

Scenario Title: LOSS OF ELECTRICAL POWER/LOSS OF SSW

Scenario Duration: 2 hours

Scenario Number: Training 89-01

Revision Number: 1

Course: Licensed Operator Requal

07-190

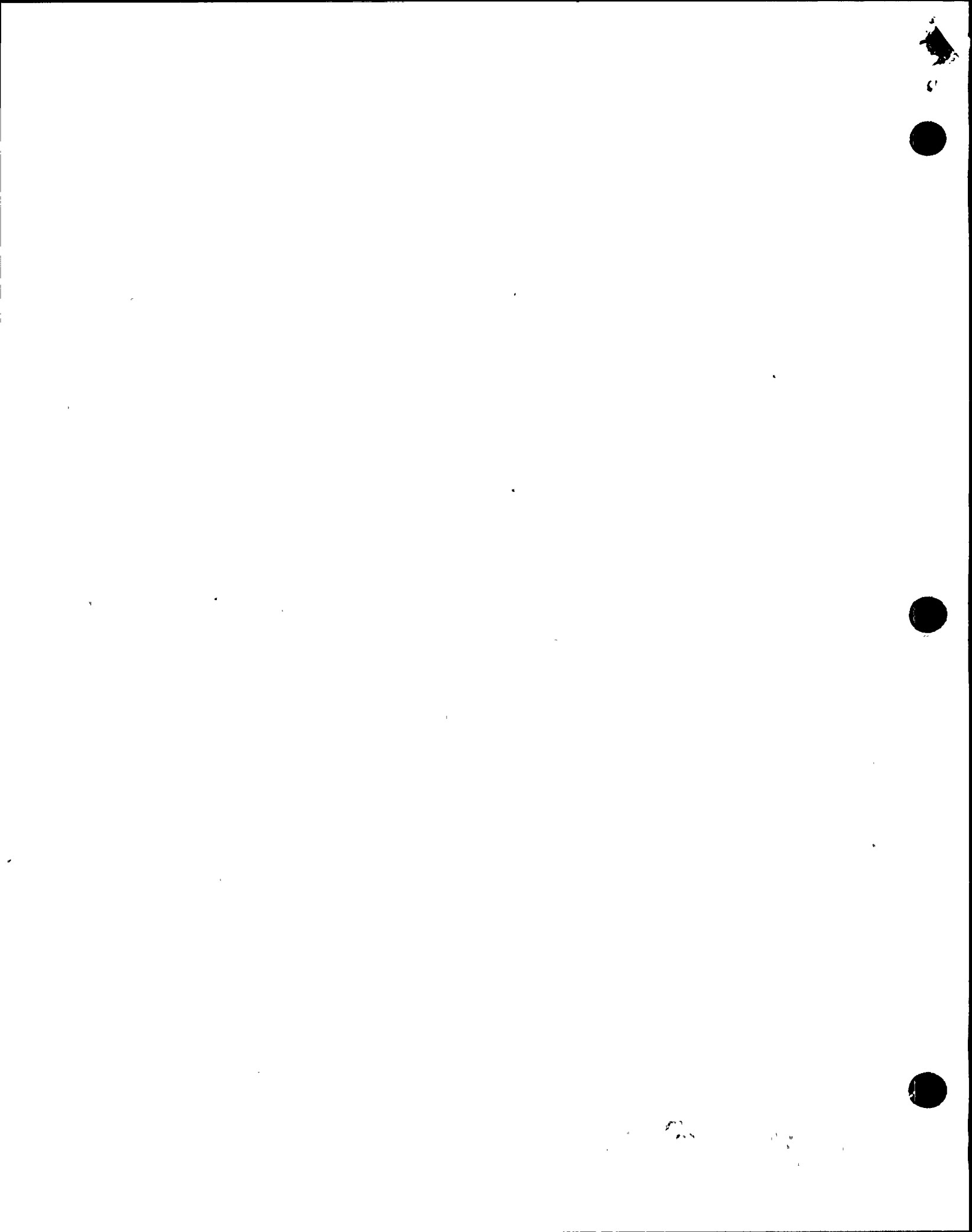
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SCENARIO SUMMARY

LOSS OF ELECTRICAL POWER/LOSS OF SSW

While operating at 100% power in Flux Auto, APRM C will fail upscale causing a short runback of recirc flow and trip to loop manual on excessive error signal. (This event may be repeated until TO-1 is attained.) Operators will recognize and commence recovery from this event when:

2ENS*SWG101 will trip on fault causing a loss of Division I SSW and a closure of Division II Category II SSW isolation valves. Flow through the Division II SSW pumps will throttle to less than 1000 gpm total which will result in tripping all running SSW pumps off on low flow after 10 seconds. Valve handswitches will be overridden to assure operators are unable to recover. A reactor SCRAM and Turbine Generator shutdown should be initiated due to the complete loss of service water.

