

Scenario Title: LOSS OF OFF-SITE POWER WITH DRYWELL STEAM LEAK

Scenario Duration: 1 hour

Scenario Number: 02-REQ-009-1DY-2-12

Revision Number: 2

Course: Licensed Operator Requal

Reviewed By: *[Signature]* / 2/13/90  
Operations Training Supervisor Date

Reviewed By: *R. T. Dwyer* / 2/26/90  
Assistant Training Superintendent Date

Approved By: *Paul [Signature] FOR MJE* / 2/26/90  
Superintendent of Operations Date

MASTER  
MASTER

CONTROLLED  
02-REQ-009-1DY-2-12 -1 February 1990 Rev. 2

NRC2/263

DOCUMENT

9304290187 911031  
PDR ADOCK 05000410  
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4/29/87



## SCENARIO SUMMARY

### LOSS OF OFF-SITE POWER WITH DRYWELL STEAM LEAK

While operating at 100% power extraction steam to the 6C heater is lost. The operators ensure that no thermal limits are being exceeded by reducing power with recirculation flow.

A non-essential 4160 volt bus, SWG-12, is lost. The cause of this trip is a ground on the A RBCLCW pump. The A pump is placed in PTL by the shift team and power is restored to the bus and its components.

Next, one source of off-site power, line 6, is lost and the Div. II Diesel Generator fails to start. The shift crew can restore power to the affected transformers and busses by rerouting incoming lines.

A small leak in the drywell provides a reactor scram. A turbine trip without bypass valves and the leak result in a containment challenge that place the operators in the EOPs.

The other source of off-site power is lost, complicating restoration efforts. Level can be restored with RCIC, and the stub busses can be re-energized from the emergency switchgear.



## SCENARIO OBJECTIVES

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

Scram the Reactor Manually and Take Immediate Actions

Task Number 2010160101 K/A Rating 4.10

Requal TIF 3.67 Class, Simulator

Perform Mode Switch Transfer in According with Requirements of OP-101A, B, C

Task Number 2019230101 K/A rating 4.00

Requal TIF 3.18 Simulator

Perform Lineups on the RHR System

Task Number 2050010101 K/A Rating 3.80

Requal TIF

Manually Initiate the RCIC System from the Control Room and Monitor for Proper Operation

Task Number 2170030101 K/A rating 3.50

Requal TIF 3.31 Class, Simulator

The Licensed Scenario Reactor Operators (SSS and ASSS):

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 Required 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-PC Section PCP

