

Georgia Power

POWER GENERATION DEPARTMENT

VOGTLE ELECTRIC GENERATING PLANT



TRAINING LESSON PLAN

TITLE:	EMERGENCY CORE COOLING SYSTEMS 3/4.5	NUMBER:	LO-LP-39209-00
PROGRAM:	LICENSED OPERATOR TRAINING	REVISION:	0
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INSTRUCTOR GUIDELINES

1. WHITE BOARD WITH MARKERS
2. OVERHEAD PROJECTOR
3. TRANSPARENCY:
 - a. LO-TP-39209-001 PURPOSE STATEMENT AND LIST OF OBJECTIVES.

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I. PURPOSE STATEMENT:

TO TEACH THE STUDENT THE APPLICABILITY AND ACTIONS OF LIMITING CONDITION FOR OPERATION SECTION 3/4.5, EMERGENCY CORE COOLING SYSTEMS.

II. LIST OF OBJECTIVES:

1. The student will be able to determine if in violation of an LCO if given a list of equipment and a given applicability condition.
2. The student will be able to give the required action statement from memory if the time limit for action is one hour or less.
3. The student will be able to look up the required action if given the applicable LCO if action required in more than one hour.

Additional for SRO

4. The student will be able to explain the bases for each of the LCO's.

REFERENCES:

TECHNICAL SPECIFICATIONS SECTION 3/4.5

EMERGENCY CORE COOLING SYSTEMS

III. LESSON OUTLINE:

NOTES

A. Accumulators

1. T/S 3/4.5.1 - Accumulators

a. Each accumulator shall be OPERABLE with:

- 1) The isolation valve open
- 2) Volume between 36.1% and 63.9%
- 3) Boron concentration between 1900 ppm and 2100 ppm
 - a) Chemistry check C_B monthly
 - b) Volume increases (1% tank volume)
- 4) N_2 cover pressure - 564 psig and 637 psig

b. Applicable in Modes 1, 2, and 3*

* Pzr Press. above 1000 psig

c. Action:

- 1) Accumulator inoperable (not due to closed isolation valve), restore operable in 1 hour or
 - a) Hot Standby in 6 hours
 - b) Reduce Pzr Press 100 psig

d. Bases

- 1) Ensures sufficient volume of borated water
 - a) Immediately forced into core through cold legs
 - b) If RCS pressure drops below accumulators
- 2) Provides initial cooling during large LOCA
- 3) Limits on Pressure, Volume and Boron Concentration
 - a) Assumptions in analysis are met

LO-TP-39209-00-001

Objectives

Verified by Proc.

(OPS SURV)

14000-C - Shiftly

14223-C - Monthly

14465-C - MOV

Verif.

III. LESSON OUTLINE:

NOTES

- 4) Isolation valves are considered "Operating Bypasses"
 - a) Required to be removed when permissive conditions not met
 - b) They also fail to meet single failure criteria
 - c) Power must be removed from valves.
- 5) Limits for operation other than isolation valve closed
 - a) Minimize time exposure to LOCA
 - b) Concurrent with another accumulator failure
 - (1) Could result in unacceptable PCT's
- 6) Inoperable accumulator because closed isolation valve
 - a) Full capability of one accumulator not available
 - b) Prompt action is required

B. ECCS Subsystems - Tavg 350°F

1. T/S 3/4.5-2

- a. Two ECCS subsystems shall be operable. Each comprised of:
 - 1) CCP
 - 2) SI Pump
 - 3) RHR Heat Exchanger
 - 4) RHR Pump
 - 5) Operable flowpath from RWST on SI signal and semi-auto transfer to CTB sump during recirc phase
- b. Applicable in Modes 1, 2, and 3

Verified operable via many surveillances OPS/CHEM/ENG. etc.

Exception to SI pump for T/S 3.5.3.2

III. LESSON OUTLINE:

NOTES

c. Action

- 1) With 1 ECCS subsystem inop. restore operable in 72 hours or
 - Hot standby in 6 hours and
 - Hot shutdown in following 6 hours
- 2) If SI actuated a special report requires in 90 days

d. Bases - Two subsystems above 350°F

- 1) Sufficient core cooling for LOCA
 - a) Assuming loss of one subsystem
- 2) Operating with accumulators
 - a) Limits PCT to within acceptable (2200°F)
 - b) For all break sizes
 - c) Provides long term cooling

C. ECCS Subsystems - Tavg 350°F

1. T/S 3/4.5.3.1

- a. ECCS subsystem operable required
 - 1) CCP
 - 2) RHR Heat Exchanger
 - 3) RHR Pump and
 - 4) Operable flowpath from RWST that can be manually realigned to take suction from CTB emer sump during recirc phase.
- b. Applicable in Mode 4.
- c. Action
 - 1) No ECCS subsystem operable due to CCP inoperable or flowpath from RWST unavailable.
 - a) Restore 1 ECCS subsystem in 1 hour or cold shutdown in next 20 hours