After a short critique of the event sequence the simulator will be reset and a loss of lines 5 and 6 will be used to again initiate the loss of electrical power/loss of SSW event from 100% power. This time both the Division II and when EDGI repowers SWG101 the Division I isolation valves will go closed with a possible loss of SSW on low flow again even though the operators have just seen a similar event.

(Practice repeats of the last scenario will be used as needed to assure TO-2 is met.)

SCENARIO OBJECTIVES

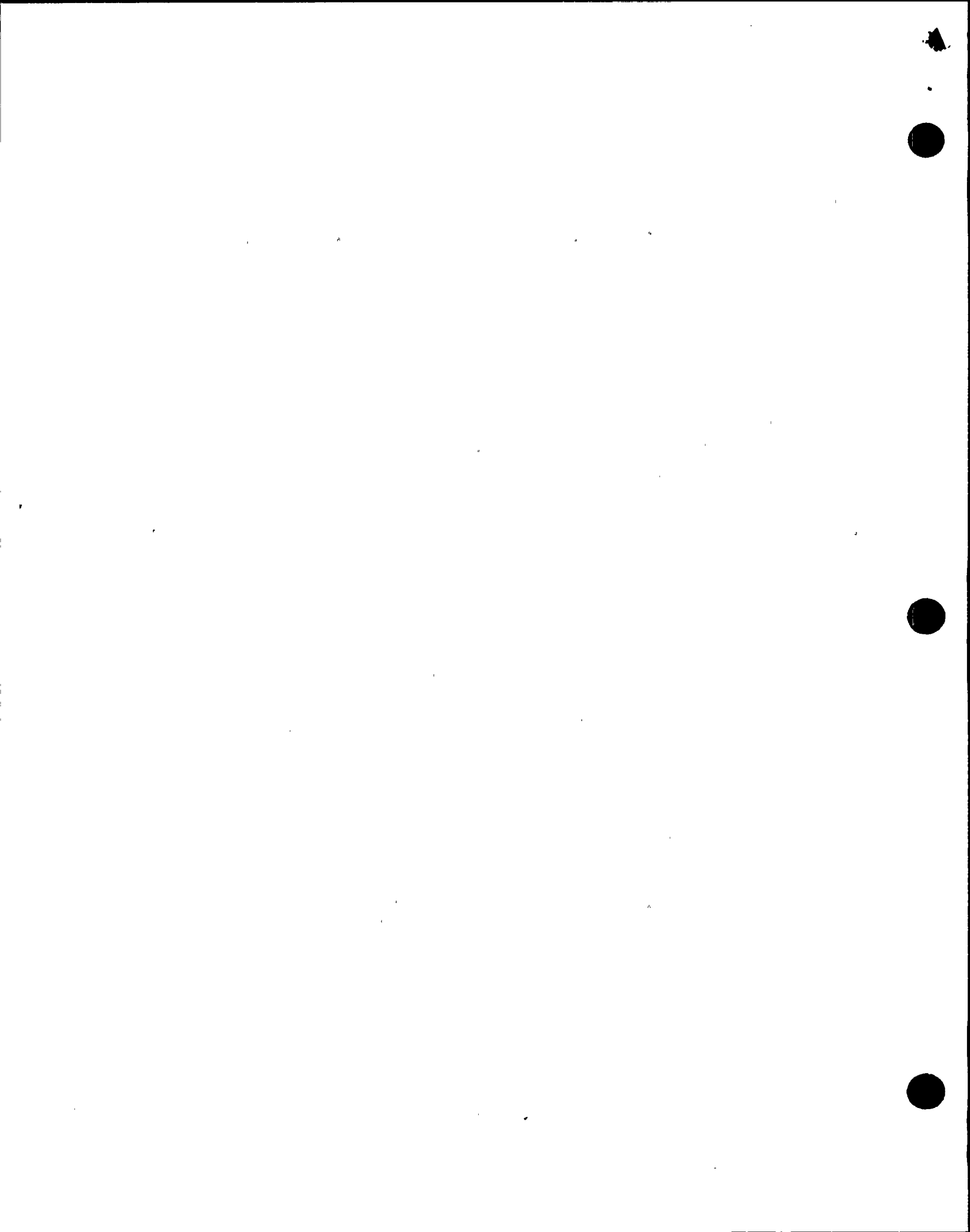
Terminal Objectives:

