1/G-32) STANDARD: Locate and open 2C-188 and 2C-912. ***Cue: After handwheel is rotated counter-clockwise indicate each valve is at the hard stop.*** COMMENTS: **END TASK**	**CRITICAL STEP** ___ SAT ___ UNSAT

STOP TIME: ____________

CRITICAL STEP EXPLANATIONS:

STEP #	Explanation
3	Step is required to ensure TDEFDWP discharge pressure in in the proper range.
6	Step is required to break vacuum and allow the TDEFDWP to take a suction on the Hotwell.
8	Step is required to allow the TDEFDWP to take a suction on the Hotwell.
9	Step is required to prevent damage to the TDEFDWP while taking a suction on the Hotwell.
10	Step is required to allow the TDEFDWP to take a suction on the Hotwell.

CANDIDATE CUE SHEET
(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

INITIAL CONDITIONS:

Unit 2 operating at 100% power

A catastrophic event occurs

AP/46 (Extensive Damage Mitigation) is initiated

IMAs have been completed

INITIATING CUE:

The procedure director directs you to perform AP/46 Encl. 5.2 (Unit 2 Plant Operator Actions for Extensive Damage Mitigation)

REGION II
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

AO-801
HPSW AND LPSW AB FLOOD ISOLATION

CANDIDATE ______________________________

EXAMINER ______________________________

REGION II
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

Task:

Isolate HPSW and LPSW during an AB Flood.

Alternate Path:

Yes

Facility JPM #:

Modified NLO-800

K/A Rating(s):

System: N/A
K/A: BW/A07 AA2.2
Rating: 3.3/3.7

Task Standard:
AP/3/A/1700/030 Encl. 5.1 is used isolate HPSW during an AB flood.
AP/3/A/1700/030 Encl. 5.2 is used isolate LPSW during an AB flood.

Preferred Evaluation Location:

Simulator ____ In-Plant __X___

Preferred Evaluation Method:

Perform _____ Simulate __X__

References:

AP/3/A/1700/030 (Auxiliary Building Flood) Encl. 5.1 and Encl 5.2
.

Validation Time: 16 minutes

Time Critical: NO

==

Candidate: ____ __________
NAME

Time Start:
Time Finish: ________

Performance Rating: SAT ______ UNSAT ______

Performance Time: _________

Examiner: ________________________________ ____________________________________/________
NAME SIGNATURE DATE

==

COMMENTS

SIMULATOR OPERATOR INSTRUCTIONS:

None

Tools/Equipment/Procedures Needed:

AP/3/A/1700/030 Encl. 5.1 and Encl. 5.2

READ TO OPERATOR

DIRECTION TO TRAINEE:

I will explain the initial conditions, and state the task to be performed. 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: _______

<u>ENCLOSURE 5.1</u> <u>STEP 1</u>: Step 1 **IAAT** the source of flooding is isolated, **THEN** notify Control Room. <u>STANDARD</u>: The candidate notes the source of flooding is not isolated and proceeds to step 2 **CUE: If asked, flooding is still occurring.** <u>COMMENTS</u>:	___ SAT ___ UNSAT
NOTE Keys for valve locks are available in <u>any</u> Emergency Equipment cabinet. <u>STEP 2</u>: Step 2 Close HPSW-959 (HPSW SUPPLY TO FLOW LIMITER BLOCK VALVE) (T-1/M-21 south, west of RCW Heat Exchangers). <u>STANDARD</u>: The candidate locates and attempts to close HPSW-959. ***Examiner Note: Operators 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 proceeds to RNO*** <u>COMMENTS</u>:	___ SAT ___ UNSAT

STEP 3: Step 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.*** COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT
STEP 4: Step 3 Notify control Room HPSW isolation is complete. STANDARD: The candidate notifies the control Room HPSW isolation is complete. COMMENTS:	___ SAT ___ UNSAT
STEP 5: Step 4 **EXIT** this enclosure. STANDARD: Candidate EXITS enclosure 5.1 and proceeds to Enclosure 5.2. COMMENTS:	___ SAT ___ UNSAT

ENCLOSURE 5.2 STEP 6: Step 1 **IAAT** the source of flooding is isolated, **THEN** notify Control Room. STANDARD: The candidate notes the source of flooding is not isolated and proceeds to step 2 **CUE: If asked, flooding is still occurring.** COMMENTS:	___ SAT ___ UNSAT
STEP 7: Step 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.*** COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT
STEP 8: Step 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.*** COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT

STEP 9: Step 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.*** COMMENTS:	___ SAT ___ UNSAT
STEP 10: Step 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.*** COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT
STEP 11: Step 6 Notify Unit 3 control Room LPSW isolation is complete. STANDARD: The candidate notifies the control Room LPSW isolation is complete. COMMENTS:	___ SAT ___ UNSAT
STEP 12: Step 7 **EXIT** this enclosure. STANDARD: Candidate EXITS enclosure 5.2 and returns CUE Sheet to examiner.. COMMENTS: **END TASK**	___ SAT ___ UNSAT

STOP TIME: _____________

CRITICAL STEP EXPLANATIONS:

STEP #	Explanation
3	Step ensures proper isolation of HPSW leak.
7	Step ensures proper isolation of LPSW leak.
8	Step ensures proper isolation of LPSW leak.
10	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
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

Admin-142

Determine Time for SFP to reach 180ºF

CANDIDATE ______________________________

EXAMINER ______________________________

REGION II
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

Task:

Determine Time for SFP to reach 180ºF

Alternate Path:

N/A

Facility JPM #:

CRO-142

K/A Rating(s):

System: GEN
K/A: 2.1.25
Rating: 3.9/4.2

Task Standard:

Tables in AP/1-2/A/1700/035 (Loss of SFP Cooling And/Or Level) are used to determine total time required for SFP temperature to reach 180ºF

Preferred Evaluation Location:

Simulator _____ In-Plant _____ Classroom __X___

Preferred Evaluation Method:

Perform __X___ Simulate ____

References:

AP/1-2/A/1700/035 (Loss of SFP Cooling And/Or Level)

Validation Time: 15 minutes

Time Critical: NO

==

Candidate: ____ Time Start: _________
NAME
Time Finish: ________

Performance Rating: SAT ______ UNSAT ______

Performance Time: _________

Examiner: ______________________________ ____________________________________/________
NAME SIGNATURE DATE

