



W. R. McCollum, Jr.
Vice President

Duke Energy Corporation

Oconee Nuclear Station
7800 Rochester Highway
Seneca, SC 29672

(864) 885-3107 OFFICE
(864) 885-3564 FAX

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U. S. Nuclear Regulatory Commission
Document Control Desk
Washington, D. C. 20555

Subject: Oconee Nuclear Station
Docket Nos. 50-269, -270, -287
Emergency Plan Implementing Procedures Manual
Volume C Revision 2002-03

Please find attached for your use and review copies of the revision to the Oconee Nuclear Station Emergency Plan: Volume C Revision 2002-03 March 2002.

This revision is being submitted in accordance with 10 CFR 50-54(q) and does not decrease the effectiveness of the Emergency Plan or the Emergency Plan Implementing Procedures.

Any questions or concerns pertaining to this revision please call Mike Thorne, Emergency Planning Manager at 864-885-3210.

By copy of this letter, two copies of this revision are being provided to the NRC, Region II, Atlanta, Georgia.

Very truly yours,

W. R. McCollum, Jr.
VP, Oconee Nuclear Site

xc: (w/2 copies of attachments)
Mr. Luis Reyes,
Regional Administrator, Region II
U. S. Nuclear Regulatory Commission
61 Forsyth St., SW, Suite 24T23
Atlanta, GA 30303

w/copy of attachments
Mr. Steven Baggett
Rockville, Maryland

(w/o Attachments, Oconee Nuclear Station)
NRC Resident Inspector
M. D. Thorne, Manager, Emergency Planning

A045

March 25, 2002

OCONEE NUCLEAR SITE
INTRASITE LETTER

SUBJECT: Emergency Plan Implementing Procedures
 Volume C, Revision 2002-03

Please make the following changes to the Emergency Plan Implementing
Procedures Volume C by following the below instructions.

REMOVE

Cover Sheet - Rev. 2002-02
Table of Contents, Page 1 & 2
RP/0/B/1000/002 - 11/05/01
Engineering Directive 5.1
09/12/01

ADD

Cover Sheet Rev. 2002-03
Table of Contents, Page 1 & 2
RP/0/B/1000/002 - 03/21/02
Engineering Directive 5.1
03/11/02

DUKE POWER

EMERGENCY PLAN
IMPLEMENTING PROCEDURES
VOLUME C



APPROVED:



W. W. Foster, Manager
Safety Assurance

03/25/2002

Date Approved

03/25/2002

Effective Date

VOLUME C
REVISION 2002-03
MARCH 2002

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HP/0/B/1009/018	Off-Site Dose Projections	05/19/00
HP/0/B/1009/020	Estimating Food Chain Doses Under Post Accident Conditions	10/09/98
HP/0/B/1009/021	Source Term Assessment Of A Gaseous Release From Non-Routine Release Points	12/01/97
HP/0/B/1009/022	On Shift Off-Site Dose Projections	10/08/01
RP/0/B/1000/001	Emergency Classification	01/15/02
RP/0/B/1000/002	Control Room Emergency Coordinator Procedure	03/21/02
RP/0/B/1000/003 A	ERDS Operation	12/03/98
RP/0/B/1000/007	Security Event	11/05/01
RP/0/B/1000/009	Procedure For Site Assembly	02/19/02
RP/0/B/1000/010	Procedure For Emergency Evacuation/Relocation Of Site Personnel	04/24/01
RP/0/B/1000/015 A	Offsite Communications From The Control Room	12/11/01
RP/0/B/1000/015 B	Offsite Communications From The Technical Support Center	12/11/01
RP/0/B/1000/015 C	Offsite Communications From The Emergency Operations Facility	12/11/01
RP/0/B/1000/016	Medical Response	01/30/01
RP/0/B/1000/017	Spill Response	11/30/00
RP/0/B/1000/018	Core Damage Assessment	09/30/97
RP/0/B/1000/019	Technical Support Center Emergency Coordinator Procedure	12/05/01
RP/0/B/1000/020	Emergency Operations Facility Director Procedure	12/05/01
RP/0/B/1000/021	Operations Interface (EOF)	04/30/01
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Business Management	Business Management Emergency Plan	03/21/01
SSG Functional Area Directive 102	SSG Emergency Response Plan – ONS Specific	03/01/01
NSC – 110	Nuclear Supply Chain – SCO Emergency Response Plan	04/02/01
Engineering Directive 5.1	Engineering Emergency Response Plan	03/11/02
Human Resources Procedure	ONS Human Resources Emergency Plan	01/07/02
Radiation Protection Manual Section 11.3	Off-Site Dose Assessment And Data Evaluation	04/06/99
Radiation Protection Manual Section 11.7	Environmental Monitoring For Emergency Conditions	11/26/01
Safety Assurance Directive 6.1	Safety Assurance Emergency Response Organization	11/28/94
Safety Assurance Directive 6.2	Emergency Contingency Plan	03/27/00
Training Division	Training Division Emergency Response Guide DTG-007	12/17/01

Revision 2002-03
March, 2002

**INFORMATION
ONLY****Duke Power Company
PROCEDURE PROCESS RECORD**(1) ID No. RP/0/B/1000/002Revision No. 009**REPARATION**(2) Station OCONEE NUCLEAR STATION(3) Procedure Title Control Room Emergency Coordinator Procedure(4) Prepared By Rodney Brown (Signature) Rodney Brown Date 03/18/2002

(5) Requires NSD 228 Applicability Determination?

