

Facility:	CPSES	Scenario No.:	1	Op Test No.:	NRC
Examiners:	_____	Operators:	_____		
	_____		_____		
	_____		_____		
Initial Conditions:	<ul style="list-style-type: none"> • 100% power - RCS Boron is 906 ppm by Chemistry Sample. • Power Operated Relief Valve (PCV-456) closed and isolated due to seat leakage. 				
Turnover:	<ul style="list-style-type: none"> • Power reduction required at 25%/hr (MWe/min). 				
Critical Tasks:	<ul style="list-style-type: none"> • Determines Steam Generator #4 is ruptured and isolates the Steam Generator. • Determines Safety Injection Pump fails to start and starts pump. • Determines SGTR and SBLOCA and performs actions to minimize leak flow. 				
Event No.	Malf. No.	Event Type*	Event Description		
1 + 20 min		R (RO) N (BOP, SRO)	Power reduction required at 25% per hour.		
2 +30 min	RD08	I (RO, SRO)	Automatic Rod Control direction failure.		
3 +40 min	SW01B	C (BOP, SRO) TS (SRO)	Station Service Water Pump (1-02) trip.		
4 +50 min	RX08A	I (RO, SRO) TS (SRO)	Pressurizer Pressure Channel (PT-455) fails high.		
5 +60 min	SG01D	M (ALL)	Steam Generator #4 Tube Rupture @ 350 gpm (120 second ramp).		
6 +60 min	ED03B	M (ALL)	Loss of 345 kV Transformer 1ST (Loss of all RCPs).		
7 +60 min	SI04C	C (BOP)	Train A Safety Injection Pump (1-01) fails to start from sequencer.		
8 +100 min	RX16A	M (ALL)	Power Operated Relief Valve (PCV-455A) fails open during depressurization (SBLOCA).		
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor, (TS) Technical Specifications					

SCENARIO SUMMARY NRC #1

The crew will conduct a down power pre-shift brief prior to assuming the watch. Once completed, the crew will assume the shift and commence a power reduction at 25% per hour for Main Turbine Valve Testing per Integrated Plant Operating (IPO) procedure IPO-003A, Power Operations, Attachment 6, OPT-217A Power Reduction.

Once the down power is underway, an automatic Rod Control direction failure will occur. The crew will enter Abnormal Conditions Procedure (ABN) ABN-712, Rod Control System Malfunction. The crew will secure the power reduction and perform actions to restore plant parameters to normal.

When control of the plant is restored, a Station Service Water Pump will trip. The crew will follow guidance contained in ABN-501, Station Service Water System Malfunction to restore Service Water flow. The SRO will evaluate Technical Specifications.

After the crew has stabilized the plant, a Pressurizer pressure instrument fails high and the crew responds per ABN-705, Pressurizer Pressure Malfunction. The SRO will evaluate Technical Specifications.

When the plant is stable, a Steam Generator Tube Rupture on Loop 4 (SGTR) will occur. Upon Reactor trip, a loss of 345 kV Transformer will occur removing power to the Reactor Coolant Pumps and all Non-1E Buses. The crew will enter EOP-0.0A, Reactor Trip or Safety Injection and then transition to EOP-3.0A, SGTR to isolate the affected Steam Generator.

Following the Reactor Trip the Train A Safety Injection Pump 1-01 fails to start. The pump is subsequently started during performance of EOP-0.0A, Attachment 2.

During the RCS depressurization, a Power Operated Relief Valve (PCV-455A) will fail open with its associated Block Valve failing to close and require entry into ECA-3.1A, SGTR with Loss of Reactor Coolant - Subcooled Recovery Desired.

Event termination will occur when a RCS cooldown is in progress per ECA-3.1A.