==

COMMENTS

SIMULATOR OPERATOR INSTRUCTIONS:

NONE

Tools/Equipment/Procedures Needed:

AP/1-2/A/1700/035 (Loss of SFP Cooling And/Or Level)

READ TO OPERATOR

DIRECTION TO TRAINEE:

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% stable
- Unit 1 EFPD = 278
- Unit 2 EFPD = 47
- Unit 2 was operating at 100% when it experienced a Unit blackout
- SSF has been activated for Unit 2
- Unit 2 RCMUP is aligned and operating
- 2HP-426 is being cycled to maintain Pressurizer Level as directed by AP/25
- AP/1-2/A/1700/035 (Loss of SFP Cooling And/Or Level) has been initiated
- Unit 1 & 2 SFP level = 0" stable
- Unit 1 & 2 SFP temperature = 102 ºF

INITIATING CUES:

CRS has directed you to utilize AP/35 Enclosure 5.4 and determine the time for Unit 1&2 SFP to reach 180 ºF

START TIME: _______

STEP 1: 1. Refer to tables A, B, and C below. 2. ONLY one row from one table below applies 3. Check the row in Table A, B, or C that applies to current conditions, and then use Tables listed on subsequent pages of Encl 5.4, as directed, to calculate SFP heat up times. STANDARD: Candidate selects Table B and then chooses to use Table 10 based on 1. SSF Event in progress for U1 or U2 with Unit letdown going to SFP AND 2. U1 and U2 each have 177 Fuel Assemblies in RB Candidate proceeds to Table 10 (page 33 of 63) COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT

STEP 2: Determine the Time (in days) row based on direction from page 5 of 63 STANDARD: • Candidate selects the lower EFPD unit and adds 20 which results in 67 days. • Determine that 67 days is between 60 and 70 days on the far left column of Table 10 • Based on guidance in Step 7 on Page 7 of 63, elects to use 60 days (the shorter time). ***Note: Step 2 and Step 3 can be performed in any order*** COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT
STEP 3: Determine initial Spent Fuel Pool Temperature column based on directions from page 7 of 63 Step 6. STANDARD: • Actual SFP temp = 102ºF • Temperature columns available are 100 and 105 • Based on directions in step 6, elects to use the 105 (higher) column ***Note: Step 2 and Step 3 can be performed in any order*** COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT

STEP 4: Find the Time in hours based on the intersection of the 60 day row and the 105 degree column. STANDARD: Based on the intersection of the 60 day row and the 105 degree column, determine that **16.4 hours** is the time to reach 180ºF COMMENTS: **END TASK**	**CRITICAL STEP** ___ SAT ___ UNSAT

STOP TIME: ____________

CRITICAL STEP EXPLANATIONS:

STEP #	Explanation
1	Required to determine the time to reach 180 ºF
2	Required to determine the time to reach 180 ºF
3	Required to determine the time to reach 180 ºF
4	Required to determine the time to reach 180 ºF

CANDIDATE CUE SHEET
(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

INITIAL CONDITIONS:

- Unit 1 is at 100% stable
- Unit 1 EFPD = 278
- Unit 2 EFPD = 47
- Unit 2 was operating at 100% when it experienced a Unit blackout
- SSF has been activated for Unit 2
- Unit 2 RCMUP is aligned and operating
- 2HP-426 is being cycled to maintain Pressurizer Level as directed by AP/25
- AP/1-2/A/1700/035 (Loss of SFP Cooling And/Or Level) has been initiated
- Unit 1 & 2 SFP level = 0” stable
- Unit 1 & 2 SFP temperature = 102 ºF

INITIATING CUES:

CRS has directed you to utilize AP/35 Enclosure 5.4 and determine the time for Unit 1&2 SFP to reach 180 ºF

REGION II
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

ADMIN-146

Manually Calculate Shutdown Margin

CANDIDATE ______________________________

EXAMINER ______________________________

REGION II
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

Task: Manually Calculate Shutdown Margin

Alternate Path:

No

Facility JPM #:

CRO-125

K/A Rating(s):
System: GENERIC
K/A: 2.1.43
Rating: 4.1/4.3

Task Standard:

Shutdown Margin agrees with attached example.

Preferred Evaluation Location:

Simulator ____ In-Plant _____ Classroom __X__

Preferred Evaluation Method:

Perform __X___ Simulate ____

References:
PT/2/A/1103/15, Reactivity Balance Procedure

Validation Time: 20 minutes

Time Critical: NO

==

Candidate: ____ Time Start: _________

NAME Time Finish: ________

Performance Rating: SAT ______ UNSAT ______ Performance Time: _________

Examiner: ______________________________ ____________________________________/________

NAME SIGNATURE DATE

==

COMMENTS

SIMULATOR OPERATOR INSTRUCTIONS

None

Tools/Equipment/Procedures Needed:

- PT/**2**/A/1103/015, Reactivity Balance Procedure,
  - Enclosure 13.1, Shutdown Boron Concentration/Shutdown Margin Calculation
  - Enclosures 13.7 through 13.21
- Calculator
- Straight edge ruler

READ TO OPERATOR

DIRECTION TO TRAINEE

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 has been shutdown for 15 days for leak repair. The following conditions exist:

- Cycle burnup = 100 EFPD
- RCS temperature = 60°F
- Control Rod Group 1 at 0% withdrawn
- Control Rod Group 8 at 35% withdrawn
- Assume 0% for Xenon and Samarium worth
- RCS Boron 1500 ppm
- Present power level is 25 cpm on NI-2
- The RHOCALC program is NOT available

INITIATING CUES

Control Room supervisor directs you to perform the Original manual calculation of SDM using PT/2/A/1103/015, Reactivity Balance Procedure, Enclosure 13.1, Shutdown Boron Concentration/Shutdown Margin Calculation through step 2.6.

This is NOT being performed for a Control Rod Trip Time test.

.