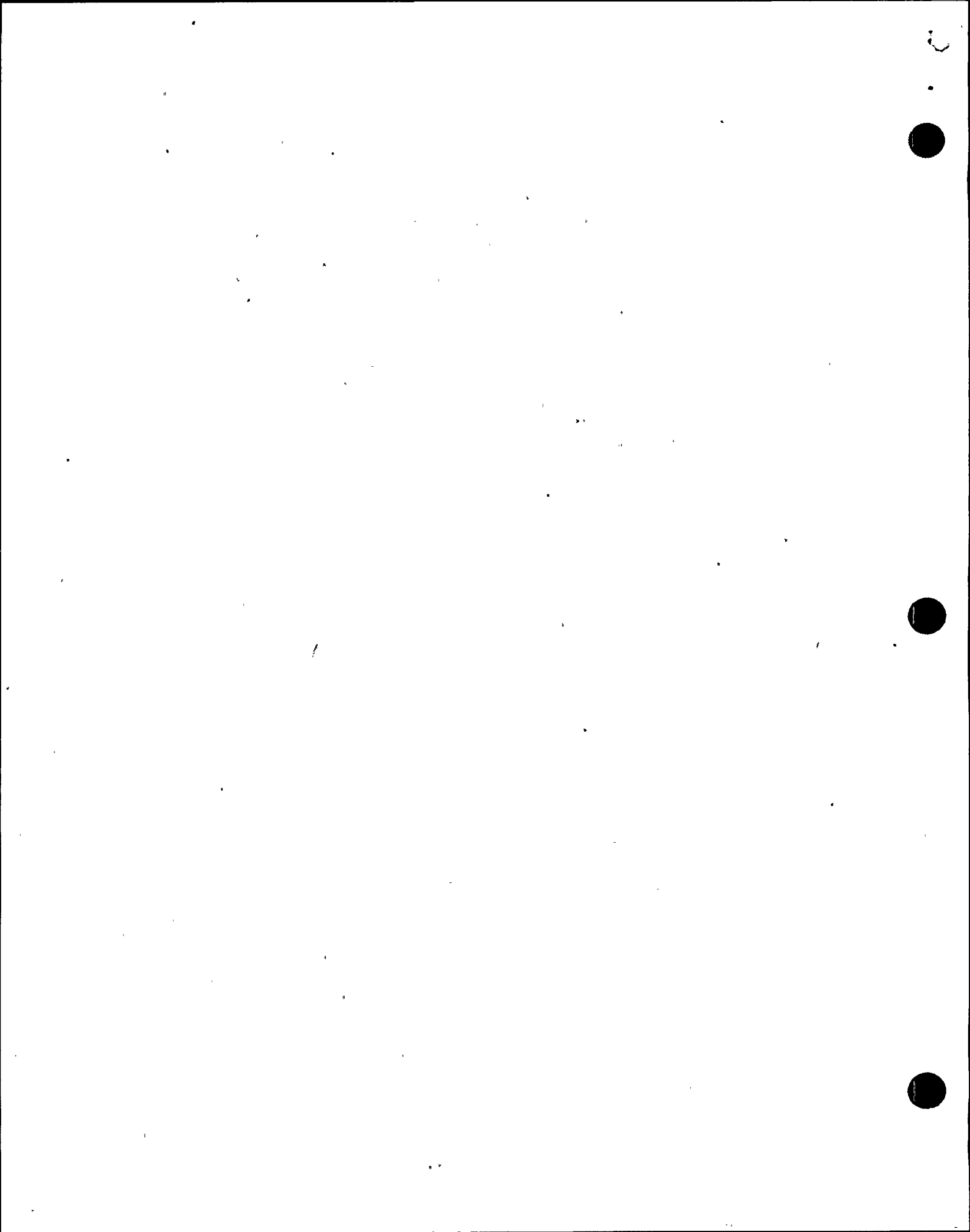
1. Operators will be able to perform corrective actions for loss of input to the flux estimator.
2. Operators and Supervisors will be able to perform actions required for loss of a divisional switchgear and prevent a loss of SSW which could result from such a switchgear loss.

