NINE MILE POINT NUCLEAR STATION

UNIT II OPERATIONS

02-REQ-006-344-2-05 Revision 4

TITLE: EMERGENCY OPERATING PROCEDURES, SUPPRESSION POOL LEVEL CONTROL (SPL)

	SIGNATURE	DATE
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Summary of Pages

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THIS LESSON PLAN IS A GENERAL REWRITE

TRAINING DEPARTMENT RECORDS ADMINISTRATION ONLY:

VERIFICATION: _____ _____

DATA ENTRY: _____ _____

RECORDS: _____ _____

4/29/30

I. TRAINING DESCRIPTION

A. Title of Lesson: Emergency Operating Procedures, Suppression Pool Level Control (SPL)

B. Lesson Description: This lesson plan discusses action taken to control suppression pool level.

C. Estimate of the Duration of the Lesson: Approximately 2 hours

D. Method of Evaluation, Grade Format, and Standard of Evaluation:

1. Written Examination with 80% minimum passing grade.

E. Method and Setting of Instruction:

1. Classroom Lecture

2. Assign the Student Learning Objectives as review problems with the students obtaining answers from the text, writing them down and handing them in for grading.

F. Prerequisites:

1. Instructor:

a. Certified in accordance with NTP-16 to NTP-16.1.

2. Trainee:

a. In accordance with NTP-10 or NTP-11 or

b. Be recommended for this training by the Operations Superintendent (or designee) or the Training Superintendent.

G. References:

1. BWROG Emergency Procedure Guidelines, Rev. 4

II. REQUIREMENTS

A. AP-9.0, Administration of Training

B. NTP-10, Training of Licensed Operator Candidates

C. NTP-11, Licensed Operator Requalification Training

III. TRAINING MATERIALS

A. Instructor Materials:

1. Transparency Package
2. Overhead Projector
3. Whiteboard and Felt Tip Markers
4. EOP Flow Chart for SPL

B. Trainee Materials:

1. EOP Flow Chart of SPL
2. OLP-SPL

IV. EXAMINATIONS AND MASTER ANSWER KEYS

A. Will be generated and administered as necessary. They will be on permanent file in the Records Room.

V. LEARNING OBJECTIVES

A. Terminal Objectives:

TO-1.0 Given conditions requiring the use of the Emergency Operating Procedure, use the procedure to place the plant in a stable condition as prescribed in the procedure.

B. Enabling Objectives:

EO-1.0 State the purpose of the Suppression Pool Level Control Procedure.

EO-2.0 State the entry conditions for the Suppression Pool Level Control Procedure.

EO-3.0 Given the procedural step, discuss the technical basis for that step.

VI. LESSON CONTENT LESSON CONTENT	DELIVERY NOTES	OBJECTIVES/ NOTES

I. INTRODUCTION

A. Student Learning Objectives

B. Purpose

This procedure specifies the operator actions necessary to control and maintain Suppression Pool Water Level in such a manner as to protect containment equipment and preserve Primary Containment integrity.

EO-1.0

C. Procedure Overview

1. The Suppression Pool Level Control procedure is executed concurrently with the following procedures:
   a. N2-EOP-SPT Suppression Pool Temperature Control
   b. N2-EOP-DWT Drywell Temperature Control
   c. N2-EOP-PCP Primary Containment Pressure Control
   d. N2-EOP-PCH Primary Containment Hydrogen Control
2. Concurrent execution is necessary because:
   a. The actions taken to control any one Primary Containment parameter may directly effect control of the others.

b. This procedure is based on the symptomatic approach the emergency response, where the initiating event of the transient is not known in advance. Assignment of priorities to any one of the five parameters is therefore not possible.

3. The values and trends of parameters, and the status of plant equipment during the event will dictate the order of execution of each flowchart.

II. DETAILED DESCRIPTION

A. Entry Conditions

1. Setpoints

a. The conditions which require entry into this procedure are:

EO-2.0

1) Suppression Pool temperature above 90°F

- Most limiting pool temperature addressed by Technical Specifications.

2) Drywell temperature above 150°F

- Drywell limiting temperature as specified by Tech Specs.

3) Suppression Pool water level above El. 201 ft.
   - Maximum LCO pool level by Tech. Specs.

4) Suppression Pool water level below El. 199.5 ft.
   - Minimum LCO pool level by Tech. Specs.