START TIME: _______

STEP 1:	Step 2.1 This enclosure must be performed twice - the second is the separate verification. Indicate whether this is the original or the verification:	___ SAT ___ UNSAT
STANDARD:	Candidate checks “Original”.	
COMMENTS:		
STEP 2:	Step 2.2 Enter the conditions for which this calculation is effective: Core Burnup:_______EFPD RCS Temperature______°F CRD Grp1 Posn:_____%w/d CRD Grp8 Posn:_____%w/d NOTE: The Xe/Sm time interval is normally 12 hours. However, any time interval may be used. This time interval is only required if credit is to be taken for Xenon/Samarium. Xenon/Samarium time interval valid from date/time:__________________ to Date/time:___________________.	___ SAT ___ UNSAT
STANDARD:	Candidate enters the values for the required parameters from the INITIAL/CURRENT CONDITIONS. Core Burnup:___**100**____ EFPD RCS Temperature__**60**__°F CRD Grp1 Posn:__**0**___**%**w/d CRD Grp8 Posn:__**35**___%w/d Candidate makes N/A for Xenon/Samarium date/time.	
COMMENTS:		

STEP 3:	Step 2.3 Obtain reference Shutdown Boron Concentration using the effective Burnup and RCS Temp from step (2.2) by performing one of the following: Enclosure 13.10, Shutdown Boron Concentration vs. Burnup (Group 1 @ 0% wd) if CRD Groups 1-7 are at 0%w/d Enclosure 13.11, Shutdown Boron Concentration vs. Burnup (Group 1 @ 50% wd) if CRD Grp1 is at 50% and Grp 2-7 are at 0%w/d	**CRITICAL STEP** ___ SAT ___ UNSAT
STANDARD:	Reference Shutdown Boron Concentration is obtained from the point of intersection of the current cycle burnup and the 60°F curve on Enclosure 13.10 (or table) and the value is recorded in Enclosure 13.1. **1415 PPM (+/-5)**	
COMMENTS:		
STEP 4:	Step 2.4 Adjust for non-reference conditions as follows:	___ SAT ___ UNSAT
STANDARD:	Candidate should determine from the INITIAL CONDITIONS that no adjustments are required. All of step 2.4 is NOT applicable.	
COMMENTS:		
STEP 5:	Step 2.5 Determine required shutdown boron concentration as follows: Step 2.5.1 Subtract 2.4.7 (**IF** 2.4.7 applicable) **OR** 2.4.6 (**IF** 2.4.7 **NOT** applicable) from 2.3 to obtain the required Boron concentration for 1%Δk/k shutdown margin (assumes worst rod stuck out): ________ppmB - ________ppmB = __________ppmB step 2.3 steps 2.4.7 or 2.4.6 pos or zero	**CRITICAL STEP**
STANDARD:	Determine that required boron concentration is equal to reference shutdown boron concentration. **1415 (+/-5)** ppmB - **0** ppmB = **1415 (+/-5)** ppmB step 2.3 steps 2.4.7 or 2.4.6 pos or zero	
COMMENTS:		___ SAT ___ UNSAT

STEP 6:	Step 2.5.2 Obtain minimum RCS Boron Concentration for SSF operability from Enclosure 13.19, Minimum RCS Boron Concentration to Maintain SSF Operability, using the Minimum Xenon from the effective time period: Minimum RCS Boron for SSF operability = _______ppmB	___ SAT ___ UNSAT
STANDARD:	The candidate should determine that the Minimum RCS Boron for SSF operability is **1080 PPM (+/-10)**.	
COMMENTS:		
STEP 7:	Step 2.5.3 Determine the minimum RCS Boron Concentration by recording the **GREATER** of step 2.5.1 or 2.5.2: Minimum RCS Shutdown Boron Concentration = _______ppmB	**CRITICAL STEP** ___ SAT ___ UNSAT
STANDARD:	The candidate should determine that the greater of the boron concentrations is same as step 2.5.1 value. **(1415 ppmB +/-5)**	
COMMENTS:		
STEP 8:	Step 2.6 **IF** desired, calculate actual shutdown margin as follows: Step 2.6.1 Record actual RCS conditions: RCS Boron Concentration:_____ppmB RCS Temperature____°F	___ SAT ___ UNSAT
STANDARD:	RCS Boron Concentration **1500** ppmB RCS Temperature **60** °F	
COMMENTS:		

STEP 9:	Step 2.6.2 Calculate the B10 corrected boron concentration by subtracting the 100 ppmB B10 depletion penalty from the measured boron concentration in Step 2.6.1: ________ppmB – 100 ppmB = ________ppmB step 2.6.1 (B10 Penalty)	**CRITICAL STEP** ___ SAT ___ UNSAT
STANDARD:	The Candidate should subtract the B10 penalty (100) from the actual of 1500 and obtain a net result of (1400) ppmB (positive). **1500** ppmB - **100** ppmB = **1400 (+/-5)** ppmB step 2.6.1 (B10 Penalty)	
COMMENTS:		
STEP 10:	Step 2.6.3 Subtract the required Boron concentration in Step 2.5.1 from the boron concentration in Step 2.6.2: ________ppmB – ________ppmB = ________ppmB step 2.6.2 step 2.5.1	**CRITICAL STEP** ___ SAT ___ UNSAT
STANDARD:	The Candidate should subtract the boron in step 2.5.1 (1415) from the boron in step 2.6.2 (1400) and obtain a net result of (-15) ppmB (negative). **1400** ppmB - **1415 (+/-5)** ppmB = **- 10 to -20** ppmB step 2.6.2 step 2.5.1	
COMMENTS:		
STEP 11:	Step 2.6.4 Calculate the actual shutdown margin by multiplying 2.6.3 by the Differential Boron Worth from Enclosure 13.8, (Differential Boron Worth vs. Burnup) and subtracting 1%Δk/k: (________ppmB x ________%Δk/k/ppmB) **- 1%Δk/k**= ________%Δk/k step 2.6.3 negative Encl 13.8 should be neg	**CRITICAL STEP** ___ SAT ___ UNSAT
STANDARD:	(**- 10 to -20)** ppmB x **(-0.0091 to -0.0092)** %Δk/k/ppmB) **- 1%Δk/k= -0.816 to -0.909** %Δk/k step 2.6.3 negative Encl 13.8 should be neg Candidate determines SDM is less than 1%ΔK/K and is between **-0.816 to -0.909% Δk/k.**	
COMMENTS:		
	END OF TASK	

STOP TIME: ____________

CRITICAL STEP EXPLANATIONS

STEP #	Explanation
3	Step is required to produce an accurate SDM
5	Step is required to produce an accurate SDM
7	Step is required to produce an accurate SDM
9	Step is required to produce an accurate SDM
10	Step is required to produce an accurate SDM
11	Step is required to produce an accurate SDM

CANDIDATE CUE SHEET
(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

INITIAL CONDITIONS

Unit 2 has been shutdown for 15 days for leak repair. The following conditions exist:

- Cycle burnup = 100 EFPD
- RCS temperature = 60°F
- Control Rod Group 1 at 0% withdrawn
- Control Rod Group 8 at 35% withdrawn
- Assume 0% for Xenon and Samarium worth
- RCS Boron 1500 ppm
- Present power level is 25 cpm on NI-2
- The RHOCALC program is NOT available

INITIATING CUES

Control Room supervisor directs you to perform the Original manual calculation of SDM using PT/2/A/1103/015, Reactivity Balance Procedure, Enclosure 13.1, Shutdown Boron Concentration/Shutdown Margin Calculation through step 2.6.