Task Number 3449430603 K/A Rating 4.70

Requal TIF 4.36 Class, Simulator

Direct the Actions Required per EOP-PC Section SPT

Task Number 3449450603 K/A Rating 4.70

Requal TIF 4.33 Class, Simulator

Classify/Reclassify and Emergency Condition

Task Number 3450420503 K/A Rating 4.70

Requal TIF 4.10 Class, Simulator

(\*) Individual Simulator Critical Task

(\*\*) Crew Simulator Critical Task



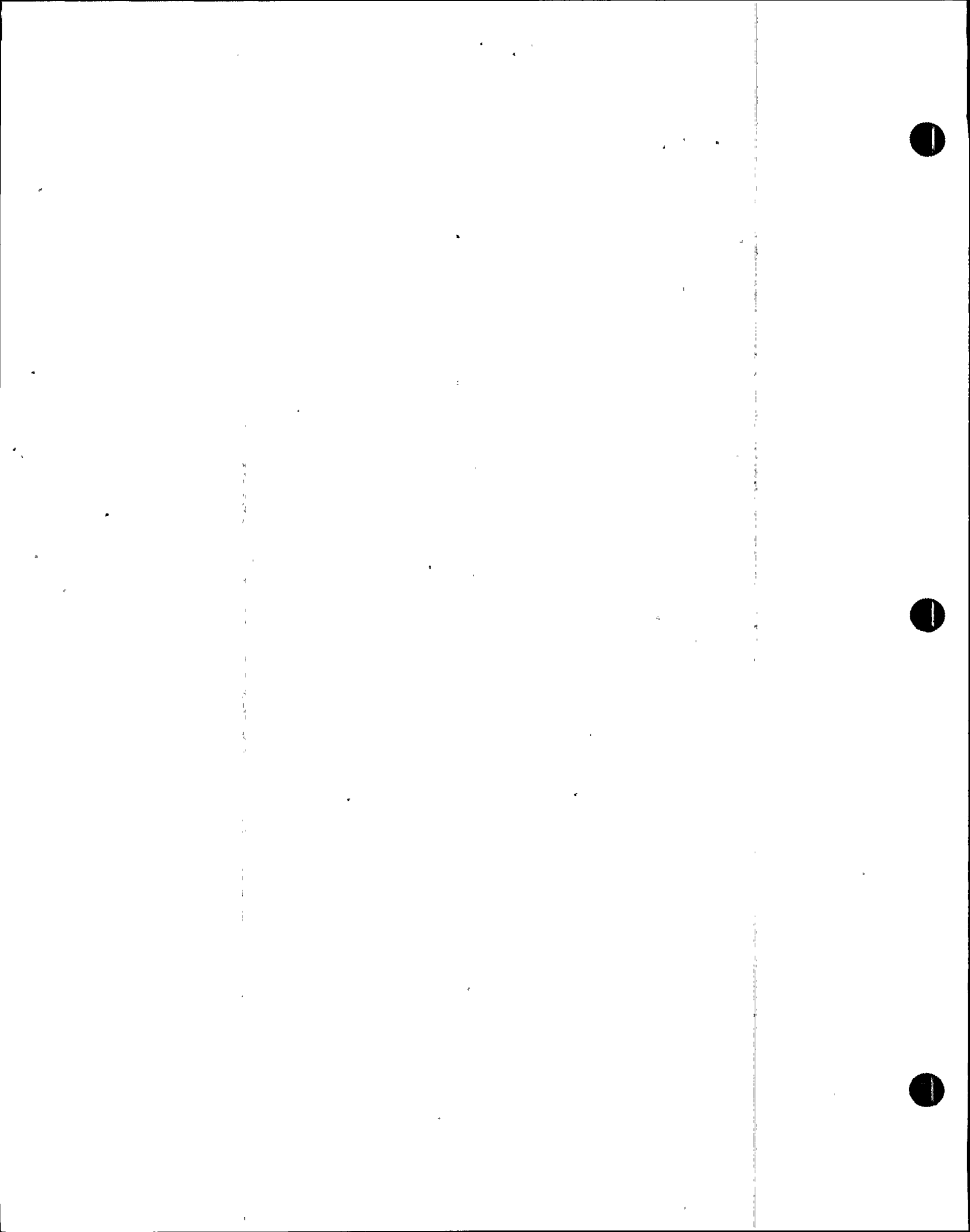
## NMP 2 CONTROL ROOM REFERENCES

### PROCEDURES:

OP-8, Feedwater Heaters and Extraction Steam System  
OP-13, Reactor Building Closed Loop Cooling  
OP-14, Turbine Building Closed Loop Cooling  
OP-31, E.7.0, Residual Heat Removal System  
OP-35, F.2.0, Reactor Core Isolation Cooling  
OP-70, I.3.0, Station Electrical Feed and 115 KV Switchyard  
OP-71, E.11, 13.8 KV/4160 V/600 V AC Power Distribution  
OP-97, I.30.0, Reactor Protection System  
OP-101C, H, Scram and Scram Recovery  
  
EOP-RL, RPV Water Level Control  
EOP-SPT, Suppression Pool Temperature Control  
EOP-PCP, Primary Containment Pressure Control  
EAP-2, Classification of Emergency Conditions  
EPP-20, Emergency Notifications  
EPP-25, Emergency Reclassification and Recovery

### TECHNICAL SPECIFICATIONS:

3.3.1; Table 3.3.1-1, Note C  
3.6.3  
3.8.1





TIME

EVENT

INSTRUCTOR ACTIVITY

PLANT RESPONSE

OPERATOR ACTIONS

EVALUATOR COMMENTS

Special Instructions:

Markup as out-of-service:

HPCS

Place Recirc Flow Control in

Loop Manual

Simulator Operation:

Initialize: IC-20

Preset Malfunctions:

1,TC06

All Turbine Bypass Valves

Fail Closed

2,HS10C,,,0004

Loss of Extract Stm

to FW Heater 6C

3,ED04B,,,0015

4.16 KV Normal Bus

Fault (SWG-12)

7,CH02A,,,0015

CCP Pump 1A Electrical Fault

Preset Remote Functions:

None

Preset Instructor Overrides:

None



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PLANT RESPONSE

OPERATOR ACTIONS

EVALUATOR COMMENTS

Distribute and discuss

Turnover sheets

Initial Conditions:

100%, BOL, maintaining  
power in OP-101A

RHM GR-147

Recirc in Loop Manual for  
Preconditioning

Out-of-service equipment:

HPCS - Excessive pump  
vibration. Maintenance  
performing inspection.