☐ Yes (New procedure or revision with major changes)☒ No (Revision with minor changes)☐ No (To incorporate previously approved changes)(6) Reviewed By Ray Waterman (QR) Date 3/18/02Cross-Disciplinary Review By Tony R. Lee (QR) NA Date 3/20/02

Reactivity Mgmt Review By _____ (QR) NA Date _____

Mgmt Involvement Review By _____ (Ops Supt) NA Date _____

(7) Additional Reviews

Reviewed By _____ Date _____

Reviewed By _____ Date _____

Temporary Approval (if necessary)

By _____ (OSM/QR) Date _____

By _____ (QR) Date _____

(9) Approved By M. R. Shum Date 3-21-02**PERFORMANCE** (Compare with control copy every 14 calendar days while work is being performed.)

(10) Compared with Control Copy _____ Date _____

Compared with Control Copy _____ Date _____

Compared with Control Copy _____ Date _____

(11) Date(s) Performed _____

Work Order Number (WO#) _____

COMPLETION

(12) Procedure Completion Verification:

☐ Unit 0 ☐ Unit 1 ☐ Unit 2 ☐ Unit 3 Procedure performed on what unit?☐ Yes ☐ NA Check lists and/or blanks initialed, signed, dated, or filled in NA, as appropriate?☐ Yes ☐ NA Required enclosures attached?☐ Yes ☐ NA Data sheets attached, completed, dated, and signed?☐ Yes ☐ NA Charts, graphs, etc. attached, dated, identified, and marked?☐ Yes ☐ NA Procedure requirements met?

Verified By _____ Date _____

(13) Procedure Completion Approved _____ Date _____

(14) Remarks (Attach additional pages)

Duke Power Company Oconee Nuclear Site Control Room Emergency Coordinator Procedure Reference Use	Procedure No. RP/0/B/1000/002
	Revision No. 009
	Electronic Reference No. OX002WOT

Control Room Emergency Coordinator Procedure

NOTE: This procedure is an implementing procedure to the Oconee Nuclear Site Emergency Plan and must be forwarded to Emergency Planning within three (3) working days of approval.

1. Symptoms

- 1.1 Events are in process or have occurred which require activation of the Oconee Nuclear Site Emergency Plan.

2. Immediate Actions

The Operations Shift Manager/Emergency Coordinator shall use this procedure until relieved by the Station Manager/Alternate in the Technical Support Center.

NOTE: Place Keeping Aids: ☐ at left of steps may be used for procedure place keeping. (☒)

- ☐ 2.1 **IF** General Emergency conditions are met,
THEN GO TO Enclosure 4.1 (General Emergency).
- ☐ 2.2 **IF** Site Area Emergency conditions are met,
THEN GO TO Enclosure 4.2 (Site Area Emergency).
- ☐ 2.3 **IF** Alert conditions are met,
THEN GO TO Enclosure 4.3 (Alert).
- ☐ 2.4 **IF** Unusual Event conditions are met,
THEN GO TO Enclosure 4.4 (Unusual Event).
- ☐ 2.5 **IF** An Emergency Classification does **NOT** exist and ERO Activation is desired,
THEN GO TO Step 1.6 of Enclosure 4.4 (Unusual Event).

3. Subsequent Actions

NOTE: Actions are **NOT** required to be followed in any particular sequence.

- ☐ 3.1 **IF** A SBLOCA or Steam Generator Tube Leak exist,
THEN Implement Step 5.4, Emergency Worker Exposure Limits, of OMP 1-18,
(Implementation Standard During Abnormal And Emergency Events).

- ☐ 3.2 **IF** RIA 46 is on scale,
 THEN Use Enclosure 4.3 of RP/0/B/1000/001, (Emergency Classification), to determine if the emergency classification should be upgraded to a Site Area Emergency or General Emergency based on radiation activity.
- ☐ 3.2.1 Instruct RP to perform an Offsite Dose Calculation and determine any additional Protective Action Recommendations.
- ☐ 3.3 **IF** 1, 3 RIA 57 reads ≥ 1.0 R/hr; 2 RIA 57 reads ≥ 1.6 R/hr; or 1, 2, 3 RIA 58 reads ≥ 1.0 R/hr.
 THEN Use Enclosure 4.1 or 4.8 of RP/0/B/1000/001, (Emergency Classification), to determine if the emergency classification should be upgraded to a Site Area Emergency or General Emergency based on radiation activity.
- ☐ 3.4 **IF** RIA 16 or 17 are/were in Alert or High Alarm (≥ 2.5 mR/hr),
 THEN Instruct RP to perform an Offsite Dose Calculation using the RIA values.
- ☐ 3.4.1 Use Enclosure 4.3 of RP/0/B/1000/001, (Emergency Classification), and the Offsite Dose Calculation results to determine if the emergency classification should be upgraded to a Site Area Emergency or General Emergency based on dose projection at the site boundary.
- ☐ 3.4.2 Determine any additional Protective Action Recommendations.
- ☐ 3.5 **IF** A large scale fire or flood damage has occurred or is occurring,
 THEN Use RP/0/B/1000/022, (Procedure For Site Fire Damage Assessment And Repair) and /or RP/0/B/1000/29, (Fire Brigade Response) to determine additional actions that may be required.
- ☐ 3.6 **IF** A Security Event is in progress,
 THEN Use RP/0/B/1000/007, (Security Event), to determine additional actions that may be required.
- ☐ 3.7 **IF** A hazardous substance has been released,
 THEN Use RP/0/B/1000/017, (Spill Response), to determine additional actions that may be required.