Enabling Objectives:

- A. Licensed reactor operators (CSO/NAOE) will practice the skills required to successfully accomplish the following tasks without deviation from approved procedures:

RO-1	2009040501	Perform the actions required for an APRM/LPRM failure.	
	K/A NUREG 3.1		NMP2 1.94
RO-2	2029330401	Perform the actions required for FCV runback.	
	K/A NUREG 3.3		NMP2 1.67
RO-3	2000040501	Perform actions for an Emergency Electrical System failure.	
	K/A NUREG 3.8		NMP2 3.0
RO-4	2769110401	Operate the Service Water System with a loss of one division of off site power. (This task will result in a loss of service water)	
	K/A NUREG 4.2		NMP2 1.94
RO-5	2010130101	Scram the reactor manually and take immediate actions.	
	K/A NUREG 4.1		NMP2 2.88

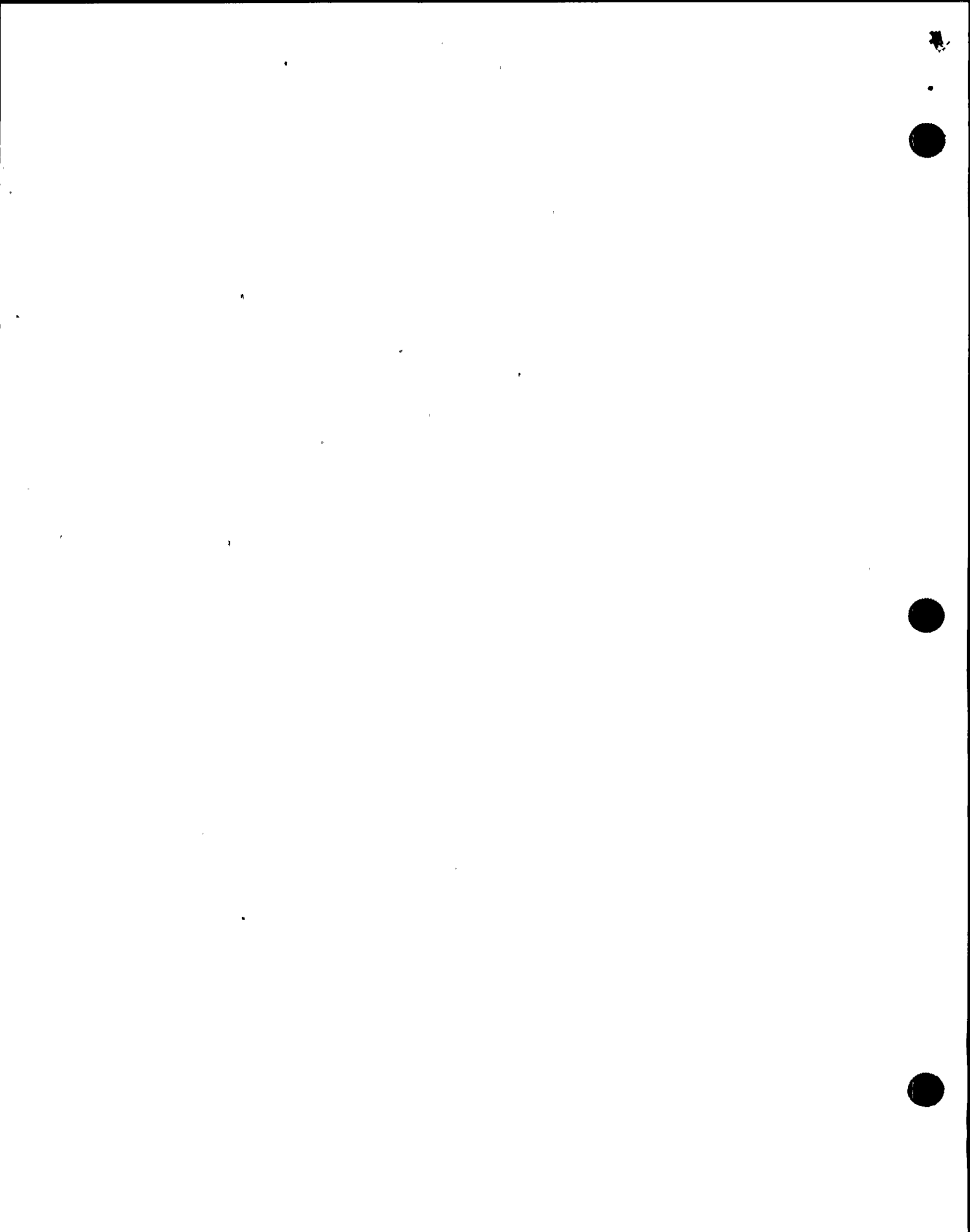




NMP 2 CONTROL ROOM REFERENCES

PROCEDURES:

- N2-OP-11, Service Water System
- N2-OP-29, Reactor Recirculation
- N2-OP-72, Standby and Emergency AC Distribution
- N2-OP-71, 13.8KV/4160V/600V AC Distribution
- N2-OP-92, Neutron Monitoring
- N2-OP-97, Reactor Protection
- N2-OP-101C, Plant Shutdown
- NMP2 Technical Specification



TIME

EVENT

INSTRUCTOR ACTIVITY

PLANT RESPONSE

OPERATOR ACTIONS

COMMENTS

Special Instructions:

Markup as out-of-service:

HPCS (CSH*P1)

Simulator Operations:

Initialize to IC-20

100%, BOL

Preset Malfunctions:

1,NM11C,,,5;

APRM C Fails Upscale

2,ED05A,,,15;

Electrical Fault on 2ENS*SWG101

Preset I/O Overrides:

1,1-2SWPB02-B,16:00,CLS

2,1-2SWPB09-A,16:00,CLS

3,1-2SWPB11-A,16:00,CLS

Initial Conditions:

100% power, BOL, maintaining power
per N2-OP-101A.

RWM Group 147

Operating above the 100% rod line
in flux auto.



TIME	EVENT	INSTRUCTOR ACTIVITY	PLANT RESPONSE	OPERATOR ACTIONS	COMMENTS
		<p>Out of service Equipment: HPCS pump is marked up to replace motor terminal lugs.</p> <p>Work started last shift and is expected to be complete tomorrow, day shift.</p> <p>The DRMS computer is OOS.</p>			