III. LESSON OUTLINE:

NOTES

- 2) ECCS train inoperable due to RHR Heat Exchanger or RHR pump OOS.
 - a) Restore operable or maintain RCS Tavg 350°F via alternate heat removal methods.
- 3) If SI actuated prepare special report to the commission within 90 days
- d. Bases - One ECCS subsystem below 350°F
 - 1) Do not require single failure consideration
 - a) Stable reactivity condition of core
 - b) Limited core cooling requirements
 - 2) Limits on maximum of one CCP and SIP less than 350°F
 - a) Mass addition transient relieved by one PORV
 - 3) Surveillance requirements on components
 - a) Ensure that assumption in analysis are met
 - (1) And subsystem operability maintained
 - 4) Surveillances on throttle position stops and flow balancing
 - a) Ensure proper ECCS flows for LOCA
 - b) Maintenance of proper flow resistance and pressure drops necessary to:
 - (1) Prevent runout conditions
 - (2) Provide same flow split as in analysis
 - (3) Maintain flow above that in analysis
 - (4) Assure seal injection flow less than assumed in analysis

These bases apply to 3.5.2 and 3.5.3

III. LESSON OUTLINE:

NOTES

D. ECCS - Tavg 350°F - Safety Injection Pumps

1. T/S 3/4.5.3.2 - Safety Injection Pumps

- a. All SI pumps shall be inoperable
- b. Applicable in Modes 4, 5, and 6 with Rx vessel head on
- c. Action
 - 1) With a SI pump operable, make all SI pumps INOP in 4 hours

d. Bases

- 1) Ensure mass addition pressure transient can be relieved by a single PORV.

T_{avg} below 350°F

E. Refueling Water Storage Tank

1. T/S 3/4.5.4

a. RWST will be operable with

- 1) Volume of 631, 478 minimum
- 2) Boron concentration between 2000 ppm and 2100 ppm
- 3) Minimum temp - 50°F and
- 4) Max temp 120°F
- 5) RWST SLUDGE mixing valves capable or closing on low-low RWST level

b. Applicable in Modes 1, 2, 3 and 4

c. Action:

- 1) With RWST INOP (Exclude sludge valves) restore operable in 1 hour or hot standby in 6 hours and cold shutdown in following 30 hours.
- 2) With sludge mixing valves inop. restore within 24 hours or isolate system with manual valves or deenergize solenoid pilot valve.

III. LESSON OUTLINE:**NOTES**

d. Bases

- 1) Ensures sufficient negative reactivity inserted into core
 - a) To counteract positive insertion from
cooldown
 - b) Cooldown can be caused by:
 - (1) Inadvertent depressurization
 - (2) LOCA
 - (3) Steam Line rupture
- 2) In the event of LOCA
 - a) Limits on volume and boron concentration
 - (1) Sufficient water for recirculation
 - (2) Remain subcritical cold after mixing with RCS volumes. All rods in but one
 - 3) Takes into account unusable volume
 - 4) Limits on volume and boron concentration
 - a) Ensure pH value between 8.5 and 10.5
 - (1) Minimizes evolution of iodine
 - (2) Minimizes effect of chloride or caustic stress corrosion

E. Summary

1. Accumulators
2. ECCS Subsystems - Tave ___ 350°F
3. ECCS Subsystems - Tave 350°F
 - a. Safety Injection Pumps
4. RWST

III. LESSON OUTLINE:

NOTES

F. Exercises

1. Case 1 - Plant is operating at 100% power 1153 MW load - Tavg - 588°F. Crew a is conducting routine surveillance required during their shift. Chemistry reports results of accumulator liquid boron samples for the monthly surveillance.

The results are as follows:

Accumulator #1	-	1957 ppm
Accumulator #2	-	1890 ppm
Accumulator #3	-	1940 ppm
Accumulator #4	-	1950 ppm

Are these concentrations alright to operate with?
Is a Tech Spec affected and if so what action is required.

Answer:

1. No. All samples appear very low with accumulator #2 low out of spec.
 2. Tech Spec 3.5.1 is affected. If boron concentration can't be recovered in 1 hour a shutdown and plant pressure reduction is called for.
2. Case 2 - Plant is starting up following a refueling is in Mode 4 going to Mode 3. During the SS/STA review of clearance and tagging logs it is noticed that SI pump 'A' is stilled tagged out to perform a routine oil change pm. Can the osos authorize the mode change from Mode 4 to Mode 3? What Tech Spec(s) are affected?

Answer:

1. Yes. A mode change can be made safety injection pumps can be inoperable going into Mode 3 but not with temp exceeding 375°F.
2. T/S affected 3.5.2 (See Note asterisk for Mode 3, bottom or page 3/4 5-3) this is working in conjunction with T.S. 3.5.3.2

III. LESSON OUTLINE:**NOTES**Note

Pumps must be restored within 4 hours of Mode 3 entry or prior to Tave exceeding 375°F, whichever occurs first.