Risk Significance:

- | | |
|---|--|
| • Risk important components out of service: | PORV isolated due to seat leakage |
| • Failure of risk important system prior to trip: | Station Service Water Pump trip |
| • Risk significant core damage sequence: | SGTR with SBLOCA |
| • Risk significant operator actions: | Failure to isolate ruptured SG
Failure to start SI Pump |

Facility:	CPSES	Scenario No.:	2	Op Test No.:	NRC
Examiners:	_____	Operators:	_____		
	_____		_____		
	_____		_____		
Initial Conditions:	<ul style="list-style-type: none"> • 54% power - RCS Boron is 1052 ppm by Chemistry Sample. • Power Operated Relief Valve (PCV-456) closed and isolated due to seat leakage. 				
Turnover:	<ul style="list-style-type: none"> • Maintain steady-state operation. 				
Critical Tasks:	<ul style="list-style-type: none"> • Determines Steam Generator #2 is faulted and isolates the Steam Generator. • Determines Containment Isolation Signal fails to actuate and manually actuates. • Determines required conditions met for tripping RCPs. 				
Event No.	Malf. No.	Event Type*	Event Description		
1 +10 min	RX09A	I (ALL)	Main Turbine 1 st Stage Pressure Transmitter (PT-505) fails low.		
2 +20 min	RX15B	C (RO, SRO) TS (SRO)	Pressurizer Spray Valve (PCV-455C) fails 40% open.		
3 +30 min	EG01	C (BOP, SRO)	Main Generator Voltage Regulator fails high.		
4 +40 min	RX05A	I (RO, SRO) TS (SRO)	Pressurizer Level Channel (LT-459A) fails low.		
5 +50 min	MS01B	M (ALL)	Faulted Steam Generator #2 inside Containment.		
6 +55 min	RP09A/B RP18A	C (BOP)	Containment Isolation Valves fail to close.		
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor, (TS) Technical Specifications					

SCENARIO SUMMARY NRC #2

The crew will assume the shift with steady-state conditions per Integrated Plant Operating (IPO) procedure IPO-003A, Power Operations.

The first event is a Main Turbine 1st Stage Pressure Transmitter (PT-505) failure. The crew responds per Abnormal Conditions Procedure (ABN) ABN-709, Steam Line Pressure, Steam Header Pressure, Turbine 1st-Stage Pressure and Feed Header Pressure Instrument Malfunction. Several actions are required on the part of the RO and BOP to stabilize plant conditions.

When the plant is stable, a Pressurizer Spray Valve will fail open. The crew will enter ABN-705, Pressurizer Pressure Malfunction and take manual control of the Spray Valve. The SRO will be required to evaluate Technical Specifications.

The next event is a Main Generator Voltage Regulator failure. The crew will respond per ABN-402, Main Generator Malfunction. The BOP will take manual control of the voltage regulator to manage Main Generator VARs and voltage within specification.

When control of Main Generator is obtained, a Pressurizer level channel will fail low. The crew should respond to the channel failure in accordance with ABN-706, Pressurizer Level Instrumentation Malfunction. Actions include manual control of Charging by the RO. The SRO will evaluate Technical Specifications.

When the channel failure actions are complete, a Steam Line Break inside Containment on Steam Generator #2 will occur. The crew will enter EOP-0.0A, Reactor Trip or Safety Injection and then transition to EOP-2.0A, Faulted Steam Generator Isolation. Once the Steam Generator is isolated the crew will transition to EOS-1.1A, Safety Injection Termination.

An automatic failure of both Trains of Containment Isolation Valves will require actions on the part of the BOP.

Event termination will occur when the crew has completed actions for securing high head Safety Injection.

Risk Significance:

- Risk important components out of service: PORV isolated due to seat leakage
- Failure of risk important system prior to trip: Pressurizer Spray Valve fails open
- Risk significant core damage sequence: PTS due to faulted Steam Generator
- Risk significant operator actions: Manually initiate Containment Isolation
Stop all RCPs on loss of cooling

Facility:	CPSES	Scenario No.:	3	Op Test No.:	NRC
Examiners:	_____	Operators:	_____		
	_____		_____		
	_____		_____		
Initial Conditions:	<ul style="list-style-type: none"> • 1×10^{-8} amps - RCS Boron is 1806 ppm by Chemistry Sample. 				
Turnover:	<ul style="list-style-type: none"> • Rod withdrawal and power increase to ~2% power. 				
Critical Tasks:	<ul style="list-style-type: none"> • Determine Reactor Coolant Pump trip, manual Reactor Trip required. • Determine inadvertent SI and secures Charging prior to Pressurizer overflow. • Determine LOCA in progress and reinitiates Safety Injection. 				
Event No.	Malf. No.	Event Type*	Event Description		
1 +20 min		R (RO) N (BOP, SRO)	Rod withdrawal and power increase to ~2% power.		
2 +30 min	FW24A	C (BOP, SRO) TS (SRO)	Motor-driven Auxiliary Feedwater Pump (1-01) trip.		
3 +40 min	CV01B	C (RO, SRO) TS (SRO)	Centrifugal Charging Pump (1-01) trip.		
4 +45 min	RC15C	C (RO, SRO)	Reactor Coolant Pump (1-03) seized shaft, manual Reactor Trip required.		
5 +45 min	RP14B	M (ALL)	Spurious Train B Safety Injection actuation upon Reactor Trip.		
6 +50 min	CC02D	C (BOP)	Component Cooling Water Pump (1-02) fails to start from sequencer.		
7 +65 min	RC17C	M (ALL)	Loss of Coolant Accident at 1700 gpm following isolation of high head injection.		
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor, (TS) Technical Specifications					