5	1	<p>Half 1, NM11C, APRM C upscale active</p> <p>If APRM C is bypassed without shift to flux manual, freeze and have crew identify their error.</p> <p>Hold a short critique to discuss effect of faulty APRM C on recirc flow control. Have crew identify proper sequence of responses.</p>	<ol style="list-style-type: none"> 1. RPS A half scram trip. 2. FCV closure in response to high flux estimator output. 3. FCV motion stopped by low flow limiter, core flow will be approximately 52%. 	<p>CSO/E</p> <ol style="list-style-type: none"> 1. Report APRM "C" upscale. 2. Shift recirc flow control to manual. <p>TEAM</p> <ol style="list-style-type: none"> 1. Identify failure as instrumentation vice actual high power. <p>SSS/ASSS</p> <ol style="list-style-type: none"> 1. Direct bypass of APRM "C" and reset of half scram. 	



TIME	EVENT	INSTRUCTOR ACTIVITY	PLANT RESPONSE	OPERATOR ACTIONS	COMMENTS
		As I&C report that a new averaging card must be obtained from the warehouse.		CSO/E Bypass APRM "C" and reset half scram.	
		As reactor analyst report there are no restrictions for return to power if accomplished within 30 minutes.		SSS/ASSS 1. Take LCO action for failed APRM. 2. Contact I&C to troubleshoot and correct problem. 3. Direct consultation with reactor analysts and power control to return unit to 100% power.	
		As power control, request ≤ 25 M W/min loading.			
15	2	MalF 2, ED05A 2ENS*SWG101 electrical fault	1. 2ENS*SWG101 is deenergized. 2. EDG01 starts but will not close on the bus. 3. SSW pumps A, C and E are de-energized. 4. Div II SSW non-essential header isolation valves close.	CSO/NOAE 1. Identify loss of SWG101 and failure to re-energize. 2. Verify closure of 2SWP*MOV3B 2SWP*MOV19B 2SWP*MOV93B FV47A FV54A	No attempt should be made to reset 86 bus lockouts until cause is identified