NOTE: Priority should be placed on providing treatment for the most life-threatening event (i.e., medical vs radiation exposure - OSC procedure RP/0/B/1000/011, (Planned Emergency Exposure). The Emergency Coordinator may authorize (either verbal or signature) exposures greater than 25 rem TEDE (Total Effective Dose Equivalent) for lifesaving missions.

- ☐ 3.8 **IF** A medical response is required,
 THEN Use RP/0/1000/016, (Medical Response).
- ☐ 3.8.1 Document verbal approval of Planned Emergency Exposures required for lifesaving missions in the Control Room Emergency Coordinator Log.
- ☐ 3.9 **IF** Changing plant conditions require an emergency classification upgrade,
 THEN **GO TO** the applicable enclosure, designated in the Immediate Actions section of this procedure, required for the appropriate emergency classification.

☐ 3.10 Announce over the Plant Public address System the following information:

- ☐ 3.10.1 The current emergency classification level and plant status UE/Alert/SAE/GE
- ☐ 3.10.2 If appropriate, the status of contamination and how people are to handle themselves:

Plant personnel should assume they are contaminated until surveyed by RP or until they have frisked themselves.

NO eating, drinking, or smoking until the area is cleared by RP

Identify areas of contamination to plant personnel:

WARNING: Use of the Outside Air Booster Fans during a Security Event may introduce incapacitating agents into the Control Room.

{3}

- NOTE:**
- The Outside Air Booster Fans (Control Room Ventilation System - CRVS) are used to provide positive pressure in the Control Room to prevent smoke, toxic gases, or radioactivity from entering the area as required by NuReg 0737.
 - Chlorine Monitor Alarm will either stop the Air Booster Fans or will not allow them to start.

☐ 3.11 **IF** There is an indication that smoke or toxic gases from the Turbine Building may enter the Control Room.

THEN Instruct Control Room personnel to turn on the Outside Air Booster Fans.

Fans On _____ Time: _____

☐ 3.12 **IF** RIA-39 is in **ALARM**,

THEN Follow AP/1/2/3/1700/018, (Abnormal Release Of Radioactivity).

Fans On _____ Time: _____

- ☐ Secure fans if back-up sample by RP shows RIA-39 is in error.
- ☐ Isolate source of airborne contamination to the Control Room if sample from RP shows RIA alarm is valid.
- ☐ Secure fans if dose levels in CR/TSC/OSC are increased by the addition of outside filtered air.

Fans Off _____ Time: _____

- NOTE:**
- 10CFR50.54(q) allows for reasonable actions that depart from a License Condition or Technical Specification to be performed in an emergency when this action is immediately needed to protect the health and safety of the public and no action consistent with the License Condition or Technical Specification that can provide adequate or equivalent protection is immediately apparent.
 - 10CFR50.54 (y) requires approval of any 10CFR50.54(x) actions by a Licensed Senior Operator
 - Implementation of Oconee Severe Accident Guidelines (OSAG) requires the use of 10CFR50.54 (x) and (y) provisions.

- ☐ 3.13 **IF** Plant conditions require a decision to implement 10CFR50.54(x),
THEN Perform the following steps:

- ☐ 3.13.1 Document decision and actions taken in the affected unit's log.
- ☐ 3.13.2 Document decision and actions taken in the CR Emergency Coordinator Log.

NOTE: NRC **must be** notified of any 10CFR50.54(x) decisions and actions within one (1) hour.

- ☐ 3.13.3 Request CR NRC Communicator to report decision and actions taken to the NRC.

NOTE: 10CFR50.72 requires NRC notification for specific plant conditions.

- ☐ 3.14 **IF** Plant conditions require NRC notification under 10CFR50.72,
THEN Request the CR NRC Communicator to provide this notification using the guidance in OMP 1-14, (Notifications).

- 3.15 **IF** The Emergency Response Organization was activated,
THEN Provide turnover to the Technical Support Center using Enclosure 4.5 of this procedure.

Technical Support Center Activated _____ Time: _____

A. Turn over all emergency response procedures in use to the TSC.

- 3.16 **IF** An Unusual Event classification is being terminated,
- THEN** **REFER TO** Enclosure 4.6, (Emergency Classification Termination Criteria), of this procedure for termination guidance.
- ☐ 3.16.1 Verify that the Offsite Communicator has provided termination message to the offsite agencies.