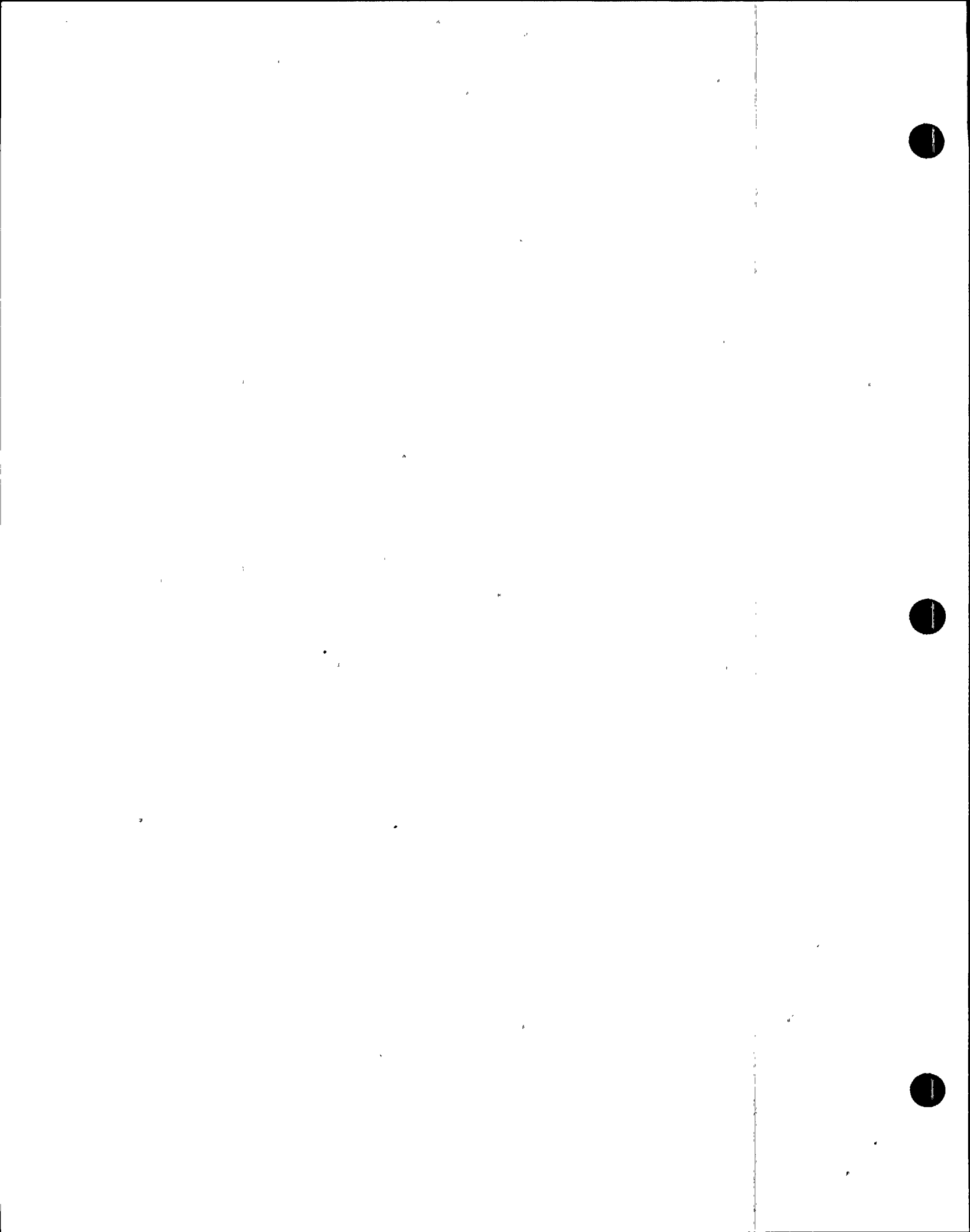
Estimate 2 days total  
down time.

Surveillances scheduled:

None

Allow not more than five  
minutes for panel walk down.

Walk panels.



TIME	EVENT	INSTRUCTOR ACTIVITY	PLANT RESPONSE	OPERATOR ACTIONS	EVALUATOR COMMENTS
T = 0		Begin scenario		Assume the shift, continue power operation.	
T = 4	1	Malfunction 2 effective.	Loss of extract steam to FW heater	<p>TEAM</p> <p>Recognizes/reports changes in:</p> <p>MWe (increases 50-80)</p> <p>MWt (increases 80-120)</p> <p>FW temperature (decreases 10-15°F)</p> <p>SSS</p> <p>Enters OP-8, H.3.0</p> <p>Directs operator response</p>	<p>2a,c;6a</p> <p>3a</p> <p>3b;6a</p>



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OPERATOR ACTIONS

EVALUATOR COMMENTS

CSO/E

Responds to transient

- |    |  |         |
|----|--|---------|
| 1. | Reduces power with recirc to $\leq 70\%$ or 20% below highest power (whichever results in lower power) | 4b;5a,b |
| 2. | Inserts rods as advised by Rx Analyst  | 5a,b    |
| 3. | Take heater OOS (H.2.0)  | 4b;5a,b |

