Georgia Power

POWER GENERATION DEPARTMENT

VOGTLE ELECTRIC GENERATING PLANT

TRAINING LESSON PLAN

TITLE:	REFUELING OPERATIONS	NUMBER:	LO-LP-39213-00
PROGRAM:	LICENSED OPERATOR TRAINING	REVISION:	0
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INSTRUCTOR GUIDELINES:

WHITE BOARD WITH MARKERS

MASTER COPY

I. PURPOSE STATEMENT:

TO TEACH THE STUDENT THE APPLICABILITY AND ACTIONS OF LIMITING CONDITION FOR OPERATION SECTION 3/4.9, REFUELING OPERATIONS.

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 actions required in more than one hour.

4. The student should be able to paraphase the LCO's associated with refueling operations.

Required for SRO only.

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

REFERENCES:

TECHNICAL SPECIFICATIONS

SECTION 3/4.9 REFUELING OPERATIONS

III. LESSON OUTLINE:

NOTES

A. Boron Concentration — T.S. 3/4.9.1

1. C_B in RCS and refueling canal uniform and sufficient to ensure more restrictive of:

   a. k_{eff} __ .95, or

   b. __ 2000 ppm.

2. Applicable in Mode 6

3. Actions — Immediate actions

   a. Suspend CORE ALTERATIONS and positive reactivity changes

   b. Borate at __ 30 gpm with __ 7000 ppm boron until LCO restored

4. Bases

   a. Ensures that

      1) Reactor remains subcritical during core alterations

      2) Uniform boron in water with direct access to fuel

   b. Consistent with assumptions in accident analyses

      1) Boron dilution incident

      2) Includes 1% delta K/K conservative analyses

      3) Includes 50 ppm conservative analyses

B. Instrumentation — T.S. 3/4.9.2

1. Two SR monitors OPERABLE with visual indication in Control Room and one with audible indication in Containment and Control Room.

2. Applicable in Mode 6.

3. If one inoperable, suspend core ALTERATIONS and positive reactivity changes. If both inoperable, determine RCS C_B every 12 hours. — Immediate action

III. LESSON OUTLINE:

	NOTES
4. Bases	
a. Ensures redundant monitoring capability	
1) Detect changes in reactivity of core	
C. Decay Time	T.S. 3/4.9.3
1. Reactor subcritical at least 100 hours.	
2. Applicable during movement of irradiated fuel within vessel.	
3. Actions is to stop moving fuel.	Immediate action
4. Bases	
a. Ensures adequate decay time for short lived fission products	
1) Consistent with accident analyses	
D. Containment Building Penetrations	T.S. 3/4.9.4
1. All penetrations must be as follows:	
a. Equipment hatch closed, held by at least 4 bolts.	
b. At least 1 door in each airlock closed.	
c. All others providing direct access must be:	
1) Closed by isolation valve, manual valve, blind flange, or	
2) Capable of being closed by OPERABLE automatic containment ventilation isolation valve.	
2. Applicable during CORE ALTERATIONS or movement of irradiated fuel within containment.	
3. Action is to stop CORE ALTERATIONS, movement of fuel within containment.	Immediate action

III. LESSON OUTLINE:

	NOTES
4. Bases	
a. Release to containment restricted from environment	
b. Sufficient to restrict release from fuel rupture	
1) Lack of pressurization in refueling	
E. Communications	T.S. 3/4.9.5
1. Direct communications between Control Room and refueling station	
2. Applicable during CORE ALTERATIONS	
3. Action is to suspend CORE ALTERATION	Immediate action
4. Bases	
a. Ensure facility staff informed during core alterations	
1) Significant changes in facility status	
2) Changes in core reactivity conditions	
F. Refueling Machine	T.S. 3/4.9.6
1. Refueling machine OPERABLE with:	
a. Design rated load on hoist of 3166 lbs (1966 lbs. on gripper)	
b. Overload setpoint	Refer to T.S.
1) Primary - +250 wet, +350 dry	
2) Secondary - primary setpoint +150	
c. Load reduction - -150 wet or dry	
2. Auxiliary hoist OPERABLE with:	
a. Minimum capacity of 3000 lbs.	
b. 1000 lb. load indicator	

III. LESSON OUTLINE:

NOTES

3. Applicable during movement of drive rods or fuel assemblies within the vessel

4. Action is to suspend use of the equipment. — Immediate action

   a. T.S. 3.0.3 is NA.

5. Bases

   a. Ensures

      1) Used for movement of RCCA's and fuel assembly

      2) Has capacity to lift RCCA's and fuel assembly

      3) Core internals protected against excessive lifting force.

G. Crane Travel - Spent Fuel Storage Area — T.S. 3/4.9.7

1. Heavy loads prohibited over fuel in pool. — Define heavy load

2. Applicable with irradiated fuel in pool.

3. Action is to place load in safe condition — Immediate action

   a. T.S. 3.0.3 and 3.0.4 are NA.

4. Bases

   a. Ensures that if a load is dropped:

      1) Release limited to single fuel assembly

      2) Distortion of fuel will not result in critical array

H. Residual Heat Removal and Coolant circulation

1. At least 1 RHR train OPERABLE and in operation.* — T.S. 3/4.9.8.1

   a. *Footnote - train may be removed from operation for 1 hour out of 8 during CORE ALTERATIONS near hot legs

   b. Applicable in Mode 6, with __ 23 ft of water over vessel flange

III. LESSON OUTLINE:

NOTES

c. Actions are:

1) Do not increase decay heat load or reduce boron concentration — Immediate action

2) Initiate corrective actions, return to operation ASAP — Immediate action

3) Close containment penetrations within 4 hrs.