NOTE: The EP Section shall develop a written report, for signature by the Site Vice President, to the State Emergency Preparedness Agency, Oconee County EPD, and Pickens County EPD within 24 working hours of the event termination.

- ☐ 3.16.2 Notify Emergency Planning Section (Emergency Planning Duty person after hours) that the Unusual Event has been terminated.
- ☐ 3.16.3 Emergency Planning shall hold a critique following termination of any actual Unusual Event.

4. Enclosures

- 4.1 General Emergency
- 4.2 Site Area Emergency
- 4.3 Alert
- 4.4 Unusual Event
- 4.5 Operations Shift Manager to TSC Emergency Coordinator Turnover Sheet
- 4.6 Emergency Classification Termination Criteria
- 4.7 Condition A/Condition B Response Actions
- 4.8 ERO Pager Activation By Security
- 4.9 References

Enclosure 4.1
General Emergency

RP/0/B/1000/002
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1. Immediate Actions

- NOTE:**
- State and County Agencies must be notified of event classification within **15 minutes** of Emergency Declaration.
 - Provide Offsite Communicator with declaration time.

- ☐ 1.1 **IF** It has been determined that an Emergency Action Level for an Initiating Condition has been met,

THEN Declare a **General Emergency**.

 Time of Declaration: _____

- ☐ 1.2 Appoint a person to maintain the Emergency Coordinator Log **OR** maintain the log yourself.

- NOTE:**
- Remind the Control Room Offsite Communicator that Follow Up notifications (updates) are required at least every **60 Minutes** for this classification.
 - Condition A, Dam Failure (Keowee or Jocassee), **OR** Condition B also requires notification of the Georgia Emergency Management Agency and National Weather Service. Remind the Control Room Offsite Communicator to notify these agencies in addition to and after SC State, Oconee County, and Pickens County.

- ☐ 1.3 Appoint Control Room Offsite Communicator(s).

- ☐ 1.4 Provide the following Protective Action Recommendations for use by the Offsite Communicator to complete the Emergency Notification Form.

PROTECTIVE ACTION RECOMMENDATION	PICKENS COUNTY SECTORS							OCONEE COUNTY SECTORS						
	A0	A1	B1	C1	A2	B2	C2	A0	D1	E1	F1	D2	E2	F2
EVACUATE	X	X	X	X				X	X	X	X			
SHELTER					X	X	X					X	X	X

- 1.4.1 **IF** Condition A, Imminent or Actual Dam Failure (Keowee or Jocassee) exists,
- THEN** **REFER TO** Enclosure 4.7, (Condition A/Condition B Response Actions), Step 1.0, for additional Protective Action Recommendations.

Enclosure 4.1
General Emergency

RP/0/B/1000/002
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NOTE: Steps 1.6 - 1.13 may be started/completed while the Emergency Notification Form is being prepared by the Offsite Communicator.

- ☐ 1.5 Review and approve completed Emergency Notification Form.

1.5.1 Sign Emergency Notification Form.

NOTE: Activate the Alternate TSC and OSC in the Oconee Office Building, Rooms 316 and 316A, if a fire in the Turbine Building, flooding conditions, security events, or onsite/offsite hazardous materials spill have occurred or are occurring.

- ☐ 1.6 Activate the Emergency Response Organization (ERO) by completing the following actions.

1.6.1 Activate ERO Pagers as follows:

NOTE: Flooding/dam failure/earthquake conditions assume bridges may be impassable to reach emergency facilities. Provide the code below for these conditions.

- ☐ A. **IF** ERO activation for an Emergency (Blue Echo) is required,
THEN Press ERO Pager Activation Panel Button 1.
- ☐ B. **IF** ERO activation for an Emergency affecting bridges (Blue Echo Bridges) is required,
THEN Press ERO Pager Activation Panel Button 2.
- ☐ C. **IF** ERO activation for a Drill (Blue Delta) is required,
THEN Press ERO Pager Activation Panel Button 3.
- ☐ D. **IF** ERO activation for a Drill affecting bridges (Blue Delta Bridges) is required,
THEN Press ERO Pager Activation Panel Button 4.
- ☐ E. **IF** Alternate TSC/OSC will be used,
THEN Press ERO Pager Activation Panel Button 5.
- ☐ F. **IF** A Security Event is in progress,
THEN Press ERO Pager Activation Panel Button 6.

- ☐ 1.6.2 Wait one minute and repeat step 1.6.1.

- ☐ 1.6.3 Monitor ERO Pager and verify that message has been provided to the ERO.

Enclosure 4.1
General Emergency

RP/0/B/1000/002
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- ☐ 1.6.4 Repeat steps 1.6.1 - 1.6.3 if message is not displayed on ERO Pager.
- A. **REFER TO** Enclosure 4.8, (ERO Pager Activation By Security), if the ERO Pager is not activated by the completion of Steps 1.6.1 - 1.6.3.
- ☐ 1.6.5 **IF** ERO activation is after normal working hours,
THEN Contact Security at extension 3636 or 2309.

Security Officer Name _____

- A. Request Security Officer to activate the CAN call list.

WARNING: Conducting Site Assembly during a Security Event may not be prudent.