This is NOT being performed for a Control Rod Trip Time test.

REGION II
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

ADMIN-147

Manually Calculate Shutdown Margin and Determine Any Required Actions

CANDIDATE ____

EXAMINER ____

REGION II
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

Task: **Manually Calculate Shutdown Margin and Determine Any Required Actions**

Alternate Path:

No

Facility JPM #:

CRO-125

K/A Rating(s):
System: GENERIC
K/A: 2.1.43
Rating: 4.1/4.3

Task Standard:
Shutdown Margin agrees with attached example and determine that TS 3.1.1 CONDITION A must be entered.

Preferred Evaluation Location:

Simulator ____ In-Plant _____ Classroom __X__

Preferred Evaluation Method:

Perform __X___ Simulate ____

References:
PT/2/A/1103/15, Reactivity Balance Procedure

Validation Time: 25 minutes

Time Critical: NO

==

Candidate: ____ Time Start: _________

NAME Time Finish: ________

Performance Rating: SAT ______ UNSAT ______ Performance Time: _________

Examiner: _______________________________ ____________________________________/________

NAME SIGNATURE DATE

==

COMMENTS

SIMULATOR OPERATOR INSTRUCTIONS

None

Tools/Equipment/Procedures Needed:

- PT/**2**/A/1103/015, Reactivity Balance Procedure,
    - Enclosure 13.1, Shutdown Boron Concentration/Shutdown Margin Calculation
    - Enclosures 13.7 through 13.21
- TS 3.1.1 (Shutdown Margin)
- Calculator
- Straight edge ruler

READ TO OPERATOR

DIRECTION TO TRAINEE

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 has been shutdown for 15 days for leak repair. The following conditions exist:

- Cycle burnup = 100 EFPD
- RCS temperature = 60°F
- Control Rod Group 1 at 0% withdrawn
- Control Rod Group 8 at 35% withdrawn
- Assume 0% for Xenon and Samarium worth
- RCS Boron 1500 ppm
- Present power level is 25 cpm on NI-2
- The RHOCALC program is NOT available

INITIATING CUES

Control Room supervisor directs you to perform the Original manual calculation of SDM using PT/2/A/1103/015, Reactivity Balance Procedure, Enclosure 13.1, Shutdown Boron Concentration/Shutdown Margin Calculation through step 2.6.

Evaluate the calculated SDM and determine what (if any) Tech Specs apply and their required actions and associated completion times.

This is NOT being performed for a Control Rod Trip Time test.

START TIME: _______

STEP 1:	Step 2.1 This enclosure must be performed twice - the second is the separate verification. Indicate whether this is the original or the verification:	___ SAT ___ UNSAT
STANDARD:	Candidate checks “Original”.	
COMMENTS:		
STEP 2:	Step 2.2 Enter the conditions for which this calculation is effective: Core Burnup:_______EFPD RCS Temperature______°F CRD Grp1 Posn:_____%w/d CRD Grp8 Posn:_____%w/d NOTE: The Xe/Sm time interval is normally 12 hours. However, any time interval may be used. This time interval is only required if credit is to be taken for Xenon/Samarium. Xenon/Samarium time interval valid from date/time:__________________ to Date/time:___________________.	___ SAT ___ UNSAT
STANDARD:	Candidate enters the values for the required parameters from the INITIAL/CURRENT CONDITIONS. Core Burnup:___**100**____ EFPD RCS Temperature__**60**__°F CRD Grp1 Posn:__**0**___**%**w/d CRD Grp8 Posn:__**35**___%w/d Candidate makes N/A for Xenon/Samarium date/time.	
COMMENTS:		

STEP 3:	Step 2.3 Obtain reference Shutdown Boron Concentration using the effective Burnup and RCS Temp from step (2.2) by performing one of the following: Enclosure 13.10, Shutdown Boron Concentration vs. Burnup (Group 1 @ 0% wd) if CRD Groups 1-7 are at 0%w/d Enclosure 13.11, Shutdown Boron Concentration vs. Burnup (Group 1 @ 50% wd) if CRD Grp1 is at 50% and Grp 2-7 are at 0%w/d	**CRITICAL STEP** ___ SAT ___ UNSAT
STANDARD:	Reference Shutdown Boron Concentration is obtained from the point of intersection of the current cycle burnup and the 60°F curve on Enclosure 13.10 (or table) and the value is recorded in Enclosure 13.1. **1415 PPM (+/-5)**	
COMMENTS:		
STEP 4:	Step 2.4 Adjust for non-reference conditions as follows:	___ SAT ___ UNSAT
STANDARD:	Candidate should determine from the INITIAL CONDITIONS that no adjustments are required. All of step 2.4 is NOT applicable.	
COMMENTS:		
STEP 5:	Step 2.5 Determine required shutdown boron concentration as follows: Step 2.5.1 Subtract 2.4.7 (**IF** 2.4.7 applicable) **OR** 2.4.6 (**IF** 2.4.7 **NOT** applicable) from 2.3 to obtain the required Boron concentration for 1%Δk/k shutdown margin (assumes worst rod stuck out): ________ppmB - ________ppmB = __________ppmB step 2.3 steps 2.4.7 or 2.4.6 pos or zero	**CRITICAL STEP**
STANDARD:	Determine that required boron concentration is equal to reference shutdown boron concentration. **1415 (+/-5)** ppmB - **0** ppmB = **1415 (+/-5)** ppmB step 2.3 steps 2.4.7 or 2.4.6 pos or zero	
COMMENTS:		___ SAT ___ UNSAT