2. Two RHR trains OPERABLE, one in operation* — T.S. 3/4.9.8.2

a. *Footnote - prior to initial criticality, RHR train may be removed from operation for 1 hour out of 2 during CORE ALTERATIONS near hot legs — Lower (approx. none) decay heat load.

b. Applicable in Mode 6 when 23 ft over vessel flange.

c. Actions are:

1) With 1 RHR train inoperable. — Immediate action

a) Initiate corrective actions, or

b) Establish water level __ 23 ft over flange

2) With no RHR train in operation — Immediate action

a) Do not reduce RCS C_B

b) Initiate corrective actions

c) Close containment penetrations within 4 hours

3. Bases

a. At least one RHR train in operation

1) Sufficient cooling to remain below 140°F

2) Sufficient circulation to mitigate dilution event

III. LESSON OUTLINE:

	NOTES
b. Two RHR trains with less than 23 feet	
1) Need single failure criteria	
a) 23 feet of water provides heat sink	
I. Containment Ventilation Isolation	T.S. 3/4.9.9
1. Containment Ventilation Isolation System must be OPERABLE.	
2. Applicable during CORE ALTERATIONS or movement of irradiated fuel within containment.	
3. Action is to close all ventilation penetrations.	Immediate action
a. T.S. 3.0.3 and 3.0.4 are NA.	
4. Bases	
a. Ensures penetrations isolate	
b. Minimize release to environment	
J. Water Level - Reactor Vessel	
1. Maintain __ 23 ft of water over vessel flange	T.S. 3/4.9.10.1
a. Applicable during movement of irradiated fuel within containment.	
b. Action is to suspend fuel movement within the vessel.	Immediate action
2. Maintain __ 23 feet over irradiated fuel within vessel.	T.S. 3/4.9.10.2
a. Applicable in Mode 6 when moving control rods within vessel	
b. Action is to stop moving control rods within vessel	Immediate action
3. Bases	
a. Ensures sufficient water depth available	
1) Remove 99% of 10% iodine gap activity released during rupture of irradiated fuel	

III. LESSON OUTLINE:

NOTES

K. Water Level - Spent Fuel Pool — T.S. 3/4.9.11

1. Maintain __ 23 ft water over irradiated fuel stored in pool.

2. Applicable when irradiated fuel in pool.

3. Action is to stop moving fuel and crane operations over the pool and restore level within 4 hours. — Immediate action

a. T.S. 3.0.3 and 3.0.4 are NA.

III. Summary

A. Boron Concentration

B. Instrumentation

C. Decay Time

D. Containment Building Penetrations

E. Communications

F. Refueling Machine

G. Crane Travel - Spent Fuel Storage Building

H. Residual Heat Removal and Coolant Circulation

I. Containment Ventilation Exhaust System

J. Water Level - Reactor Vessel

K. Water Level - Storage Pool

IV. PRACTICAL EXERCISE

A. Exercise #

1. Provide the students with the following information.

a. Calculated SDM is 5.3%

b. RCS wide range temperature is 102°F.

c. RCS Boron concentration is 2063 ppm.

d. Refueling canal boron concentration 24 hours after head removal is 1980 ppm.

III. LESSON OUTLINE:

NOTES

2. What actions are required by Tech. Specs? When?

   a. Stop CORE ALTERATIONS, positive reactivity changes

   b. Initiate boration at __ 30 gpm of __ 7000 ppm boron

B. Exercise #2

1. Provide the students with the following information.

   a. Unit at 100% power following first refueling outage.

   b. Fuel transfer canal gate seal mechanism removal and replacement in progress.

   c. You are the Licensed Operator operating the SF Bridge Crane.

   d. You are directed to move the gate to a storage area which will require traversing over the spent fuel storage racks.

2. What are your actions?

   a. Do not move the gate from its present location, or

   b. Place it in a safe condition. (Not over spent fuel)

C. Exercise #3

1. Provide the students with the following information:

   a. Unit in Mode 6.

   b. RHR Train 'A' in operation.

   c. RCS wide range temp. approx. 100°F.

   d. Reactor water level is 24 ft over the fuel assemblies.

   e. The Refueling Machine auxiliary hoist operator is in process of disengaging control rod drive mechanisms.

   f. 'A' DG is out of service for maintenance.

III. LESSON OUTLINE:

NOTES

2. A fault on the grid results in 'A' RAT feeder breaker tripping. What are your actions? What is the Tech Spec. of concern?

   a. T.S. 3/4.9.8.2 requires two trains of RHR OPERABLE and one train in operation when water level is < 23 ft above vessel flange. Required action is immediately initiate corrective action to return to two OPERABLE trains or raise vessel level to > 23 ft above flange. In addition, with no RHR train in operation, do not reduce boron concentration, return one train to operation, and close all containment penetrations within 4 hours.

   b. Suggested operator actions.

      1) Place 'B' RHR train in service.

      2) Establish reactor vessel level > 23 ft above flange.