- ☐ 1.7 Contact the Security Shift Supervisor.
- 1.7.1 Inform the Security Shift Supervisor that the ERO has been activated.
- 1.7.2 Discuss the need to conduct Site Assembly.
- ☐ 1.8 **IF** A Security Event does **NOT** exist,
OR A Security Event does exist and the Security Shift Supervisor agrees,
THEN Conduct Site Assembly per RP/0/B/1000/009, (Procedure For Site Assembly), Enclosure 4.1 and 4.3.
- ☐ 1.9 **IF** Area Radiation Monitors are in **ALARM**,
OR Steam Line Break has occurred,
THEN Contact shift RP and dispatch onsite monitoring teams.

- NOTE:**
- Remind the NRC Communicator to complete the NRC Event Notification Worksheet and Plant Status Sheet from OMP 1-14 (Notifications).
 - An open line to the NRC may be required.

- ☐ 1.10 Appoint a SRO to notify the NRC immediately after notification of the Offsite Agencies but not later than **one (1) hour** after declaration of the emergency.
- 1.10.1 NRC Communicator (SRO) Name _____

Enclosure 4.1
General Emergency

RP/0/B/1000/002
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NOTE: The NRC Communicator is responsible for activating ERDS.

- ☐ 1.10.2 Start the Emergency Response Data System (ERDS) for unit(s) involved within **one (1) hour** of the emergency classification.
 - A. **REFER TO** RP/0/B/1000/003A, (ERDS Operation).
- ☐ 1.11 Evacuate all non-essential personnel from the site after personnel accountability has been reached.
 - 1.11.1 **REFER TO** RP/0/B/1000/010, (Procedure For Emergency Evacuation/Relocation Of Site Personnel).
- ☐ 1.12 **IF** Condition A, Imminent or Actual Dam Failure (Keowee or Jocassee),
OR Condition B (Keowee) exists,
THEN **REFER TO** Enclosure 4.7, (Condition A/Condition B Response Actions), Step 2.0 or 3.0, for additional response actions.
- ☐ 1.13 Return to Step 3.0, (Subsequent Actions), of this procedure.

1. Immediate Actions

- NOTE:**
- State and County Agencies must be notified of event classification within **15 minutes** of Emergency Declaration.
 - Provide Offsite Communicator with declaration time.

- ☐ 1.1 **IF** It has been determined that an Emergency Action Level for an Initiating Condition has been met,

THEN Declare a **Site Area Emergency**.

Time of Declaration: _____

- ☐ 1.2 Appoint a person to maintain the Emergency Coordinator Log **OR** maintain the log yourself.

- NOTE:**
- Remind the Control Room Offsite Communicator that Follow Up notifications (updates) are required at least every **60 Minutes** for this classification.
 - Condition A, Dam Failure (Keowee or Jocassee), **OR** Condition B also requires notification of the Georgia Emergency Management Agency and National Weather Service. Remind the Control Room Offsite Communicator to notify these agencies in addition to and after SC State, Oconee County, and Pickens County.

- ☐ 1.3 Appoint Control Room Offsite Communicator(s).

- ☐ 1.4 Provide the Protective Action Recommendations from Enclosure 4.7, (Condition A/ Condition B Response Actions), Step 1.0, for use by the Offsite Communicator if a Condition A, Imminent or Actual Dam Failure, exists.

- NOTE:** Steps 1.6 - 1.12 may be started/completed while the Emergency Notification Form is being prepared by the Offsite Communicator.

- ☐ 1.5 Review and approve completed Emergency Notification Form.

1.5.1 Sign Emergency Notification Form.

Enclosure 4.2
Site Area Emergency

RP/0/B/1000/002
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NOTE: Activate the Alternate TSC and OSC in the Oconee Office Building, Rooms 316 and 316A, if a fire in the Turbine Building, flooding conditions, security events, or onsite/offsite hazardous materials spill have occurred or are occurring.

- ☐ 1.6 Activate the Emergency Response Organization (ERO) by completing the following actions.

1.6.1 Activate ERO Pagers as follows:

NOTE: Flooding/dam failure/earthquake conditions assume bridges may be impassable to reach emergency facilities. Provide the code below for these conditions.

- ☐ A. **IF** ERO activation for an Emergency (Blue Echo) is required,
THEN Press ERO Pager Activation Panel Button 1.
 - ☐ B. **IF** ERO activation for an Emergency affecting bridges (Blue Echo Bridges) is required,
THEN Press ERO Pager Activation Panel Button 2.
 - ☐ C. **IF** ERO activation for a Drill (Blue Delta) is required,
THEN Press ERO Pager Activation Panel Button 3.
 - ☐ D. **IF** ERO activation for a Drill affecting bridges (Blue Delta Bridges) is required,
THEN Press ERO Pager Activation Panel Button 4.
 - ☐ E. **IF** Alternate TSC/OSC will be used,
THEN Press ERO Pager Activation Panel Button 5.
 - ☐ F. **IF** A Security Event is in progress,
THEN Press ERO Pager Activation Panel Button 6.
- ☐ 1.6.2 Wait one minute and repeat step 1.6.1.
- ☐ 1.6.3 Monitor ERO Pager and verify that message has been provided to the ERO.
- ☐ 1.6.4 Repeat steps 1.6.1 - 1.6.3 if message is not displayed on ERO Pager.
- A. **REFER TO** Enclosure 4.8, (ERO Pager Activation By Security), if the ERO Pager is not activated by the completion of Steps 1.6.1 - 1.6.3.