STEP 6:	Step 2.5.2 Obtain minimum RCS Boron Concentration for SSF operability from Enclosure 13.19, Minimum RCS Boron Concentration to Maintain SSF Operability, using the Minimum Xenon from the effective time period: Minimum RCS Boron for SSF operability = _______ppmB	___ SAT
STANDARD:	The candidate should determine that the Minimum RCS Boron for SSF operability is **1080 PPM (+/-10)**.	___ UNSAT
COMMENTS:		
STEP 7:	Step 2.5.3 Determine the minimum RCS Boron Concentration by recording the **GREATER** of step 2.5.1 and 2.5.2: Minimum RCS Shutdown Boron Concentration = _______ppmB	**CRITICAL STEP** ___ SAT
STANDARD:	The candidate should determine that the greater of the boron concentrations is same as step 2.5.1 value. **(1415 ppmB +/-5)**	___ UNSAT
COMMENTS:		
STEP 8:	Step 2.6 **IF** desired, calculate actual shutdown margin as follows: Step 2.6.1 Record actual RCS conditions: RCS Boron Concentration:_____ppmB RCS Temperature____°F	___ SAT
STANDARD:	RCS Boron Concentration **1500** ppmB RCS Temperature **60** °F	___ UNSAT
COMMENTS:		

STEP 9:	Step 2.6.2 Calculate the B10 corrected boron concentration by subtracting the 100 ppmB B10 depletion penalty from the measured boron concentration in Step 2.6.1: ________ppmB – 100 ppmB = ________ppmB step 2.6.1 (B10 Penalty)	**CRITICAL STEP** ___ SAT ___ UNSAT
STANDARD:	The Candidate should subtract the B10 penalty (100) from the actual of 1500 and obtain a net result of (1400) ppmB (positive). **1500** ppmB - **100** ppmB = **1400 (+/-5)** ppmB step 2.6.1 (B10 Penalty)	
COMMENTS:		
STEP 10:	Step 2.6.3 Subtract the required Boron concentration in Step 2.5.1 from the boron concentration in Step 2.6.2: ________ppmB – ________ppmB = ________ppmB step 2.6.2 step 2.5.1	**CRITICAL STEP** ___ SAT ___ UNSAT
STANDARD:	The Candidate should subtract the boron in step 2.5.1 (1415) from the boron in step 2.6.2 (1400) and obtain a net result of (-15) ppmB (negative). **1400** ppmB - **1415(+/-5)** ppmB = **- 10 to-20** ppmB step 2.6.2 step 2.5.1	
COMMENTS:		
STEP 11:	Step 2.6.4 Calculate the actual shutdown margin by multiplying 2.6.3 by the Differential Boron Worth from Enclosure 13.8, (Differential Boron Worth vs. Burnup) and subtracting 1%Δk/k: (________ppmB x ________%Δk/k/ppmB) **- 1%Δk/k**= ________%Δk/k step 2.6.3 negative Encl 13.8 should be neg	**CRITICAL STEP** ___ SAT ___ UNSAT
STANDARD:	(**-10 to -20)** ppmB x **-0.0091 to -0.0092)** %Δk/k/ppmB) **- 1%Δk/k= -0.816 to -0.909** %Δk/k step 2.6.3 negative Encl 13.8 should be neg Candidate determines SDM is less than 1%ΔK/K and is between **-0.816 to -0909% Δk/k.**	
COMMENTS:		

STEP 12:	Evaluate the calculated SDM.	**CRITICAL STEP**
STANDARD:	Determine that TS LCO 3.1.1 is NOT met because a SDM of -0.863 is less than 1% as required by the COLR. TS 3.1.1 must be met. REQUIRED ACTION – Initiate boration to restore SDM to within limit. COMPLETION TIME – 15 minutes	___ SAT
COMMENTS:		___ UNSAT
	END OF TASK	

STOP TIME: ____________

CRITICAL STEP EXPLANATIONS

STEP #	Explanation
3	Step is required to produce an accurate SDM
5	Step is required to produce an accurate SDM
7	Step is required to produce an accurate SDM
9	Step is required to produce an accurate SDM
10	Step is required to produce an accurate SDM
11	Step is required to produce an accurate SDM
12	Step is required because the SDM is below the TS allowable limit

CANDIDATE CUE SHEET
(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

INITIAL CONDITIONS

Unit 2 has been shutdown for 15 days for leak repair. The following conditions exist:

- Cycle burnup = 100 EFPD
- RCS temperature = 60°F
- Control Rod Group 1 at 0% withdrawn
- Control Rod Group 8 at 35% withdrawn
- Assume 0% for Xenon and Samarium worth
- RCS Boron 1500 ppm
- Present power level is 25 cpm on NI-2
- The RHOCALC program is NOT available

INITIATING CUES

Control Room supervisor directs you to perform the Original manual calculation of SDM using PT/2/A/1103/015, Reactivity Balance Procedure, Enclosure 13.1, Shutdown Boron Concentration/Shutdown Margin Calculation up to step 2.7.

Evaluate the calculated SDM and determine what (if any) Tech Specs apply and their required actions and associated completion times.

This is NOT being performed for a Control Rod Trip Time test.

REGION II
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

ADMIN-245

Compare measured Incore Axial Imbalance To Excore Axial Imbalance

CANDIDATE ______________________________

EXAMINER ______________________________

REGION II
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

Task:

Compare measured Incore Axial Imbalance to Excore Axial Imbalance

Alternate Path:

No

Facility JPM #:

New

K/A Rating(s):
System: GENERIC
K/A: 2.2.12
Rating: 3.7/4.1

Task Standard:

Compare measured Incore Axial Imbalance to Excore Axial Imbalance by procedure and determine that an NI calibration is required.

Preferred Evaluation Location: Simulator ____ In-Plant _____ Classroom __X__

Preferred Evaluation Method: Perform __X___ Simulate ____

References:
OP/1/A/1105/014, Control Room Instrumentation Operation and Information

Validation Time: 22 minutes

Time Critical: NO

==

Candidate: ____ Time Start: _________
NAME Time Finish: ________

Performance Rating: SAT ______ UNSAT ______ Performance Time: _________

Examiner: ______________________________ ____________________________________/________
NAME SIGNATURE DATE

==

COMMENTS

SIMULATOR OPERATOR INSTRUCTIONS

None

Tools/Equipment/Procedures Needed:

OP/1/A/1105/014, Control Room Instrumentation Operation and Information

READ TO OPERATOR

DIRECTION TO TRAINEE

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/1105/014 (Control Room Instrumentation Operation and Information) Enclosure 4.1 (Mode 1 & 2) in progress

- NAS-MMI is OOS
- OAC Reactor Calculation package is running

INITIATING CUES

CRS directs you to perform the surveillance in OP/1/A/1105/014 Enclosure 4.1 (Mode 1 & 2) at the top of Page 4 of 15 “Measured Incore Axial Power Imbalance value to Measured Out of Core (NI) Axial Power Imbalance values”.