SCENARIO SUMMARY NRC #3

The crew will assume the shift with the Reactor critical at 1×10^{-8} amps and then raise power to approximately 2% per Integrated Plant Operating (IPO) procedure IPO-002A, Plant Startup from Hot Standby.

The first event is a trip of the running Auxiliary Feedwater Pump. The crew will refer to Abnormal Conditions Procedure (ABN) ABN-305, Auxiliary Feedwater System Malfunction and place the Turbine Driven AFW Pump in service. The SRO will evaluate Technical Specifications.

When the crew has evaluated Technical Specifications, a loss of the running Centrifugal Charging Pump will occur. The crew will enter ABN-105, Chemical and Volume Control System Malfunction and perform actions as required. The SRO will evaluate Technical Specifications.

The major event begins with a Reactor Coolant Pump seized shaft that requires a manual Reactor trip. When the Reactor is manually tripped a spurious Train B Safety Injection signal will actuate. The crew will enter EOP-0.0A, Reactor Trip or Safety Injection and perform immediate actions including actuation of both Trains of Safety Injection. When it is determined that a spurious actuation has occurred the crew will transition to EOS-1.1A, Safety Injection Termination. During the event a Component Cooling Water Pump will fail to start and require actions on the part of the BOP during Attachment 2 of EOP-0.0A.

When the high head injection alignment is secured in EOS-1.1A, a small break LOCA will occur and require re-initiation of Safety Injection flow per the Foldout Page Criteria of EOS-1.1A.

Event termination will occur when the crew has reinitiated Safety Injection and transitioned to EOP-1.0A, Loss of Reactor or Secondary Coolant.

Risk Significance:

- Failure of risk important system prior to trip: Auxiliary Feedwater Pump trip
Centrifugal Charging Pump trip
- Risk significant core damage sequence: SBLOCA following safety injection termination
- Risk significant operator actions: Restore AFW flow
Reinitiate Safety Injection

Facility: <u>Comanche Peak</u>		Date of Examination: <u>04/16/2007</u>	
Exam Level (circle one): <u>RO / SRO(I) / SRO (U)</u>		Operating Test No.: <u>NRC</u>	
Control Room Systems [®] (8 for RO; 7 for SRO-I; 2 or 3 for SRO-U, including 1 ESF)			
	System / JPM Title	Type Code*	Safety Function
S-1	064 - Emergency Diesel Generator (RO4302A) Load the Emergency Diesel Generator	A, M, S	6
S-2	003 - Reactor Coolant Pump System (RO1102A) Start a Reactor Coolant Pump	A, D, L, P, S	4-P
S-3	015 - Nuclear Instrumentation System (RO1820) Respond to a Power Range Channel Failure	D, S	7
S-4	059 - Main Feedwater System (RO3301) Place a Main Feed Pump in Service	D, S	4-S
S-5	026 - Containment Spray System (RO2002) Transfer Containment Spray from Injection to Recirculation	A, D, S	5
S-6	001 - Control Rod Drive System (RO1012) Control Axial Flux Distribution	A, M, S	1
S-7	006 - Emergency Core Cooling System (RO7005A) Isolate Accumulators	A, D, S	2
S-8	029 - Containment Purge System (New) Perform a Containment Pressure Reduction	A, N, S	8
In-Plant Systems [®] (3 for RO; 3 for SRO-I; 3 or 2 for SRO-U)			
P-1	004 - Chemical and Volume Control System (AO5403) Perform a Dilution Path Isolation	D, E, R	1
P-2	062 - AC Electrical Distribution (New) Place an inverter in service	N	6
P-3	039 - Main and Reheat Steam System (AO6421) Transfer Control of Atmospheric Relief Valves	D, E	4-S