Enclosure 4.2
Site Area Emergency

RP/0/B/1000/002
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- ☐ 1.6.5 **IF** ERO activation is after normal working hours,
 THEN Contact Security at extension 3636 or 2309.

Security Officer Name _____

A. Request Security Officer to activate the CAN call list.

WARNING: Conducting Site Assembly during a Security Event may not be prudent.

- ☐ 1.7 Contact the Security Shift Supervisor.
- 1.7.1 Inform the Security Shift Supervisor that the ERO has been activated.
- 1.7.2 Discuss the need to conduct Site Assembly.
- ☐ 1.8 **IF** A Security Event does **NOT** exist,
 OR A Security Event does exist and the Security Shift Supervisor agrees,
 THEN Conduct Site Assembly per RP/0/B/1000/009, (Procedure For Site Assembly),
 Enclosure 4.1 and 4.3.
- ☐ 1.9 **IF** Area Radiation Monitors are in **ALARM**,
 OR Steam Line Break has occurred,
 THEN Contact shift RP and dispatch onsite monitoring teams.

NOTE:

- Remind the NRC Communicator to complete the NRC Event Notification Worksheet and Plant Status Sheet from OMP 1-14 (Notifications).
- An open line to the NRC may be required.

- ☐ 1.10 Appoint an SRO to notify the NRC immediately after notification of the Offsite Agencies but not later than **one (1) hour** after declaration of the emergency.
- 1.10.1 NRC Communicator (SRO) Name _____

Enclosure 4.2
Site Area Emergency

RP/0/B/1000/002
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NOTE: The NRC Communicator is responsible for activating ERDS.

- ☐ 1.10.2 Start the Emergency Response Data System (ERDS) for unit(s) involved within **one (1) hour** of the emergency classification.
 - A. **REFER TO** RP/0/B/1000/003A, (ERDS Operation).
- ☐ 1.11 **IF** Condition A, Imminent or Actual Dam Failure (Keowee or Jocassee),
OR Condition B (Keowee) exists,
THEN **REFER TO** Enclosure 4.7, (Condition A/Condition B Response Actions),
Step 2.0 or 3.0, for additional response actions.
- ☐ 1.12 Return to Step 3.0, (Subsequent Actions), of this procedure.

4

1. Immediate Actions

- NOTE:**
- State and County Agencies must be notified of event classification within **15 minutes** of Emergency Declaration.
 - Provide Offsite Communicator with declaration time.

- ☐ 1.1 **IF** It has been determined that an Emergency Action Level for an Initiating Condition has been met,

THEN Declare an **Alert**.

Time of Declaration: _____

- ☐ 1.2 Appoint a person to maintain the Emergency Coordinator Log **OR** maintain the log yourself.

- NOTE:**
- Remind the Control Room Offsite Communicator that Follow Up notifications (updates) are required at least every **60 minutes** for this classification.
 - Condition B for Keowee Hydro Project Dams/Dikes also requires notification of the Georgia Emergency Management Agency and National Weather Service. Remind the Control Room Offsite Communicator to notify these agencies in addition to and after SC State, Oconee County, and Pickens County.

- ☐ 1.3 Appoint Control Room Offsite Communicator(s).

NOTE: Steps 1.5 - 1.11 may be started/completed while the Emergency Notification Form is being prepared by the Offsite Communicator.

- ☐ 1.4 Review and approve completed Emergency Notification Form.

1.4.1 Sign Emergency Notification Form.

NOTE: Activate the Alternate TSC and OSC in the Oconee Office Building, Rooms 316 and 316A, if a fire in the Turbine Building, flooding conditions, security events, or onsite/offsite hazardous materials spill have occurred or are occurring.

- ☐ 1.5 Activate the Emergency Response Organization (ERO) by completing the following actions.

1.5.1 Activate ERO Pagers as follows:

NOTE: Flooding/dam failure/earthquake conditions assume bridges may be impassable to reach emergency facilities. Provide the code below for these conditions.

- ☐ A. **IF** ERO activation for an Emergency (Blue Echo) is required,
THEN Press ERO Pager Activation Panel Button 1.
- ☐ B. **IF** ERO activation for an Emergency affecting bridges (Blue Echo Bridges) is required,
THEN Press ERO Pager Activation Panel Button 2.
- ☐ C. **IF** ERO activation for a Drill (Blue Delta) is required,
THEN Press ERO Pager Activation Panel Button 3.
- ☐ D. **IF** ERO activation for a Drill affecting bridges (Blue Delta Bridges) is required,
THEN Press ERO Pager Activation Panel Button 4.
- ☐ E. **IF** Alternate TSC/OSC will be used,
THEN Press ERO Pager Activation Panel Button 5.
- ☐ F. **IF** A Security Event is in progress,
THEN Press ERO Pager Activation Panel Button 6.
- ☐ 1.5.2 Wait one minute and repeat step 1.5.1.
- ☐ 1.5.3 Monitor ERO Pager and verify that message has been provided to the ERO.
- ☐ 1.5.4 Repeat steps 1.5.1 - 1.5.3 if message is not displayed on ERO Pager.
- A. **REFER TO** Enclosure 4.8, (ERO Pager Activation By Security), if the ERO Pager is not activated by the completion of Steps 1.5.1 - 1.5.3.