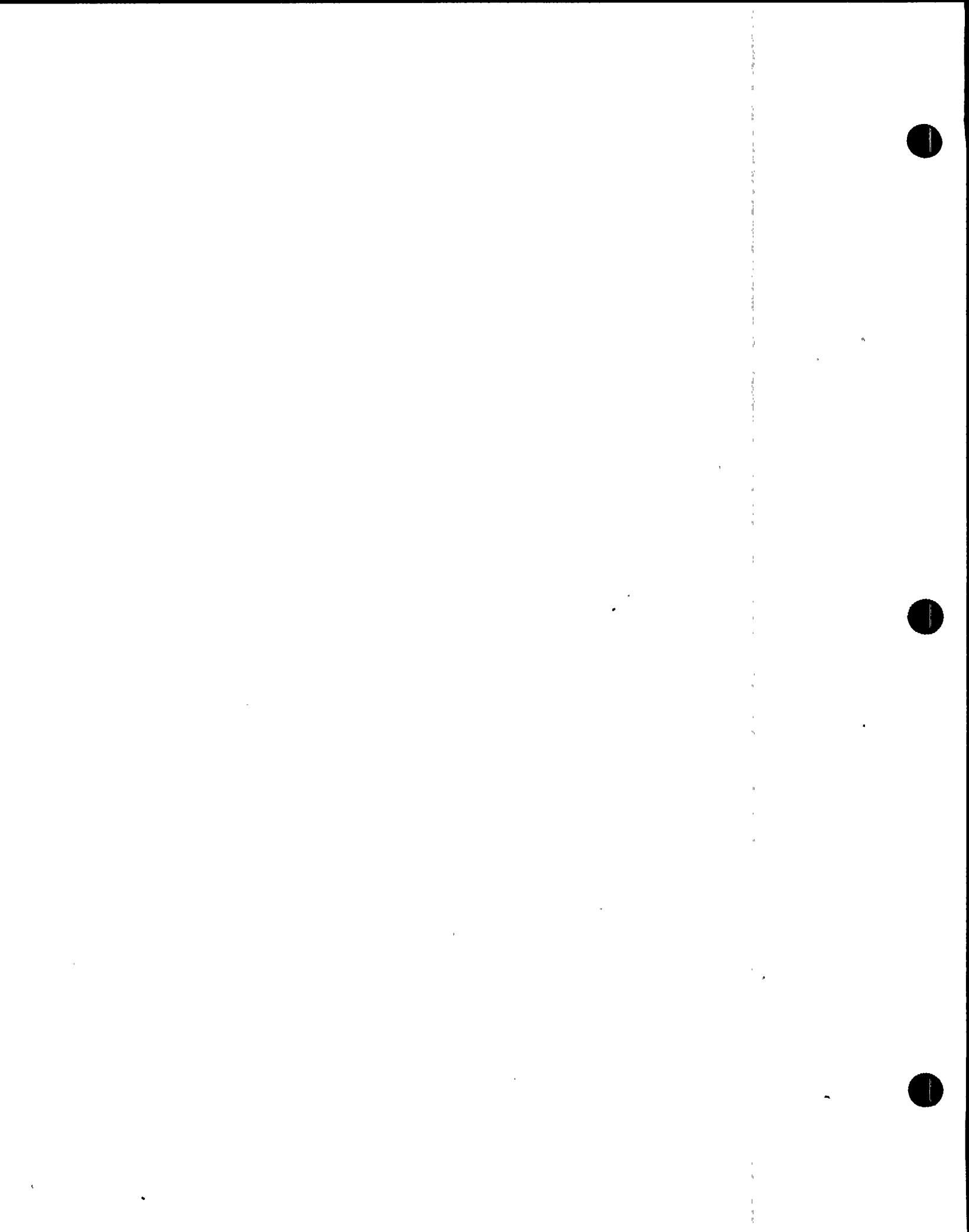
TEAM

- |    |   |    |
|----|---|----|
| 1. | Ensure scavenging steam is still available to other heaters | 2a |
| 2. | Inform Rx Analyst   | 6b |
| 3. | Ensure FW temperature within Figure. 1                      | 4b |
| 4. | Determines cause of transient                               | 2c |
| 5. | Notifies Chemistry Dept. of Power reduction.                | 6a |

SSS/ASSS/CSO

- |   |    |
|---|----|
| Request assistance in investigation of loss of extraction steam | 6b |
|---|----|

ROLE PLAY: As I&C suggest it will take some time to determine what caused the valve to shut. You will call when you know something.





TIME	EVENT	INSTRUCTOR ACTIVITY	PLANT RESPONSE	OPERATOR ACTIONS	EVALUATOR COMMENTS
T = 15	2	Malfunction 3 effective	SWG-012 lost		
				TEAM	
				Responds to alarms.	1a
				SSS/ASSS/CSO	
				Enters OP-71	3a
				1. Identify bus (SWG-012)	3b
				2. Directs operators to	3b;6a
				check:	
				TBCLCH pump 1C	
				RBCLCH pump 1A	
				Htr Drn pump 1C	
				Fire Pump 2	
				3. Request electrician to	6b
				check bus.	
				CSO/E	
				Respond/report annunciators	1a;6a
				associated with loss of the	
				switch gear	
				1. Start RBCLCH 1C	4b;5a,b
				2. Clear RBCLCH 1A annun-	4b;5a,b
				ciator	

ROLE PLAY: As electrician state you will investigate and get back to him.



TIME	EVENT	INSTRUCTOR ACTIVITY	PLANT RESPONSE	OPERATOR ACTIONS	EVALUATOR COMMENTS
T = 25		<p>ROLE PLAY: As electrician report that RBCLCW pump 1A has an acrid odor and may be grounded; I will call you when the breaker is racked out so you can re-energize the bus.</p> <p>Clear MF; 3</p> <p>Set Malfunction: Loss of off-site power MF; 4,ED02B,,30 Failure of Div II D/G to start MF; 5,DG01C,,30</p>		<p>CS0/E</p> <ol style="list-style-type: none"> <li>1. Place RBCLCW 1A in P-T-L</li> <li>2. Restores power to SHG-012 <ol style="list-style-type: none"> <li>a. Verify all loads in P-T-L <ul style="list-style-type: none"> <li>2HDL-P1C, heater drain pump</li> <li>2FWP-P2, motor fire pump</li> <li>2CCS-P1C, TBCLC</li> <li>2CCP-P1A, RBCLC</li> </ul> </li> <li>b. Reclose breaker</li> <li>c. Return loads to normal line up</li> </ol> </li> </ol>	<p>4b</p> <p>4a;5a,b</p> <p>5a,b</p> <p>4c;5a,b</p>



TIME	EVENT	INSTRUCTOR ACTIVITY	PLANT RESPONSE	OPERATOR ACTIONS	EVALUATOR COMMENTS
T = 30	3	Malfunction 4 effective	Annunciators 852412, 852413; 115 KV off-site is lost Division II D/G fails to start	TEAM Respond to alarms 1. Report Div II D/G didn't start (attempt to manually start) 2. Verify SWG 103 is not energized 3. Isolate line 6 Open MDS 4 Open MDS 2 4. Power XSR1B from line 5 Close MDS 20 Close MDS 4 5. Restore primary feed to SWG-103 6. Send personnel to investigate as appropriate.	1a 6a 4a 5a,b 4b;5a,b 4b 1a,b,c; 2c; 5a,b

Note: Allow sufficient time for crew to check Tech Specs before start of the following malfunctions.