5) Drywell pressure above 1.68 psig.
   - Limiting Safety System Setting for drywell pressure by Tech. Specs.
     - ALSO: ECCS setpoint & entry into RPV control.

6) Primary Containment hydrogen concentration above 1.8%.
   - H_2/O_2 Analyzer alarm setpoint.

b. The occurrence of any one of these conditions requires entry into this procedure.

c. If an entry condition clears prior to exiting this procedure, and then re-occurs, re-entry at the beginning of the procedure is required.

d. If a second entry condition occurs while performing the procedure, re-entry at the beginning is again required.

e. If all entry conditions clear while executing this procedure, this procedure may be exited.

f. Termination of the emergency rather than termination of an event is the basis for exiting conditions for EOP's. Consequently, these procedures may be exited at any point during their execution if the operator determines that an emergency no longer exists. The EOP's have been written so that if an operator remains in a procedure when an emergency no longer exists, they still provide proper guidance. Alternately if the operator exits a procedure prematurely, reoccurrence of an entry condition will follow and the appropriate EOP procedure will be re-entered. (TMR #02=88.232)

2. Setpoint Bases
   a. The values selected were chosen on the basis of being simple, readily identifiable and operationally significant. They also provide advance warning of potential emergency conditions, allowing action to be taken which may prevent more severe circumstances.

B. Procedural Steps
   1. Execute EOP-SPT, DWT, PCP, PCH, and SPL concurrently.
      a. As discussed previously concurrent control of all five Primary Containment parameters is required when taking action to control any one of them.
   2. Monitor and control SUPPRESSION POOL WATER LEVEL.
      - Provides a smooth transition from general plant procedures to EOPs.
      - Assures normal methods have been employed prior to more complex actions.

EO-3.0

3. While executing the steps
   IF
   Primary Containment flooding is required
   THEN
   Exit Section SPL of this procedure and enter Contingency 6, Primary Containment Flooding.
   - Exiting this procedure precludes the potential for conflicting instructions for controlling Suppression Pool water level. EO-3.0

4. Maintain Suppression Pool water level between El. 199.5 ft. and El. 201 ft. (OP 31, 33).
   a. Have chemistry department sample the Suppression Pool water level prior to discharging Suppression Pool water.
      - The possibility exists that Suppression Pool level is NOT the concern, allows attention to be diverted to that which is BUT not to ignore this parameter as exceeding either the High or Low LCO level confirms that normal pool level control methods are unable to maintain pool level and further actions are necessary. EO-3.0

- Determine and control the amount of Radioactivity transferred outside of the Primary Containment.
- The operator should maintain Suppression Pool level between the Tech. Specs. high and low level LCOs, if possible.
- Normal methods of Suppression Pool level control should be used prior to utilizing more complex methods.

5. IF
Suppression Pool level cannot be maintained above El. 199.5
THEN
Maintain Suppression Pool water level above the Heat Capacity Level Limit (Figure PC-5) (OP-33).

6. IF
Suppression Pool water level cannot be maintained above the Heat Capacity Level Limit (Fig. PC-6).
THEN
Emergency Depressurization is required enter RPV Control and execute concurrently with this procedure.

Note:
The HCLL is discussed in the Curves & Limits L.P.

- To assure sufficient heat capacity is available in the Suppression Pool to absorb all the energy from an RPV blowdown, the depressurization must be initiated before pool level decreases to below the HCLL (Fig. PC-6).
- Depressurizing the RPV via the SRVs below the HCLL may result in Primary Containment failure.
- Do not exit this procedure, flags are present to guide operators to other procedure which may be applicable (RP, C3, C5).

EO-3.0

7. IF

Suppression Pool level cannot be maintained below El. 201.

- The rate at which Suppression Pool level rises varies for different events. The event-independent structure of the EOPs thus requires that both the conditions be monitored concurrently.

EO-3.0

THEN

Concurrently execute the following steps.

- There is no priority assigned to the execution of any flowpath. EO-3.0

8. Maintain Primary Containment water level below the Maximum Primary Containment Water Level Limit (Fig. PC-8) (OP-31).
   - To assure that the integrity of the Primary Containment is maintained. EO-3.0
   - The Maximum Primary Containment Water Level Limit is based upon the elevation of the Primary Containment vent capable of rejecting all decay heat.
9. IF
   Primary Containment water level cannot be maintained below the Maximum Primary Containment Water Level Limit (Fig. PC-8) (OP-31).
   THEN
   Irrespective of whether adequate core cooling is assured, terminate injection into the Primary Containment from sources external to the Primary Containment.