Alert

- ☐ 1.5.5 **IF** ERO activation is after normal working hours,
 THEN Contact Security at extension 3636 or 2309.

Security Officer Name _____

A. Request Security Officer to activate the CAN call list.

WARNING: Conducting Site Assembly during a Security Event may not be prudent.

- ☐ 1.6 Contact the Security Shift Supervisor.
- 1.6.1 Inform the Security Shift Supervisor that the ERO has been activated.
- 1.6.2 Discuss the need to conduct Site Assembly.
- ☐ 1.7 **IF** A Security Event does **NOT** exist,
 OR A Security Event does exist and the Security Shift Supervisor agrees,
 THEN Conduct Site Assembly per RP/0/B/1000/009, (Procedure For Site Assembly),
 Enclosure 4.1 and 4.3.
- ☐ 1.8 **IF** Area Radiation Monitors are in **ALARM**,
 OR Steam Line Break has occurred,
 THEN Contact shift RP and dispatch onsite monitoring teams

NOTE:

- Remind the NRC Communicator to complete the NRC Event Notification Worksheet and Plant Status Sheet from OMP 1-14 (Notifications).
- An open line to the NRC may be required.

- ☐ 1.9 Appoint an SRO to notify the NRC immediately after notification of the Offsite Agencies but not later than **one (1) hour** after declaration of the emergency.
- 1.9.1 NRC Communicator (SRO) Name _____

NOTE: The NRC Communicator is responsible for activating ERDS.

- ☐ 1.9.2 Start the Emergency Response Data System (ERDS) for unit(s) involved within **one (1) hour** of the emergency classification.
 - A. **REFER TO** RP/0/B/1000/003A, (ERDS Operation).
- ☐ 1.10 **IF** Condition B at Keowee exists,
THEN **REFER TO** Enclosure 4.7, (Condition A/Condition B Response Actions), Step 3.0, for additional response actions.
- ☐ 1.11 Return to Step 3.0, (Subsequent Actions), of this procedure.

1. Immediate Actions

- NOTE:**
- State and County Agencies must be notified of event classification within **15 minutes** of Emergency Declaration.
 - Provide Offsite Communicator with declaration time.

- ☐ 1.1 **IF** It has been determined that an Emergency Action Level for an Initiating Condition has been met,

THEN Declare an **Unusual Event**.

Time of Declaration: _____

- ☐ 1.2 Appoint a person to maintain the Emergency Coordinator Log **OR** maintain the log yourself.

- NOTE:**
- Remind the Control Room Offsite Communicator that an Initial Message and a Termination Message are required for this classification. No Follow Up Notifications (updates) are required unless requested by the Offsite Agencies.
 - Condition B for Keowee Hydro Project Dams/Dikes also requires notification of the Georgia Emergency Management Agency and National Weather Service. Remind the Control Room Offsite Communicator to notify these agencies in addition to and after SC State, Oconee County, and Pickens County.

- ☐ 1.3 Appoint Control Room Offsite Communicator(s).

NOTE: Steps 1.5 - 1.11 may be started/completed while the Emergency Notification Form is being prepared by the Offsite Communicator.

- ☐ 1.4 Review and approve completed Emergency Notification Form.

1.4.1 Sign Emergency Notification Form.

- ☐ 1.5 **IF** Condition B at Keowee exists,
THEN **REFER TO** Enclosure 4.7, (Condition A/Condition B Response Actions),
Step 3.0, for additional response actions.

- NOTE:**
- Activation of the ERO is **NOT** required for an Unusual Event Classification.
 - Activate the Alternate TSC and OSC in the Oconee Office Building, Rooms 316 and 316A, if a fire in the Turbine Building, flooding conditions, security events, or onsite/offsite hazardous materials spills have occurred or are occurring.

- ☐ 1.6 **IF** Emergency Response Organization (ERO) activation is desired,
 THEN Complete the following actions.

1.6.1 Activate ERO Pagers as follows:

- NOTE:** Flooding/dam failure/earthquake conditions assume bridges may be impassable to reach emergency facilities. Provide the code below for these conditions.

- ☐ A. **IF** ERO activation for an Emergency (Blue Echo) is required,
 THEN Press ERO Pager Activation Panel Button 1.
- ☐ B. **IF** ERO activation for an Emergency affecting bridges
 (Blue Echo Bridges) is required,
 THEN Press ERO Pager Activation Panel Button 2.
- ☐ C. **IF** ERO activation for a Drill (Blue Delta) is required,
 THEN Press ERO Pager Activation Panel Button 3.
- ☐ D. **IF** ERO activation for a Drill affecting bridges (Blue Delta Bridges)
 is required,
 THEN Press ERO Pager Activation Panel Button 4.
- ☐ E. **IF** Alternate TSC/OSC will be used,
 THEN Press ERO Pager Activation Panel Button 5.
- ☐ F. **IF** A Security Event is in progress,
 THEN Press ERO Pager Activation Panel Button 6.
- ☐ 1.6.2 Wait one minute and repeat step 1.6.1.
- ☐ 1.6.3 Monitor ERO Pager and verify that message has been provided to the ERO.