TIME	EVENT	INSTRUCTOR ACTIVITY	PLANT RESPONSE	OPERATOR ACTIONS	COMMENTS
		<p>IO overrides will prevent re-opening valves on first run of scenario.</p> <p>Problem with valves will not be determined.</p>	<p>5. All running SSW pumps trip on low flow 10 seconds after loss of bus.</p>	<p>3. Attempt to immediately reopen</p> <p>MOV3B</p> <p>MOV19B</p> <p>MOV93B</p> <p>4. May attempt to restart SSW pump(s) which will trip 10 seconds after restart.</p> <p>5. May open RHS isolations to attain flowpath then restore SSW pumps.</p> <p>6. When directed, manually scrams reactor, trips turbine and carries out reactor scram actions per OP-101-C.</p>	



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As electrical maintenance report the fuses for potential transformer 2ENSA01 are blown and there is a slight acrid odor in the vicinity. Cause of trip is faulted PT. Lockout may be reset to enable diesel to supply the bus.

Instructor may prompt investigation of bus fault.

Instructor may prompt identification of SSW problem and crew concern for diesel running without cooling.

Remove Malf 2 when directed.

Instructor may lead investigation of SSW trips and point out cycling of diesel Hx outlet valve.

Diesel will immediately close on bus.

SSS/ASSS

1. Recognize loss of all SSW and direct reactor scram/turbine trip.
2. Contact electrical maintenance to determine and correct cause of bus trip.

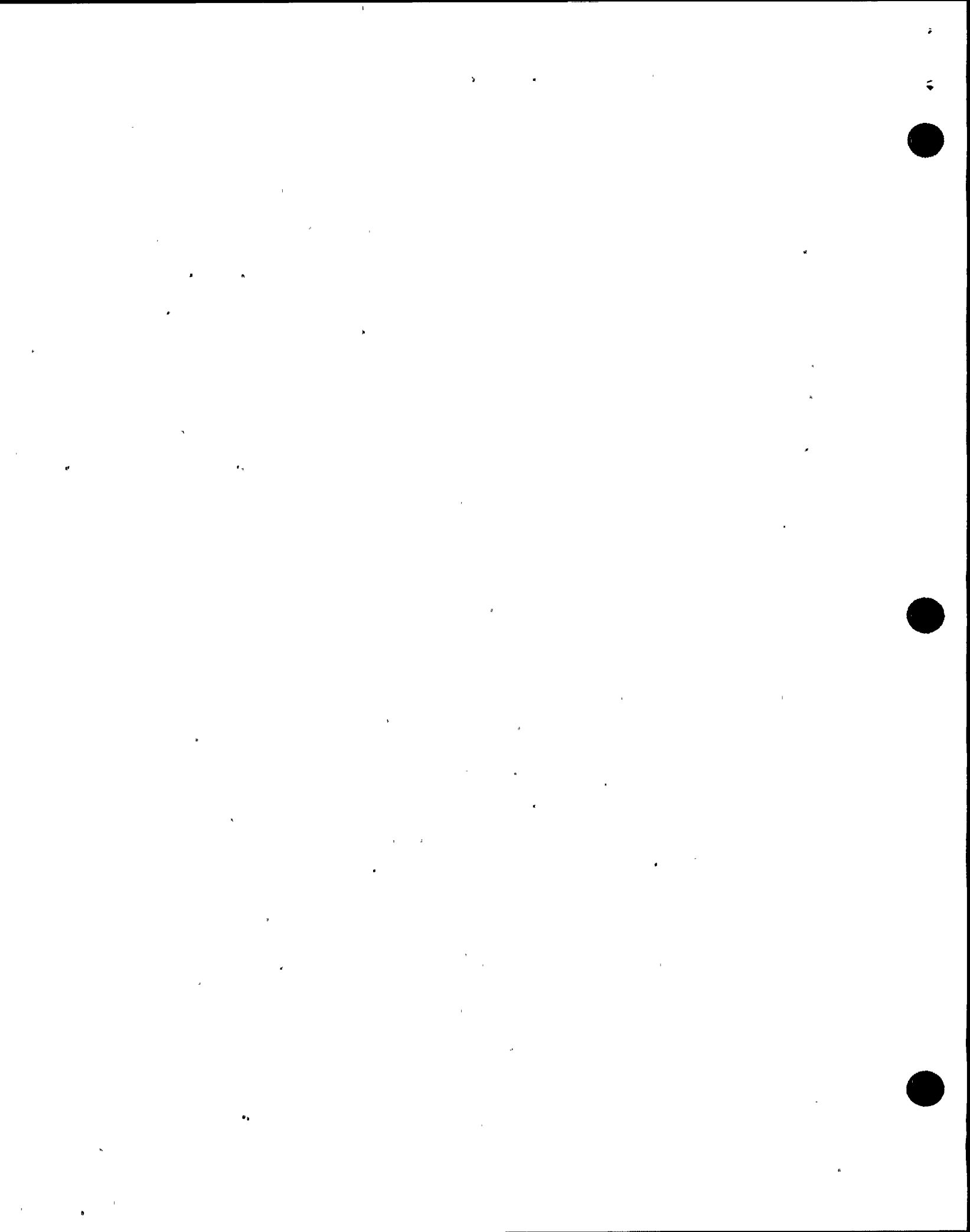
The faulty PT will not prevent resetting the 86 lockout and safely reenergizing the bus.