Set Malfunctions:

Coolant leak in drywell

MF; 6,RR19,25,10,34

Loss of off-site power

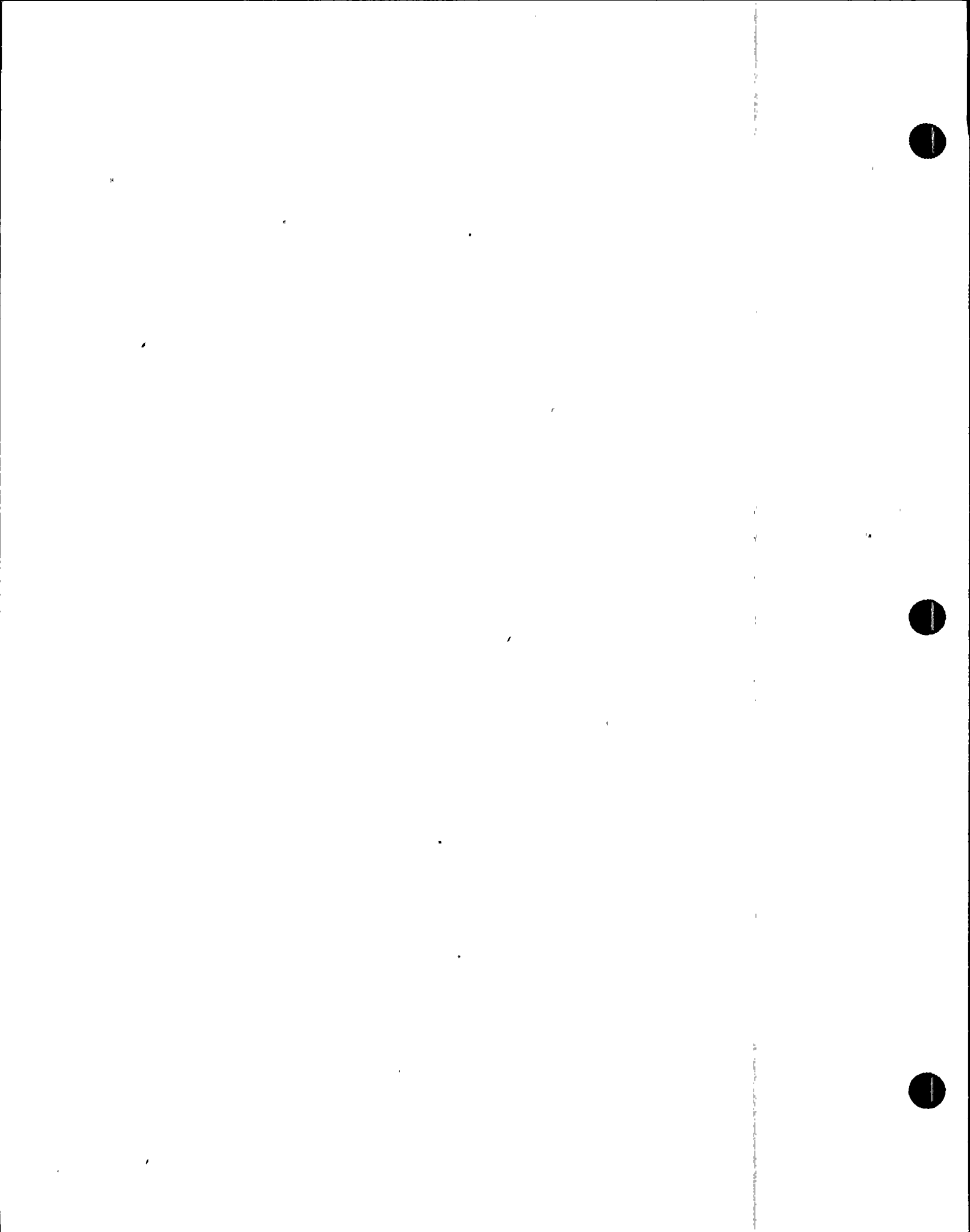
MF; 7,ED02A,,,37

CSO/E

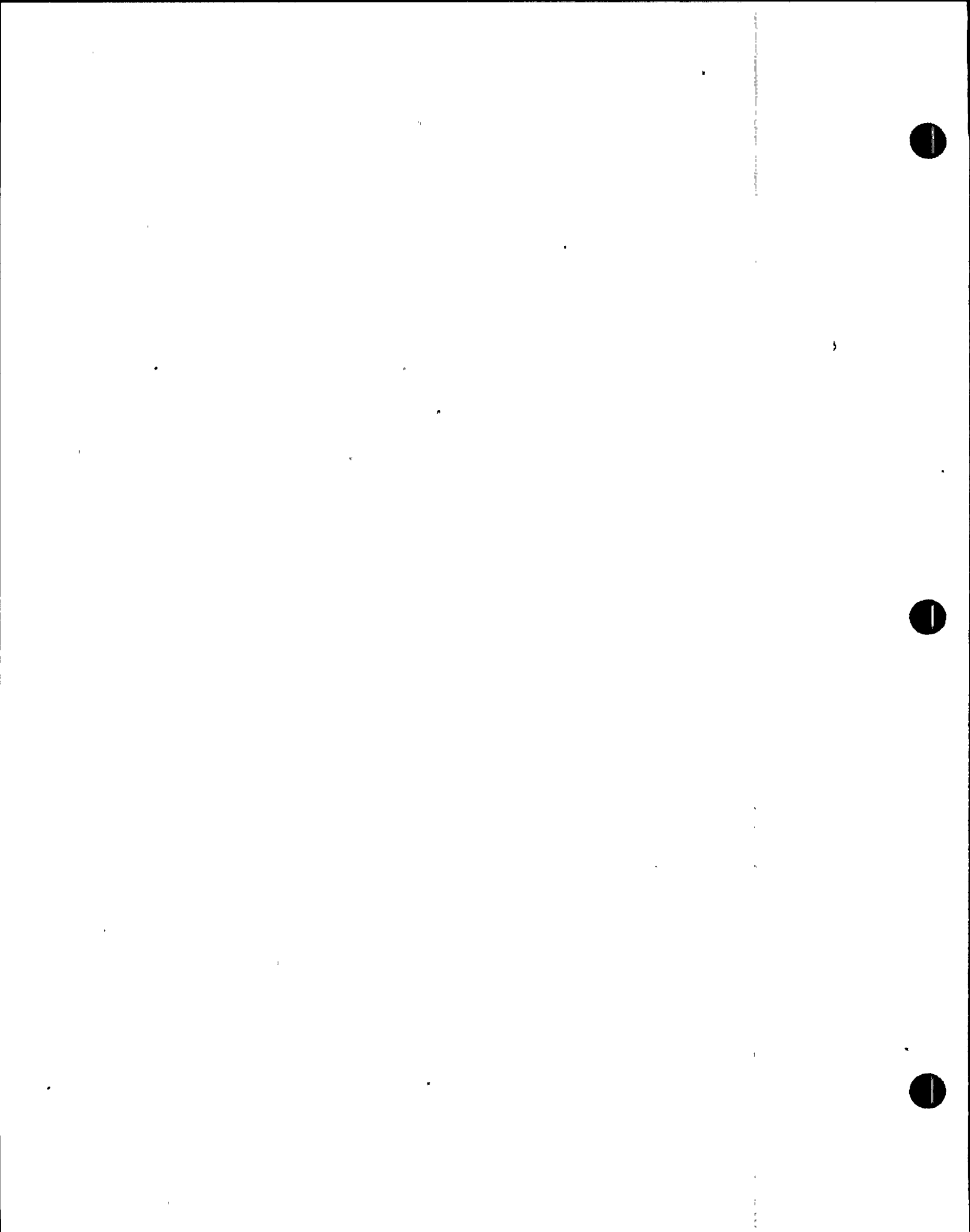
Verify/restore service water system flow. 3d

SSS/ASSS

Enter/review Technical Specifications (3/4.8.1.1; 3/4.8.3.1; 3/4.5.1)



TIME	EVENT	INSTRUCTOR ACTIVITY	PLANT RESPONSE	OPERATOR ACTIONS	EVALUATOR COMMENTS
T = 36	4	Malfunction 5 effective	Annunciator 603140; drywell pressure is .8 psig	<p>TEAM</p> <p>Respond to alarm:</p> <ol style="list-style-type: none"> <li>1. Check drywell press on P601 4a</li> <li>2. Verify drywell cooling is maximum 4a</li> <li>3. Check DFR leak rate 4a</li> </ol> <p>SSS/ASSS</p>	
T = 37	5	Malfunction 6 effective	115 KV off-site is lost; followed by a high drywell pressure scram	<ol style="list-style-type: none"> <li>(*)1. Enter EOPs RL, RP, RQ, SPT, and PCP; <ul style="list-style-type: none"> <li>Task # <u>3449400603</u></li> <li>K/A Rating <u>4.70</u></li> <li>Task # <u>3449410603</u></li> <li>K/A Rating <u>4.70</u></li> <li>Task # <u>3449390603</u></li> <li>K/A Rating <u>4.70</u></li> <li>Task # <u>3449450603</u></li> <li>K/A Rating <u>4.70</u></li> <li>Task # <u>3449430603</u></li> <li>K/A rating <u>4.70</u></li> </ul> </li> <li>2. Direct the following:</li> </ol>	3c Sat/Unsat





TIME	EVENT	INSTRUCTOR ACTIVITY	PLANT RESPONSE	OPERATOR ACTIONS	EVALUATOR-COMMENTS
				a. RL Level maintained 159.7"-202.3"	3b
				b. SPT SP cooling initiated	3b
				c. PCP 1. Initiate suppression chamber spray Before suppression chamber pressure reaches 10 psig.	3b
				2. Verify SGTS operating (if DW temperature <150°F)	3b;4b
				CSO/E 1. Performs actions of OP-101C, H.1.0	3b
				(*).a. Mode switch to S/D Task # <u>2019230101</u> K/A Rating <u>4.00</u>	5a,b Sat/Unsat



