

Scenario Title: Small Steam Break Inside the Reactor Building

Scenario Duration: 50 minutes

Scenario Number: 02-REQ-009-1DY-2-18

Revision Number: 3

Course: Licensed Operator Requalification

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Superintendent of Operations Date

**MASTER
CONTROLLED
DOCUMENT**

02-REQ-009-1DY-2-18 February, 1990

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SCENARIO SUMMARY

SMALL STEAM BREAK INSIDE THE REACTOR BUILDING

The scenario starts with the plant operating normally at rated conditions. A failure of the "C" Average Power Range Monitor causes the Recirculation Flow Control valves to open and raise power. The APRM will be bypassed and power restored.

A loss of 2NJS-US5 results in a loss of some safe shutdown loads and an RPS MG set. Electrical Maintenance is called to investigate the situation.

A break occurs in the RCIC steam supply line, resulting in high steam flow indications and an increase in Reactor Building area temperature. The RCIC system fails to isolate and steam flow to the Reactor Building continues. The operators will enter Secondary Containment EOPs.

As the leak continues the EOPs direct shutdown of the reactor. When a second area of the building also has a high temperature (212°F) an emergency depressurization must be performed.



SCENARIO OBJECTIVES

The Licensed Control Room Reactor Operators (CSO and NAOE):

Perform the Actions Required for a Small Break LOCA, Outside the Primary Containment

Task Number 2009130501 K/A Rating 4.30
Requal TIF 4.49 Class, Simulator

Scram the Reactor Manually and Take Immediate Actions

Task Number 2010130101 K/A Rating 4.10
Requal TIF 3.67 Class, Simulator

Manually Isolate the RCIC System from the Control Room

Task Number 2179060101 K/A Rating 3.40
Requal TIF 3.12 Class, Simulator

Manually Initiate the ADS System and Monitor While Activated

Task Number 2180020101 K/A Rating 4.20
Requal TIF 3.66 Class, Simulator

The Licensed Senior Reactor Operators (SSS and ASSS):

Apply Tech. Spec. Directions for Safety Limits, LCOs, and Limiting Safety System Settings.

Task Number 3410180303 K/A Rating 3.70
Requal TIF 3.35 Class, Simulator

Classify Emergency Events Requiring Emergency Plan Implementation

Task Number 3440190303 K/A Rating 4.70
Requal TIF 4.28 Simulator

Direct the Actions Required per EOP-RPV Section RQ

Task Number 3449390603 K/A Rating 4.70
Requal TIF 4.40 Class, Simulator

Direct the Actions Requiring per EOP-RPV Section RL

Task Number 3449400603 K/A Rating 4.70
Requal TIF 4.33 Class, Simulator

Direct the Actions Required per EOP-RPV Section RP

Task Number 3449410603 K/A Rating 4.70
Requal TIF 4.33 Class, Simulator

Direct the Actions Required per EOP-SC Section SCT

Task Number 3449460603 K/A Rating 4.70
Requal TIF 4.40 Class, Simulator



SCENARIO OBJECTIVES

Direct the Actions Required per EOP-SC Section SCL
Task Number 3449470603 K/A Rating 4.70
Requal TIF 4.43 Class, Simulator

Direct the Actions Required per EOP-SC Section SCR
Task Number 3449480603 K/A Rating 4.70
Requal TIF 4.43 Class, Simulator

Direct the Actions Required per EOP-C2, Emergency Depressurization
Task Number 3449520603 K/A Rating 4.70
Requal TIF 4.43 Class, Simulator

(*) Individual Simulator Critical Task
(**) Crew Simulator Critical Task



NMP 2 CONTROL ROOM REFERENCES

PROCEDURES:

N2-OP-29	Reactor Recirculation System
N2-OP-31	Residual Heat Removal System
N2-OP-35	Reactor Core Isolation Cooling
N2-OP-71	13.8 KV/4160V/600 VAC Power Distribution
N2-OP-79	Radiation Monitoring System
N2-OP-83	Primary Containment Isolation System
N2-OP-92	Neutron Monitoring
N2-OP-101A	Plant Startup
N2-OP101C	Plant Shut Down
N2-OP-101D	Power Changes
N2-EOP-SC	Secondary Containment Control
N2-EOP-RPV	Reactor Pressure Vessel Control
N2-EOP-C2	Emergency Depressurization
EAP-2	Classification of Emergency Conditions
EPP-20	Emergency Notifications

TECHNICAL SPECIFICATIONS:

3.3.1	Reactor Protection System Instrumentation
3.3.6	Control Rod Block Instrumentation
3.3.7.5	Accident Monitoring Instrumentation