- Given the choice between adequate core cooling and Primary Containment integrity, in order to protect the general public, Primary Containment integrity is chosen to prevent a later complete and uncontrolled release that would occur should the containment fail in an unpredictable location causing a complete and unrecoverable loss of the Suppression Pool.

EO-3.0

10. Maintain the Suppression Pool water level below the SRV Tail Pipe Level Limit (Fig. PC-7).
    - SRV actuation subjects the SRV tail piece and supports to hydrodynamic loading, the magnitude of which is a function of:
      1) RPV pressure
      2) Suppression Pool level
    - At sufficiently high pool levels, SRV actuation may result in dynamic loading greater than the yield strength of a SRV component.

EO-3.0

- The SRV Tail Pipe Level Limit is defined to be the maximum suppression water level at which opening of an SRV will not result in exceeding the capability of the SRV tail pipe, tail pipe supports, quencher or quencher supports.

11. IF
Suppression Pool water level cannot be maintained below the SRV Tail Pipe Level Limit (Fig. PC-7)
THEN
Enter RPV Control and execute it concurrently with this procedure.

- Entry into RPV Control requires the operator to control RPV pressure relative to SRV Tail Pipe Level Limit, if action to control pool level is ineffective.

  In addition, RPV Control requires a scram, if not yet indicated, which reduces to decay heat levels the heat generated by the core.

EO-3.0

12. IF

Suppression Pool level AND RPV pressure cannot be maintained below the SRV Tail Pipe Level Limit (Fig. PC-7) AND adequate core cooling is assured.

THEN

Terminate injection into the Primary Containment from water sources external to the Primary Containment except from boron injection and CRD System.

- This action will be taken if adequate core cooling can be assured from systems that take a suction internal to the Primary Containment.
- Injecting water from systems outside the containment will increase total water inventory, resulting in a continuous rise in Suppression Pool level.
- Boron and CRD are not secured because they may be required to shutdown the reactor.

EO-3.0

13. IF

Suppression Pool water level AND RPV pressure can not be restored and maintained below the SRV Tail Pipe Level Limit (Fig. PC-7).

THEN

Emergency Depressurization is required.

- RPV Depressurization is initiated to ensures that the dynamic load imposed on the SRV components are below the design limit.
- The consequences of not depressurizing under these conditions include:
  1) Direct pressurizing of containment due to failed SRV tailpipe or other component.
  2) Failure of containment due to the pressurizing.
  3) Potential for uncontrolled release of radioactivity to the environment.

EO-3.0

14. Maintain Suppression Pool water level below El. 217 ft.
    - El. 217 ft. equates to the bottom of the Suppression Chamber to drywell vacuum breakers less the opening pressure of the vacuum breakers converted to feet of water.

    EO-3.0

15. IF
    Suppression Pool water level cannot be maintained below El. 217 ft
    THEN
    a. Terminate drywell sprays
       - Drywell sprays are secured because water level is presumed to interfere with the operation of the Suppression Chamber to drywell vacuum breakers.

       EO-3.0

    b. <u>If</u> adequate core cooling is assured <u>then</u> terminate injection into the Primary Containment from sources external to the Primary Containment <u>except</u> from boron injection systems and CRD.

- To terminate the level increase, injection from sources external to Primary Containment is secured.
- This step will be performed only if adequate from systems that take a suction internal to Primary Containment.
- Boron and CRD are not secured because they may be required to shutdown the reactor.

EO-3.0

III. WRAP-UP

A. Summary

The Suppression Pool water level procedure specifies actions for controlling and maintaining Suppression Pool water level. Insufficient Suppression Pool water level may result in insufficient NPSH for pumps taking suction on the pool or excessive heat up of Suppression Pool. Excessive Suppression Pool water level may result in hydro-dynamic loads from SRV discharges in excess of the loads to which the SRVs were designed, also leading to containment failure.

Standard methods for draining water from and making up water to the Suppression Pool are first employed. If Suppression Pool water level decreases to the limit below which steam quenching is no longer assured, Emergency RPV Depressurization is required. If Suppression Pool water level increases to and above progressively high limits, appropriate actions are taken to terminate injection into the RPV from sources external to the Primary Containment and, ultimately, depressurized the RPV.