TIME

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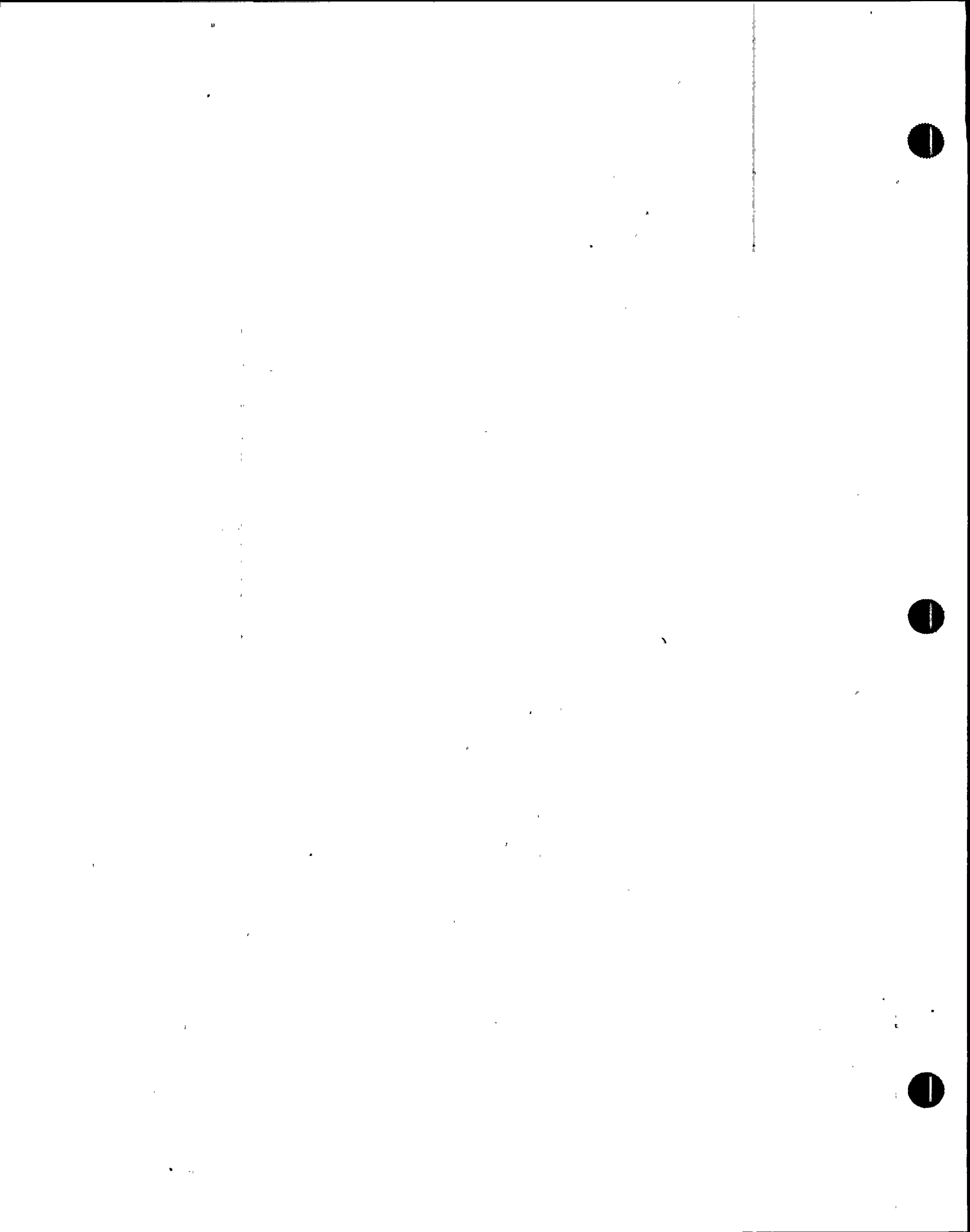
INSTRUCTOR ACTIVITY

PLANT RESPONSE

OPERATOR ACTIONS

EVALUATOR, COMMENTS

- (\*)b. Ensure scram by one or more  
Full core display; RSCS;  
RWM; OD-7  
Task # 2010130101  
K/A Rating 4.10
- c. Verify/report APRMs decreasing 4a
- d. Monitor/maintain: Level 178" to 187" pressure by turbine bypass valves or SRVs 4a;5a,b
- e. Trips turbine 5a,b
- f. Verify/report SDV vents/drains shut 4a;6a
2. Energize divisional stub busses 2a,5a,b
- a. Restart: CRD Air compressor RBCLC Drywell cooler fans 5a,b
- b. Verify reactor building service water flow. 4a,b,c
3. Enters OP-31, E.7.0, to place RHR A in Supp Pool cooling 3a



TIME      EVENT      INSTRUCTOR ACTIVITY      PLANT RESPONSE

OPERATOR ACTIONS      EVALUATOR COMMENTS

- (\*)a. SWP to RHR Hx      Sat/Unsat
- Open SWP MOV 90      3b
- Throttle SWP MOV 33 (to 7,400 gpm)      5a,b
- Task # 2050010101
- K/A Rating 3.80
- (\*)b. Verify RHR pump running      4a      Sat/Unsat
- Task # 2050010101
- K/A Rating 3.80
- (\*)c. Throttle RHS FV 38 (to 7,450 gpm) (Return to SP)      4a;5a,b      Sat/Unsat
- Task # 2050010101
- K/A Rating 3.80
- d. Throttle HX Bypass RHS MOV 8 to vary cooling      4a;5a,b
- e. Monitor/report SP temperature      2a;4a;6a

(If directed)

- 4. Enters OP-31, H.3.0, to spray Supp Pool      3a
- a. Verify RHR pump running      4a
- b. Verify shut RHS MOV 24 (LPCI Inj)      4a