.

START TIME: _______

STEP 1: TS 3.2.2 Measured Incore Axial Power Imbalance values to Measured Out of Core (NI) Axial Power Imbalance values **NOTE:** NAS-MMI, "Core Imbalance Display" shows each NI Imbalance in RED if it is outside the range. **IF** > 40% RTP **AND** Reactor calculations package is running on computer, refer to NAS-MMI "Core Imbalance Display" and verify each Out of Core (NI-5 - NI-8) Imbalance value is within the range of the values for "Lo Cal Limit NI Imb" and "Hi Cal Limit NI Imb". STANDARD: Determine that RTP is > 40% but Reactor calculations package is not running and continue. COMMENTS:	___ SAT ___ UNSAT
STEP 2: **IF** NAS-MMI is OOS **AND** Reactor calculations package is running on computer, refer to Enclosure 4.13 "Reactor Parameter Information". STANDARD: Determine that NAS-MMI is OOS and Reactor calculations are running and refer to Enclosure 4.13 "Reactor Parameter Information" Step 3.2.8. COMMENTS:	___ SAT ___ UNSAT

STEP 3:	Step 3.2.8. **IF** NAS-MMI is out of service the following formula can be used to calculate the top of range and bottom of range to compare the Measured Incore Axial Power Imbalance values to Measured Out of Core (NI) Axial Power Imbalance values. Bottom of Range = (1.15 x ______) - 0.02 x _______ = _______ % (O1P0877) (O1P0889) Top of Range = (1.15 x ______) + 0.02 x _______ = _______ % (O1P0877) (O1P0889) O1P0877 is Incore Imbalance and O1P0889 is Thermal Power Best	**CRITICAL STEP** ___ SAT ___ UNSAT
STANDARD:	Bottom of Range = (1.15 x -0.54) - 0.02 x 99.87 = **-2.618** % (O1P0877) (O1P0889) Top of Range = (1.15 x -0.54) + 0.02 x 99.87 = **1.376** % (O1P0877) (O1P0889)	
COMMENTS:		
STEP 4:	**IF** Required Conditions **NOT** met, contact SPOC to perform NI calibration.	**CRITICAL STEP** ___ SAT ___ UNSAT
STANDARD:	Compare the Out of Core Imbalance values to the top and bottom of the range and determine that NI-7 imbalance is outside of the limit and notify SPOC to perform an NI calibration.	
COMMENTS:		
	END OF TASK	

STOP TIME: ____________

CRITICAL STEP EXPLANATIONS

STEP #	Explanation
3	Step is required to calculate top and bottom range.
4	Step is required to determine reading not within limits and a NI calibration is required

CANDIDATE CUE SHEET
(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

INITIAL CONDITIONS

OP/1/A/1105/014 (Control Room Instrumentation Operation and Information) Enclosure 4.1 (Mode 1 & 2) in progress

- NAS-MMI is OOS
- OAC Reactor Calculation package is running

INITIATING CUES

CRS directs you to perform the surveillance in OP/1/A/1105/014 Enclosure 4.1 (Mode 1 & 2) at the top of Page 4 of 15 “Measured Incore Axial Power Imbalance value to Measured Out of Core (NI) Axial Power Imbalance values”.

Data Sheet

NI	Out of Core Axial Power Imbalance
5	-1.70
6	-0.83
7	-2.75
8	-0.66

Computer Points:

O1P0877 (Incore Imbalance) -0.54

O1P0889 (Thermal Power Best) 99.87%

REGION II
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

ADM-246

Determine ALL Tech Spec and SLC LCO's that are NOT met

CANDIDATE ____________________

EXAMINER ____________________

REGION II
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

Task:

Determine ALL Tech Spec and SLC LCO's that are NOT met

Alternate Path:

No

Facility JPM #:

New

K/A Rating(s):
System: GENERIC
K/A: 2.2.40
Rating: 3.4/4.7

Task Standard:

Preferred Evaluation Location:

Simulator ____ In-Plant _____ Classroom __X__

Preferred Evaluation Method:

Perform __X___ Simulate ____

References:

SLC 16.9.12
TS 3.7.7
TS LCS 3.0.3

Validation Time: 20 minutes

Time Critical: NO

==

Candidate: ____ Time Start: __________
NAME Time Finish: ________

Performance Rating: SAT ______ UNSAT ______ Performance Time: __________

Examiner: ______________________________ ____________________________________/________
NAME SIGNATURE DATE

==

COMMENTS

SIMULATOR OPERATOR INSTRUCTIONS

None

Tools/Equipment/Procedures Needed:

SLC 16.9.12
TS 3.7.7
TS LCS 3.0.3

READ TO OPERATOR

DIRECTION TO TRAINEE

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 Oconee Units operating at 100% power

Engineering reports that BOTH the A and B LPSW pump recirculation lines are inoperable

INITIATING CUES

CRS directs you to determine ALL Tech Spec and SLC LCO's that are NOT met for Unit 1 including associated Required Actions and Completion times.

START TIME: _______

<table>
<tr><td>

<u>STEP 1</u>: Refer to SLC 16.9.12

<u>STANDARD</u>: Refer to SLC 16.9.12 and determine:
SLC 16.9.12 Condition F must be entered
Required Action – Declare affected (A and B) LPSW Pumps inoperable
Completion Time - Immediately

<u>COMMENTS</u>:

</td><td>

CRITICAL STEP

___ SAT

___ UNSAT

</td></tr>
<tr><td>

<u>STEP 2</u>: Refer to TS 3.7.7

<u>STANDARD</u>: Refer to TS 3.7.7 and determine:
TS 3.7.7 (LPSW System) Condition A must be entered
Required Action – Restore required LPSW pump to OPERABLE status
Completion Time – 72 hours

Note: For current plant conditions, three LPSW pumps are required for Oconee Units 1 and 2.