TIME	EVENT	INSTRUCTOR ACTIVITY	PLANT RESPONSE	OPERATOR ACTIONS	EVALUATOR COMMENTS
		Special Instructions: None	Operating above the 100% Rod line.		
		Simulator Operation Initialize: IC-20			
		Preset Malfunctions: MF;1,RC11 MF;2,TC06	RCIC Failure to Isolate Bypass-Valves Fail Closed		
		Preset I/Os: IO;1,E51A-S2-C ₃ OPN IO;2,E51A-S1-C ₃ OPN	ICS*MOV121 to open ICS*MOV128 to open		
		Distribute and discuss turnover sheets			
		Initial Conditions: 100% power, MOL Maintaining power per N2-OP-101 ⁴ , RWM Gp-147, Step 91 Operating above the 100% rod line			
		Out of Service Equipment: None			



TIME	EVENT	INSTRUCTOR ACTIVITY	PLANT RESPONSE	OPERATOR ACTIONS	EVALUATOR COMMENTS
		Surveillances scheduled: None			
		Allow not more than five minutes for panel walkdown.		Walkdown control panels.	
T=0		Commence the scenario,		Assume the shift, continue power operation.	
T=3	1	Select Page NH2 Adjust GAF as follows 3..5	C APRM will drop to approx. a 65% reading. Recirc FCVs will start to open to raise power. FCV will ramp open to rod block setpoint or FCV motion inhibit.	<u>CSO/E</u> 1. Respond to annunciators. 2. Determine the cause of Recirc. FCV motion (or power increase). 3. Determine that C APRM input has decreased. 4. Shift Recirc flow control to loop manual.	1a,b
		Note: If Recirc FCVs are still in flux, auto and not locked up when C APRM is bypassed the valves will close down.		(*) <u>SSS/ASSS</u> 1. Determine that APRM C is inoperable.	2a,c Sat/Unsat

B35-K603B-E III AUT

B35 1:02 B III 1T+5sec
3 RR05 B III Time.

Acc. ...



TIME	EVENT	INSTRUCTOR ACTIVITY	PLANT RESPONSE	OPERATOR ACTIONS	EVALUATOR COMMENTS
		<p>Note: If FCV lock up and operators request status of LEDs inform them no LEDs lit.</p>		<p>2. Direct that APRM C be bypassed.</p> <p>3. Review Technical Specifications on the effects of bypassing the C APRM.</p> <p>Task # <u>3410190303</u></p> <p>K/A Rating <u>3.70</u></p>	<p>3d,6a</p> <p>3a</p>
		<p>Note: May wait to shift Recirc. Flow Control back to automatic until completed troubleshooting problem.</p> <p>Role Play:</p> <p>As I and C report that you will investigate problem with "C" APRM.</p>		<p><u>CSO/E</u></p> <p>1. Shift Recirc Flow Control back to flux automatic, if directed</p> <p>2. Contact I and C to investigate the problem with C APRM.</p>	<p>5a,b</p> <p>6b</p>



TIME	EVENT	INSTRUCTOR ACTIVITY	PLANT RESPONSE	OPERATOR ACTIONS	EVALUATOR COMMENTS
T±12	2	Set I/O; 5,1-2NJSX13-A,,STP Set MF; 3,RP06A	Circuit Breaker ACB 5-8B opens interrupting power to 2NJS-US5. This results in a loss of: 1. A RPS MG Set 2. A RHCPU Pump 3. 1A Instrument Air Compressor 4. Main Seal Oil pump 5. Half of operating drywell cooling units	<u>CSO/E</u> 1. Respond to annunciators. 2. Determine loss of 2NJS-US5. 3. Inform SSS of loss of 2NJS-US5. 4. Evaluate effects of loss on plant operations. <u>SSS/ASSS</u> 1. Direct CSO to inform main- tenance of US-5 loss. <u>CSO/E</u> 1. Discuss loss of power to the "A" RPS scram solenoids. 2. At Panel 610 place power source select switch to "ALT A" position. 3. Direct auxiliary operator to reset EPA's RPM MG1.	1a 2a 6a 6a 5a,b 6a