TIME

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INSTRUCTOR ACTIVITY

PLANT RESPONSE

OPERATOR ACTIONS

EVALUATOR COMMENTS

	c. Adjust RHS FV 38 to 7,450 gpm (RHR to SP C1g)	4a;5a,b	
	(*)d. Open RHS MOV 33 (SP spray) Task # <u>2050010101</u> K/A Rating <u>3.80</u>	5a,b	Sat/Unsat
	(Only if D/W Temp <150°F)		
	5. Restore air to SGTS D/W suction valves Open D/W purge outlet AOV108 and 110	5a,b 5a,b	
	<b>TEAM</b>		
	Monitor and report reactor and drywell parameters.	4a;6a,b	
	<b>SSS/ASSS</b>		
	Determine need to restore level with RCIC	4c;6a	
	<b>CSO/E</b>		
	(*)Initiate RCIC per OP-35, F.2 1. Arm and depress	4a;5a,b	Sat/Unsat





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INSTRUCTOR ACTIVITY

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OPERATOR ACTIONS

EVALUATOR-COMMENTS

2. Check auto actions: 4a  
 116 opens (LO water  
 supp);  
 124 shuts (test return  
 to CST); 159 opens  
 (steam supp bypass);  
 Gland seal compr starts;  
 120 opens (steam supp);  
 Drains close; 126 opens  
 (injection).
3. Checks flow = 600 gpm 4a
4. Adjust flow controller 4a;5a,b  
 to maintain reactor  
 level

Note: May perform manual  
 start per N2-OP-35

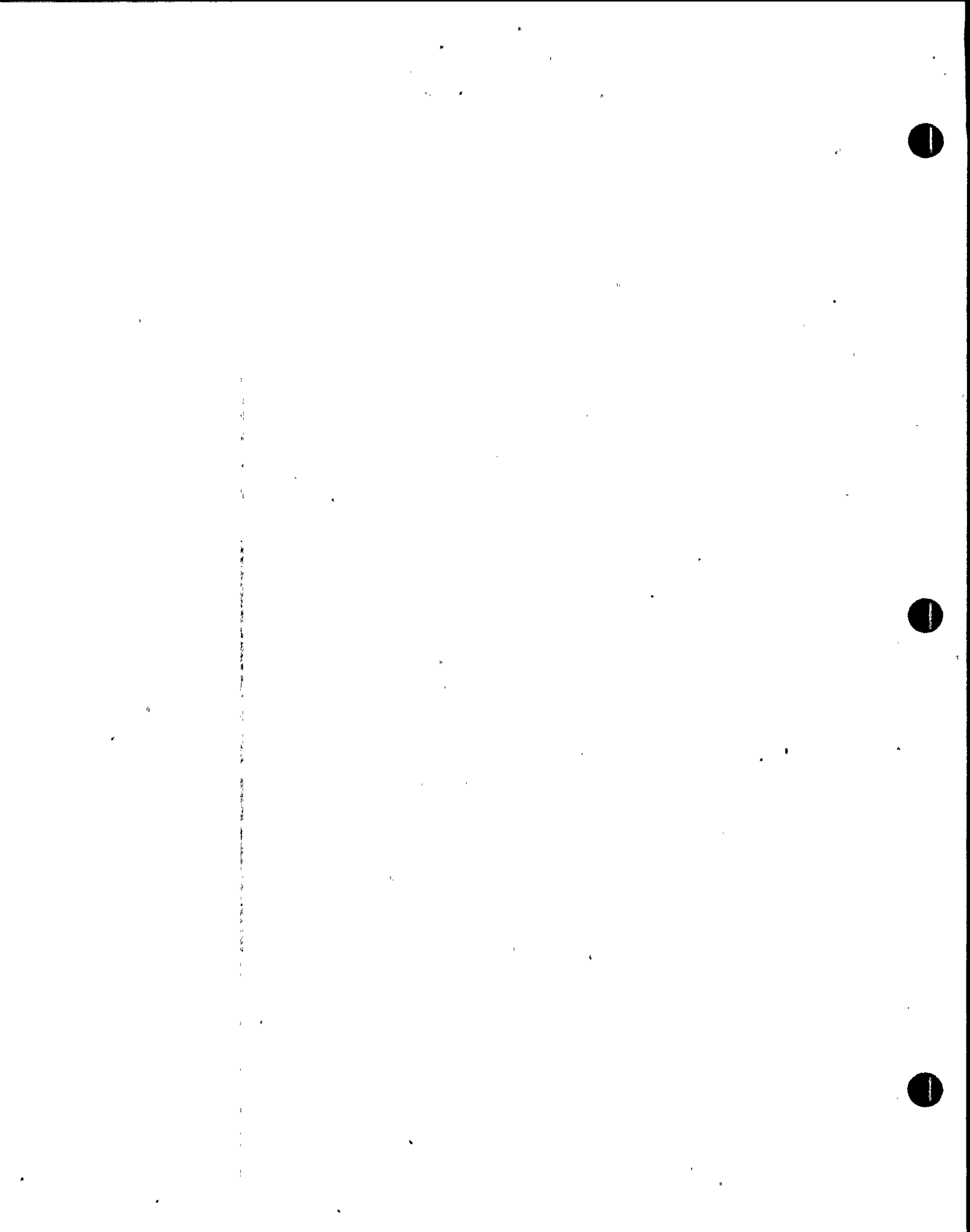
F.3.0.

Task # 2170030101

K/A Rating 3.50

SSS

- (\*) 1. Classifies event as an 2b,c Sat/Unsat  
 Unusual Event or higher  
 Task # 3450420503  
 K/A Rating 4.70
2. Makes notifications 4b;6b



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EVALUATOR COMMENTS

TERMINATION CUES:

Reactor level 159.3" to 202.3",  
pressure being controlled per  
EOP-RPV.