@ 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	$\leq 9 / \leq 8 / \leq 4$
(E)mergency or abnormal in-plant	$\geq 1 / \geq 1 / \geq 1$
(L)ow-Power	$\geq 1 / \geq 1 / \geq 1$
(N)ew or (M)odified from bank including 1(A)	$\geq 2 / \geq 2 / \geq 1$
(P)revious 2 exams	$\leq 3 / \leq 3 / \leq 2$ (randomly selected)
(R)CA	$\geq 1 / \geq 1 / \geq 1$
(S)imulator	$\geq 1 / \geq 1 / \geq 1$

**NRC JPM Examination
Summary Description**

- S-1 The candidate will perform OPT-214A, Diesel Generator Operability Test. The Diesel Generator is running at 60 Hz and 6.9 kV when the candidate will synchronize and load the Diesel Generator. The alternate path requires an emergency stop of the DG due to offsite power frequency degradation. This is a modified JPM under the Emergency Diesel Generator – Electrical Systems safety function. This is a PRA significant action.
- S-2 The candidate will start the third Reactor Coolant Pump during a plant heatup per SOP-108A, Reactor Coolant Pump. The alternate path requires tripping the RCP when conditions degrade after the pump is running. This is a bank JPM under the Reactor Coolant Pump – Primary System Heat Removal from the Reactor Core safety function. This JPM was previously used on the November 2002 NRC Exam.
- S-3 The candidate will respond to a Power Range Channel failure per ABN-703, Power Range Instrumentation Malfunction. This is a bank JPM under the Nuclear Instrumentation System – Instrumentation safety function.
- S-4 The candidate must place a Main Feedwater Pump in service per IPO-003A, Power Operations and SOP-302A, Feedwater System. This is a bank JPM under the Main Feedwater System – Secondary System Heat Removal from Reactor Core safety function.
- S-5 The candidate will transfer Containment Spray from injection to recirculation per EOS-1.3A, Transfer to Cold Leg Recirculation. The alternate path actions include stopping the Containment Spray Pumps due to loss of suction capability. This is a bank JPM under the Containment Spray System – Containment Integrity safety function. This meets the ESF function for the SRO upgrade. This is a PRA significant action.
- S-6 The candidate will respond to and control Axial Flux Distribution per guidance in IPO-003A, Power Operations. The alternate path requires a Reactor trip when two Control Rods drop into the core. This is a modified JPM under the Control Rod Drive System – Reactivity Control safety function.
- S-7 The candidate will isolate accumulators following transfer to cold leg recirculation per EOP-1.0A, Loss of Reactor or Secondary Coolant. The alternate path actions include venting an accumulator whose isolation valve will not close. This is a bank JPM under the Emergency Core Cooling System – Reactor Coolant System Inventory Control safety function.
- S-8 The candidate will perform a Containment Pressure Reduction per SOP-801A, Containment Ventilation System. The alternate path requires closing the Containment Purge path upon receipt of a high radiation alarm. This is a new JPM under the Containment Purge System - Plant Service Systems safety function.
- P-1 The candidate will locally isolate potential dilution paths per FRS-0.1A(B), Response to Nuclear Power Generation / Anticipated Transient Without Trip. This is a bank JPM under the Chemical and Volume Control System – Reactivity Control safety function. This is a PRA significant action.
- P-2 The candidate will place an inverter in service per SOP-607A(B), 118 VAC Distribution System and Inverters. This is a new JPM under the AC Electrical Distribution – Electrical Systems safety function.
- P-3 The candidate will transfer control of the Steam Generator Atmospheric Relief Valves per Attachment 9 of ABN-905A(B), Loss of Control Room Habitability. This is a bank JPM under the Main and Reheat Steam System – Secondary System Heat Removal from Reactor Core safety function. This is a PRA significant action.