<u>COMMENTS</u>:

</td><td>

CRITICAL STEP

___ SAT

___ UNSAT

</td></tr>
</table>

STEP 2:	Refer to TS LCO 3.0.3	**CRITICAL STEP**
STANDARD:	Determine: Entry in TS 3..0.3 is required because TS 3.7.7 does not have a condition for two required LPSW pumps inoperable Required Action – Action shall be initiated within 1 hour to place the unit in: MODE 3 within 12 hours MODE 4 within 18 hours MODE 5 within 37 hours	___ SAT ___ UNSAT
COMMENTS:		
	END OF TASK	

STOP TIME: ____________

CRITICAL STEP EXPLANATIONS

STEP #	Explanation
1	Step is required to determine proper TS and SLC requirments.
2	Step is required to determine proper TS and SLC requirments.
3	Step is required to determine proper TS and SLC requirments.

CANDIDATE CUE SHEET
(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

INITIAL CONDITIONS

All Oconee Units operating at 100% power

Engineering reports that BOTH the A and B LPSW pump recirculation lines are inoperable

INITIATING CUES

CRS directs you to determine ALL Tech Spec and SLC LCO's that are NOT met for Unit 1 including associated Required Actions and Completion times.

REGION II
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

Admin-306

Determine the Maximum Permissible Stay Time Within Emergency Dose Limits (EDL)

CANDIDATE ____

EXAMINER ____

REGION II
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

Task:

Determine the Maximum Permissible Stay Time Within the Emergency Dose Limits.

Alternate Path:

N/A

Facility JPM #:

Admin 305

K/A Rating(s):

System: Gen
K/A: 2.3.4
Rating: 3.2/3.7

Task Standard:

Determine the Maximum Permissible Stay Time Within the Emergency Dose Limits.

Preferred Evaluation Location:

Simulator _____ In-Plant ______ Classroom __X__

Preferred Evaluation Method:

Perform __X__ Simulate _____

References:

PD-RP-ALL-0001 Radiation Worker Responsibilities

OMP 1-18 (Implementation Standard During Abnormal And Emergency Events)

Validation Time: 20 min.

Time Critical: No

==

Candidate: ____ Time Start: _________

NAME Time Finish: ________

Performance Rating: SAT ______ UNSAT ______ Performance Time _________

Examiner: ______________________________ ____________________________________/_________

NAME SIGNATURE DATE

==

COMMENTS

SIMULATOR OPERATOR INSTRUCTIONS

NONE

Tools/Equipment/Procedures Needed:

Calculator
Note tablet

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

Steam Generator Tube Rupture has occurred on Unit 3

Emergency Dose Limits are in effect

AO “A” has received 1.26 Rem TEDE this year

The following tasks are required to be performed:

#	TASK	TIME REQUIRED	DOSE RATE
1	Close 3C-573	11 min	6.15 R/hr
2	Open 3FDW-313	6 min	18.25 R/hr
3	Open all Unit 3’s ADVs		4.65 R/hr

Note: Assume no dose is received while traveling between tasks.

INITIATING CUE

Refer to the above information. AO “A” has completed tasks 1 and 2 in the time required.

Determine how long the AO has to complete task 3 without exceeding his/her Emergency Dose Limits.

START TIME: _______

Examiner Note:

- ***Candidate may perform these steps in a different order; however, the calculated stay time must be correct.***
- ***EDL is 5 Rem per event (LOCA or SGTR).***
- ***Current exposure for the year is not counted toward the Emergency Dose Limits (EDL).***

STEP 1: Determine dose received while performing task 1. STANDARD: Determine dose received while performing task 1. 6.15 R/hr X 1hr/60 min X 11 min = 1.1275 R **(1.12 to 1.13 R)** COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT
STEP 2: Determine dose received while performing task 2. STANDARD: Determine dose received while performing task 2. 18.25 R/hr X 1hr/60 min X 6 min = 1.825 R **(1.82 to 1.83 R)** COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT
STEP 3: Determine dose remaining from EDLs. STANDARD: Determine dose remaining from EDLs. 5R – 1.1275R – 1.825R = 2.0475 R **(2.04 to 2.06 R)** COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT

STEP 4:	Determine time available for the AO to complete task 3 without exceeding EDL.	**CRITICAL STEP** ___ SAT ___ UNSAT
STANDARD:	Stay time is calculated to be: $\frac{\text{Available Dose}}{\text{Dose Rate}} = \frac{2.0475\text{ R}}{4.65\text{ R/hr}} = .44\text{ hr} \times \frac{60\text{ min}}{1\text{hr}} = \mathbf{26.42\ min}$ **(26 to 27 Minutes)**	
COMMENTS:		
	END OF TASK	

STOP TIME: ________

CRITICAL STEP EXPLANATIONS

STEP #	Explanation
1	Required to calculate stay time.
2	Required to calculate stay time.
3	Required to calculate stay time.
4	Required to calculate stay time.

CANDIDATE CUE SHEET
(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

INITIAL CONDITIONS

Steam Generator Tube Rupture has occurred on Unit 3

Emergency Dose Limits are in effect

AO “A” has received 1.26 Rem TEDE this year

The following tasks are required to be performed:

#	TASK	TIME REQUIRED	DOSE RATE
1	Close 3C-573	11 min	6.15 R/hr
2	Open 3FDW-313	6 min	18.25 R/hr
3	Open all Unit 3’s ADVs		4.65 R/hr

Note: Assume no dose is received while traveling between tasks.

INITIATING CUE

Refer to the above information. AO “A” has completed tasks 1 and 2 in the time required.

Determine how long the AO has to complete task 3 without exceeding his/her Emergency Dose Limits.

REGION II
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

ADMIN-431

Determine Emergency Classification and Protective Action Recommendations

CANDIDATE ______________________________

EXAMINER ______________________________

REGION II
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

Task:

Determine Emergency Classification and Protective Action Recommendations

Alternate Path:

NO

Facility JPM #:

CRO-407

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.