Team

1. Identify cause of loss of SSW as insufficient flowpath. Team may recognize and establish alternative flowpath through RHS heat exchange(s) to restore SSW.

SSS/ASSS

1. Directs reset of lockout 86-1.
2. Directs placing RHS heat exchanger in service and restart of SSW.



TIME	EVENT	INSTRUCTOR ACTIVITY	PLANT RESPONSE	OPERATOR ACTIONS	COMMENTS
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Remove all IO overrides

Normal flowpath is restored.

3. Directs manual opening of non-essential header isolation valves.

Note: If operators request

BRKR 101-13 be moved to 101-10

Set; I/O 4,1-2ENSX10-B,,OFF

BRKR 101-13 Green light off

RF: page ED2;5

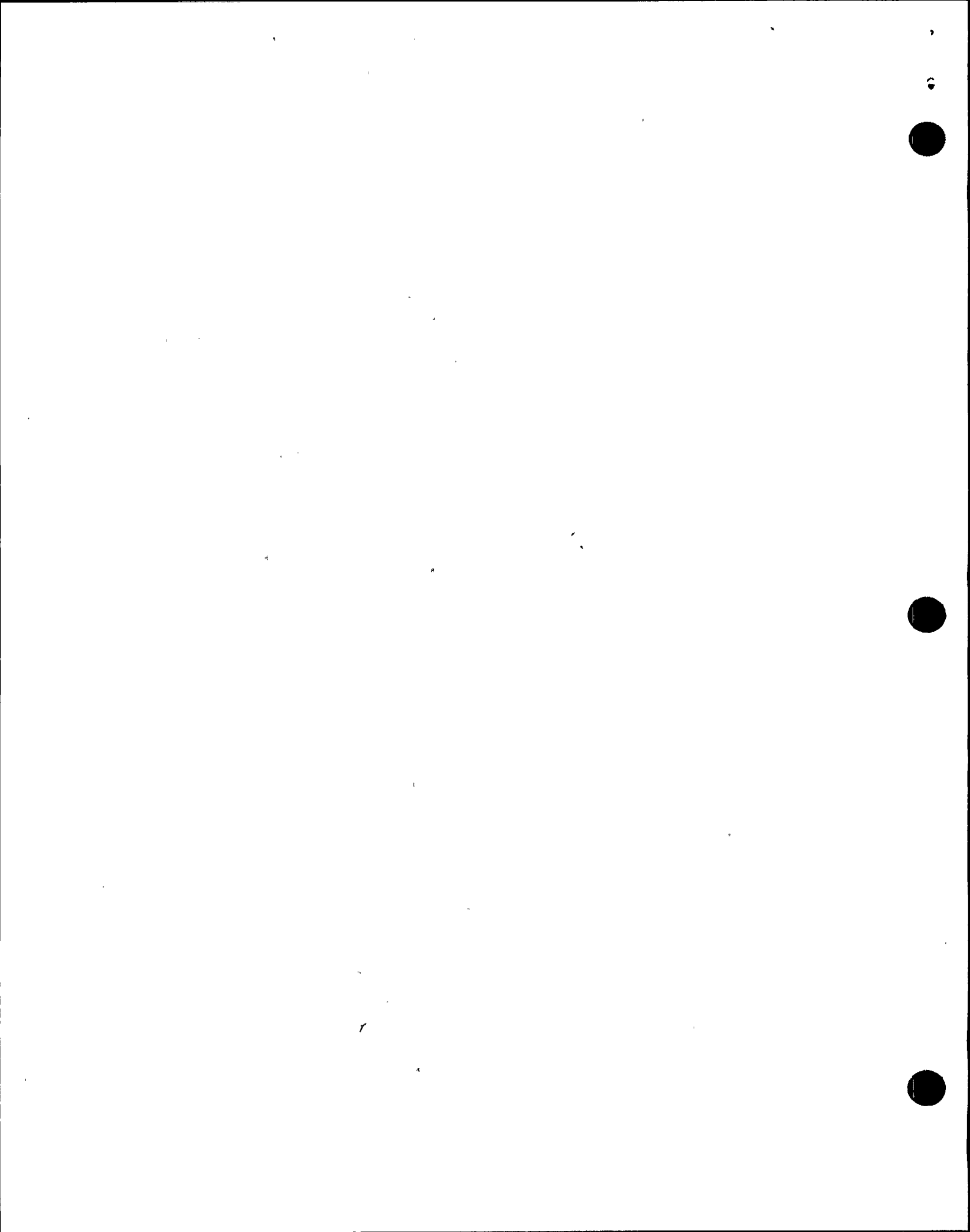
BRKR 101-10 Racked in

Termination Cue: Operators have successfully restored electrical power and SSW.

Inform trainees that SSW valve misoperation was inserted to demonstrate potential for loss of SSW and is not indicative of an expected failure. Discuss restoration of a single flowpath.

Review OP-11 responses to loss of offsite power with crew.

Review cause and effect of bus lockouts with crew including proper general response to a lockout trip.



TIME	EVENT	INSTRUCTOR ACTIVITY	PLANT RESPONSE	OPERATOR ACTIONS	COMMENTS
		<p>Proceed with the scenario to provide practice in responding to these events if initial response can be improved.</p> <p>Reset simulator to IC-20.</p> <p>Brief operators that the plant is back to same initial conditions as before.</p>			