TIME	EVENT	INSTRUCTOR ACTIVITY	PLANT RESPONSE	OPERATOR ACTIONS	EVALUATOR COMMENTS
		<p>Role Play:</p> <p>When directed as AOE to restart RPS MG A</p> <p>Clear MF;3</p> <p>Role Play:</p> <p>As Auxiliary Operator when directed by CSO to reset EPA's report that you will. Select RP page and set RF;1 to reset</p> <p>Role Play: As electrical maintenance, report problem was a breaker fault. Allow time delay or report this when prompted by Control Room.</p>	<p>White power available light on Panel 610 illuminates</p> <p>White lights for a RPS pilot solenoids illuminate on Panel 603</p>	<p>4. Contact electrical maintenance for investigation of 2NJS-USS and circuit breaker (with no fault indication, operators may energize the bus prior to any information back from the plant.)</p>	<p>6b</p>
T=22	3	Set MF;4,RC12,,20	<p>RCIC Steam Line Break</p> <p>Annunciators 601323, 601324 Steam Line</p> <p>Differential Pressure High</p>	<p><u>Team</u></p> <p>Respond to alarm</p> <p>1. Report High Reactor Bldg. Gen Area Temp. after investigation</p> <p>(**) 2. Identify/report RCIC system isolation signal and failure to isolate.</p> <p>Task # <u>2009130501</u></p> <p>K/A Rating <u>4.30</u></p>	<p>6a</p> <p>2c,6c. Sat/Unsat</p>



TIME

EVENT

INSTRUCTOR ACTIVITY

PLANT RESPONSE

OPERATOR ACTIONS

EVALUATOR COMMENTS

CSO/E

- 1. Investigate which area of reactor building has high temperature alarm on PNL 632.

4a,b

SSS

(*) Enter EOP-SC

3c

Sat/Unsat

- 1. Direct operation of all available area unit coolers.
- 2. Operate all available HVR.
- 3. Direct action to isolate RCIC steam supply.

Task # 3449460603

K/A Rating 4.70

Task # 3449470603

K/A Rating 4.70

Task # 3449480603

K/A Rating 4.70

ASSS/CSO

- 1. Sound station alarm.
- 2. Make a short announcement about EOP entry for high temperature reactor bldg.