Preferred Evaluation Location:

Simulator _____ In-Plant ______ Classroom ___X___

Preferred Evaluation Method:

Perform __X___ Simulate ____

References:

RP/0/A/1000/01, Emergency Classification
RP/0/A/1000/02, Control Room Emergency Coordinator Procedure
RP/0/A/1000/015A, Offsite Communications From The Control Room
BASIS Document (Volume “A”, Section “D” of the Emergency Plan)

Validation Time: 25 min. **Time Critical:** Yes

==

Candidate: ____ Time Start: _______________

NAME Time Finish: ______________

Performance Rating: SAT ______ UNSAT ______ Performance Time: _________

Examiner: _______________________________ ____________________________________/_________

NAME SIGNATURE DATE

==

Comments

SIMULATOR OPERATOR INSTRUCTIONS

NONE

Tools/Equipment/Procedures Needed:

RP/0/A/1000/01
RP/0/A/1000/02

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: 3 hours ago:

- ALL three Unit's at 100% power
- The Oconee County Sheriff reports that a large group of "anti-nukes" are assembling at the Visitor Center

CURRENT CONDITIONS

- Oconee County Sheriff reports that an explosion has occurred at the Keowee Hydro Dam, however the dam shows only minor damage
- Security reports a fire and explosion inside the CT-4 block house
- CT-4 lockout occurs

INITIATING CUE

You are to perform the required actions of the Emergency Coordinator by referring to RP/0/A/1000/01, 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: _______

STEP 1:	Classify the Event	**CRITICAL STEP**
STANDARD:	Refer to RP/0/A/1000/01 (Emergency Classification) Enclosure 4.6 (Fire/Explosions and Security Actions). Classify the event as a "**General Emergency**" due to the following: ***A HOSTILE ACTION has occurred such that plant personnel are unable to operate equipment required to maintain safety functions*** Time for Classification __________	___ SAT ___ UNSAT
COMMENTS:		
STEP 2:	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	___ SAT ___ UNSAT
COMMENTS:		
STEP 3:	Step 2.1. IF No EAL exists, AND ERO activation is desired, THEN **GO TO** Enclosure 4.1, (ERO Pager Activation)	___ SAT
STANDARD:	Determine step 2.1 does not apply	___ UNSAT
COMMENTS:		
STEP 4:	Step 2.2 Declare the appropriate Emergency Classification level. Classification __GE______ (UE, ALERT, SAE, GE) Time Declared: _________	**TIME CRITICAL STEP**
STANDARD:	Declare a GE due to: **4.6.G.1**	___ SAT
STOP TIME #1: Time GE Declared __________ **(Actual time)**	(SAT is < Start Time + 15 minutes)	___ UNSAT
COMMENTS:		

STEP 5: Step 2.3 IF a Security event is in progress THEN GO TO Step 2.5 STANDARD: Determine Step 2.3 does apply and GO TO Step 2.5 COMMENTS:	___ SAT ___ UNSAT
STEP 6: Step 2.5 Appoint Control Room Offsite Communicator(s) and notify him to be prepared to transmit messages. STANDARD: Any name (real or imaginary) is acceptable. COMMENTS:	___ SAT ___ UNSAT
STEP 7: Step 2.6 IAAT Changing plant conditions require an emergency classification upgrade, STANDARD: An Upgrade is not expected. COMMENTS:	___ SAT ___ UNSAT

STEP 8: Step 2.7 Obtain the appropriate Offsite Notification form from the Emergency Plan cart. STANDARD: **Initial General Emergency form # 4.6.G.1** is selected and candidate continues to fill-out form per substeps of Step 2.7. COMMENTS:	**CRITICAL STEP** ___ SAT ___ UNSAT
STEP 9: Step 2.7 Ensure EAL # as determined by RP/0/A/1000/001 matches Line 4. **(4.6.G.1)** Line 1 Mark appropriate box "Drill" or "Actual Event" (**DRILL**) *Line 1 Enter Message # **(#1)** *Line 2 Mark Initial **(INITIAL marked)** 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. **(None)** Line 7 If Line 6 Box B or C is marked, mark Box D. Otherwise mark Box A. **(A)** *Line 8 Mark "Stable" unless an upgrade or additional PARs are anticipated within an hour. **(A condition marked is CRITICAL; stable, improving or degrading- does not matter)** • Refer to Enclosure 4.10, (Event Prognosis Definitions) *Line 10 Military time and date of declaration (Refer to date/time in Step 2.2) (**Inserts time from STEP 1 and today's date, military time is not critical as long as time is specific and accurate**) Line 11 If more than one unit affected, mark "All" (**ALL**) *Line 12 Mark affected unit(s) (reference Line 11) AND enter power level of affected unit(s) or time/date of shutdown {14} **(Unit 1, 2 and 3 100% power.** Line 13 If the OSM has no remarks, write "None" STANDARD: **Correctly fills out Emergency Notification Form in accordance with Key.** COMMENTS:	***CRITICAL STEP** ___ SAT ___ UNSAT

STEP 10: Step 2.7 Continued Line 17 - OSM signature, CURRENT Time/Date **(MUST SIGN)** STANDARD: **Correctly fills out Emergency Notification Form within 15 minutes of classification time recorded in step 1.** **STOP TIME #2**: Time for Notification ___________ **(Actual time)** (SAT is < Stop Time #1 + 15 minutes) COMMENTS: **END OF TASK**	**TIME CRITICAL STEP** ___ SAT ___ UNSAT

TIME STOP: ________

CRITICAL STEP EXPLANATIONS

STEP #	Explanation
1	The candidate needs to be able to utilize the procedure and determine the conditions meet a General Emergency classification.
4	This is a time critical step. The candidate needs to declare the GE within 15 minutes of beginning the JPM. (The start of the JPM is the beginning of the assessment period)
8	The correct form that matches the EAL # is selected.
9	The emergency notification form is accurately filled-out; identified steps from the KEY are critical items.
10	This is a time critical step. The Candidate needs to complete the notification form within 15 minutes from the time the EAL was declared. (Declaration time is the time recorded in JPM step 4)

CANDIDATE CUE SHEET
(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

INITIAL CONDITIONS

Time: 3 hours ago:

- ALL three Unit's at 100% power
- The Oconee County Sheriff reports that a large group of "anti-nukes" are assembling at the Visitor Center

CURRENT CONDITIONS

- Oconee County Sheriff reports that an explosion has occurred at the Keowee Hydro Dam, however the dam shows only minor damage
- Security reports a fire and explosion inside the CT-4 block house
- CT-4 lockout occurs

INITIATING CUE

You are to perform the required actions of the Emergency Coordinator by referring to RP/0/A/1000/01, 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.