3		<p>Reinsert Malf 1, NM11C, APRM "C" upscale. If mastery of objectives RO 1,2 and SRO 1,2 previously observed proceed to event 4 below</p>	<p>Same as Event 1</p>	<p>Same as Event 1</p> <p>CSO/NOAE</p> <ol style="list-style-type: none"> 1. Reopen SSW Category II isolation valves. 	
4		<p>Insert Malf 5, ED02A</p> <p>Loss of 115KV line 5, and Malf 6, ED02B</p> <p>Loss of 115KV line 6</p>	<ol style="list-style-type: none"> 1. 2ENS*SWG101, 102 and 103 2. All diesels start and restore power. 3. Load sequencing occurs. 4. SSW pumps sequence on. 5. Both divisions of SSW non-essential isolations occur. 	<ol style="list-style-type: none"> 2. Reduce recirc flow to minimum, when directed. 3. Continue power reduction with control rods as needed to remain within the capacity of 2 SSW pumps. 	



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Lines 5 & 6 were downed by plane crashes after a mid air collision.

Ensure SSS and operators identify main generator and reactor recirc pumps as major concerns.

Discuss ways to reduce heat load to permit orderly shutdown.

1. Isolate RHCU
2. Recirc flow decrease and shift to slow.

Termination Cue: Plant is stable either shut down or required shut down in progress.

SSS/ASSS

1. Direct power reduction for partial loss of SSW.
2. Direct actions to restore SSW flow to BOP as needed.
3. Direct reactor scram if unable to maintain recirc pump temperatures/turbine temperatures within limits.
4. Initiate Tech Spec required shutdown.

CSO/NOAE

1. Run recirc flow to minimum, when directed.
2. Restore SSW to BOP per N2-OP-11.