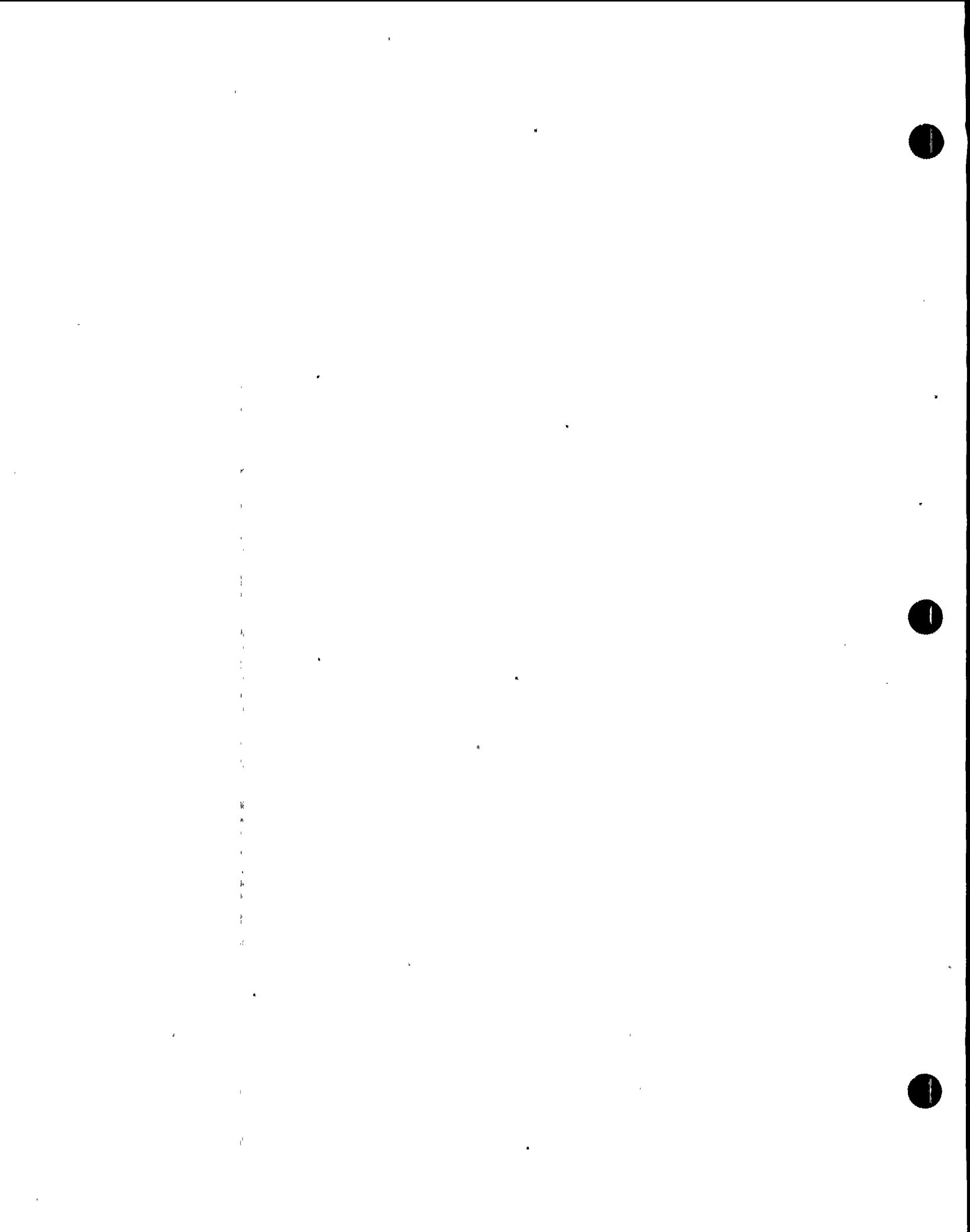
5a

6a



TIME	EVENT	INSTRUCTOR ACTIVITY	PLANT RESPONSE	OPERATOR ACTIONS	EVALUATOR COMMENTS
		<p><u>Role Play:</u> As Auxiliary Operator, when asked to locally close ICS*MOV121 report that you will attempt it. (Cannot reach due to Steam and High Radiation.)</p>		<p><u>CSO/E</u></p> <p>1. Take keylock switches for 2ICS*MOV121 and 128 to close position.</p> <p>(*) 2. Identify and report failure of isolation valves to close. Task # <u>2179060101</u> K/A Rating <u>3.40</u></p> <p>3. Direct auxiliary operator to attempt to locally close 2ICS*MOV121.</p>	<p>5a,b</p> <p>2a,6a Sat/Unsat</p> <p>6a</p>
				<p>4. Check temperature reading for area of Reactor Bldg. on Panel 632.</p> <p>5. Identify Rx. Bldg. 215 ft. Gen area as alarming.</p> <p>6. Report Rx Bldg. 215 ft. Gen area as second area in alarm.</p>	<p>4a</p> <p>4b</p> <p>6a</p>

T = 28



TIME

EVENT

INSTRUCTOR ACTIVITY

PLANT RESPONSE

OPERATOR ACTIONS

EVALUATOR COMMENTS

SSS

(*)Enter EOP-RPV control:

3c

Sat/Unsat

Direct that the reactor be
scrammed before any area
temperature reaches 212°F

Task # 3449390603

K/A Rating 4.70

Task # 3449400603

K/A Rating 4.70

Task # 3449410603

K/A Rating 4.70

CSO/E

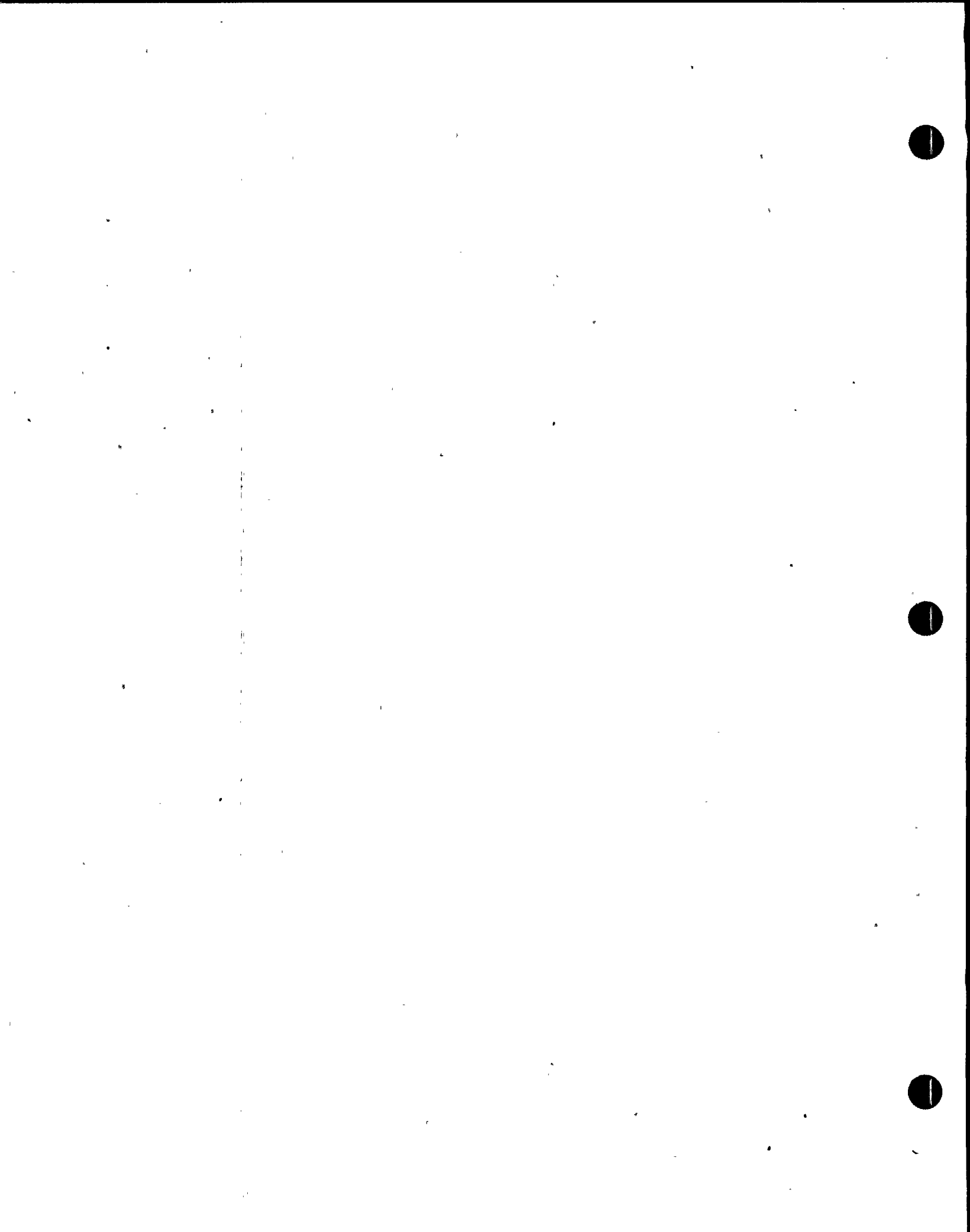
(*) 1. Place mode switch to shut-
down and take immediate
actions for reactor scram.

5a,5

Sat/Unsat

Task # 2010130101

K/A Rating 4.10



TIME	EVENT	INSTRUCTOR ACTIVITY	PLANT RESPONSE	OPERATOR ACTIONS	EVALUATOR COMMENTS
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- | | | | | | |
|--|--|--|--|---|------|
| | | | | 2. Control vessel level with feedwater/condensate to between 159.3" and 202.3". | 5a,b |
| | | | | 3. Attempt to control pressure using the bypass valves if necessary. | 5a,b |

SSS
 Anticipate emergency depressurization and direct all bypass valves be opened to rapidly depressurize.

- CSO/E
- | | | | | | |
|--|--|--|--|--|---------|
| | | | | 1. Attempt to open all five bypass valves. | 5a,b |
| | | | | 2. Report failure of valves to open. | 4a,b,6a |

- (**) TEAM
- | | | | | | |
|--|--|--|--|--|-----------|
| | | | | 1. Check Reactor Building temperatures at Panel 632. | Sat/Unsat |
| | | | | 2. Report temperatures above 212°F in two areas. | 4a |
| | | | | Task # 2009130501 | 6a |
| | | | | K/A Rating <u>4.30</u> | |

T=40

Note:
 SFP, B HX Room Area
 Temp. and Rx. Bldg. 215 ft. Area
 Temp. will exceed 212°F



TIME	EVENT	INSTRUCTOR ACTIVITY	PLANT RESPONSE	OPERATOR ACTIONS	EVALUATOR COMMENTS
				<u>SSS</u> Direct RPV emergency depressurization.	
				(*) 1. Enter EOP-C2 Task # <u>3449520603</u> K/A Rating <u>4.70</u> 2. Direct seven SRV's opened. 3. Direct suppression pool cooling placed in service.	3c Sat/Unsat
				<u>CSO/E</u> (*) 1. Open all seven ADS SRV's. Task # <u>2180020101</u> K/A Rating <u>4.20</u> 2. Place one loop of RHS in suppression pool cooling. 3. Monitor vessel depressurization.	5a,b Sat/Unsat
				<u>SSS/SEPC</u> (*) 1. Classify event as unusual event or higher Task # <u>3440190303</u> K/A Rating <u>4.70</u> 2. Direct announcement for evacuating reactor building.	2a,c,3b Sat/Unsat 4b,6b

Terminating Cues:

Vessel depressurized RPV level between 159.3" and 202.3"