Facility: Comanche Peak		Date of Examination: 04/16/2007
Examination Level RO		Operating Test Number: NRC
Administrative Topic (see Note)	Type Code*	Describe activity to be performed
Conduct of Operations	M, R	2.1.25 Ability to obtain and interpret station reference materials such as graphs, nomographs, and tables which contain performance data (2.8). JPM: Perform an RWST blended makeup calculation (RO1307).
Conduct of Operations	M, R	2.1.23 Ability to perform specific system and integrated plant procedures during all modes of plant operation (3.9). JPM: Perform a calorimetric heat balance (RO1804A).
Equipment Control	M, R	2.2.12 Knowledge of surveillance procedures (3.0). JPM: Review completed surveillance for accuracy (RO8003).
Radiation Control	N, R	2.3.10 Ability to perform procedures to reduce excessive levels of radiation and guard against personnel exposure (2.9). JPM: Determine stay time for work to be performed based on HP Surveys (New).
Emergency Plan	-	
NOTE: All items (5 total) are required for SROs. RO applicants require only 4 items unless they are retaking only the administrative topics, when 5 are required.		
*Type Codes & Criteria:		
(C)ontrol room		
(D)irect from bank (≤ 3 for ROs; \leq for 4 for SROs & RO retakes)		
(N)ew or (M)odified from bank (> 1)		
(P)revious 2 exams (≤ 1 ; randomly selected)		
(S)imulator		
Class(R)oom		

Administrative Topics Outline
Task Summary

- A.1.a The candidate will be required to calculate a blended makeup to the RWST using plant technical data tables from the Technical Data Manual. The critical tasks include calculating total makeup volume and boric acid flowrate. This is a modified bank JPM.

- A.1.b The candidate will be given a set of plant information requiring calculation of a calorimetric heat balance per OPT-309, Unit Calorimetric. The critical tasks include correctly entering data and determining the thermal output of the reactor. This is a modified bank JPM.

- A.2 The candidate will review a completed surveillance procedure OPT-110A, Measurement of Seal Injection Flow for accuracy. The critical task is to determine which surveillance items are out-of-specification. This is a modified bank JPM.

- A.3 The candidate will determine stay time for work to be performed based on HP Surveys. The critical tasks include determination of method and number of individuals required to minimize exposure. This is a new JPM.

- A.4 N/A

Facility: Comanche Peak	Date of Examination: 04/16/2007	
Examination Level: SRO(I) & (U)	Operating Test Number: NRC	
Administrative Topic (see Note)	Type Code*	Describe activity to be performed
Conduct of Operations	M, R	2.1.25 Ability to obtain and interpret station reference materials such as graphs, nomographs, and tables which contain performance data (3.1). JPM: Review an RWST blended makeup calculation (SO1002).
Conduct of Operations	M, R	2.1.23 Ability to perform specific system and integrated plant procedures during all modes of plant operation (4.0). JPM: Perform a calorimetric heat balance (RO1804A).
Equipment Control	N, R	2.2.22 Knowledge of limiting conditions for operations and safety limits (4.1). JPM: Perform a Safety Function Determination (New).
Radiation Control	N, R	2.3.10 Ability to perform procedures to reduce excessive levels of radiation and guard against personnel exposure (3.3). JPM: Determine stay time for work to be performed based on HP Surveys (New).
Emergency Plan	N, R	2.4.41 Knowledge of emergency action level thresholds and classifications (4.1). JPM: Classify an emergency event (New).
NOTE: All items (5 total) are required for SROs. RO applicants require only 4 items unless they are retaking only the administrative topics, when 5 are required.		
*Type Codes & Criteria: (C)ontrol room (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) (S)imulator Class(R)oom		

Administrative Topics Outline
Task Summary

- A.1.a The candidate will be required to review a blended makeup to the RWST calculation using plant technical data tables from the Technical Data Manual. The critical tasks include validating total makeup volume and boric acid flowrate data. This is a modified bank JPM.

- A.1.b The candidate will be given a set of plant information requiring calculation of a calorimetric heat balance per OPT-309, Unit Calorimetric. The critical tasks include correctly entering data and determining the thermal output of the reactor. This is a modified bank JPM.

- A.2 The candidate will perform a Safety Function Determination Program evaluation for the Emergency Core Cooling System per ODA-308, LCO Tracking Program. The critical tasks include determine the Systems and Safety Functions affected. This is a new JPM.

- A.3 The candidate will determine stay time for work to be performed based on HP Surveys. The critical tasks include determination of method and number of individuals required to minimize exposure. This is a new JPM.

- A.4 A Security event is in progress. The candidate will perform an EPIP classification per EPP-201, Assessment of Emergency Action Levels Emergency Classification and Plan Activation. The critical task is to properly classify the event. This is a new JPM.