Enclosure 4.4
Unusual Event

RP/0/B/1000/002
Page 3 of 4

- ☐ 1.6.4 Repeat steps 1.6.1 - 1.6.3 if message is not displayed on ERO Pager.
- A. **REFER TO** Enclosure 4.8, (ERO Pager Activation By Security), if the ERO Pager is not activated by the completion of Steps 1.6.1 - 1.6.3.
- ☐ 1.6.5 **IF** ERO activation is after normal working hours,
THEN Contact Security at extension 3636 or 2309.

Security Officer Name _____

- A. Request Security Officer to activate the CAN call list.

WARNING: Conducting Site Assembly during a Security Event may not be prudent.

- ☐ 1.7 Contact the Security Shift Supervisor.
- 1.7.1 Inform the Security Shift Supervisor that the ERO has been activated.
- 1.7.2 Discuss the need to conduct Site Assembly.

NOTE: Consider conducting a Site Assembly if a Hazardous Materials spill affecting personnel safety is involved; or, if personnel safety is a concern.

- ☐ 1.8 **IF** The Emergency Response Organization is needed to assist with the Unusual Event emergency activities,
AND A Security Event does **NOT** exist,
OR A Security Event does exist and the Security Shift Supervisor agrees,
THEN Conduct Site Assembly per RP/0/B/1000/009, (Procedure For Site Assembly), Enclosure 4.1 and 4.3.
- ☐ 1.8.1 Document the decision to conduct Site Assembly in the Control Room Emergency Coordinator Log.
- ☐ 1.9 **IF** Area Radiation Monitors are in **ALARM**,
OR Steam Line Break has occurred,
THEN Contact shift RP and dispatch onsite monitoring teams.

- NOTE:**
- Remind the NRC Communicator to complete the NRC Event Notification Worksheet and Plant Status Sheet from OMP 1-14 (Notifications).
 - An open line to the NRC may be required.

- ☐ 1.10 Appoint an SRO to notify the NRC immediately after notification of the Offsite Agencies but not later than **one (1) hour** after declaration of the emergency.

1.10.1 NRC Communicator (SRO) Name_____

- ☐ 1.11 Return to Step 3.0, (Subsequent Actions), of this procedure.

+

Operations Shift Manager To TSC Emergency
Coordinator Turnover Sheet

EMERGENCY CLASSIFICATION _____ TIME DECLARED _____
DESCRIPTION OF EVENT _____

Unit One Status:

Reactor Power _____ RCS Pressure _____ RCS Temperature _____
Auxiliaries Being Supplied Power From _____ ES Channels Actuated _____

MAJOR EQUIPMENT OUT OF SERVICE _____

JOBS IN PROGRESS _____

Unit Two Status:

Reactor Power _____ RCS Pressure _____ RCS Temperature _____
Auxiliaries Being Supplied Power From _____ ES Channels Actuated _____

MAJOR EQUIPMENT OUT OF SERVICE _____

JOBS IN PROGRESS _____

Unit Three Status:

Reactor Power _____ RCS Pressure _____ RCS Temperature _____
Auxiliaries Being Supplied Power From _____ ES Channels Actuated _____

MAJOR EQUIPMENT OUT OF SERVICE _____

JOBS IN PROGRESS _____

**Operations Shift Manager To TSC Emergency
Coordinator Turnover Sheet**

Classification Procedure in Use:

RP/0/B/1000/002 (Control Room Emergency Coordinator Procedure)

Is RP/0/B/1000/03A, (ERDS Operation) in use? Yes ____ No ____ If Yes, Unit No. ____
Step No. ____

Is RP/0/B/1000/007, (Security) in use? Yes ____ No ____ If Yes, Step No. ____

Is RP/0/B/1000/016, (Medical) in use? Yes ____ No ____ If Yes, Step No. ____

Is RP/0/B/1000/017, (Spill Response) in use? Yes ____ No ____ If Yes, Step No. ____

Is RP/0/B/1000/022, (Fire/Flood) in use? Yes ____ No ____ If Yes, Step No. ____

Is RP/0/B/1000/029, (Fire Brigade) in use? Yes ____ No ____ If Yes, Step No. ____

Is Step 5.4 of OMP 1-18 (Implementation Standard During
Abnormal And Emergency Events) in use? * Yes ____ No ____

* If yes, implementation of emergency worker exposure limits must be announced over Public
Address System. {1}

IF Condition A, Dam Failure, has been declared for Keowee Hydro Project,

THEN Provide the following information to the TSC Emergency Coordinator:

- ◆ Status of Offsite Agency Notifications _____
- ◆ Recommendations made to offsite agencies _____
- ◆ Status of relocation of site personnel _____

What is the status of Site Assembly? (This question is only applicable for those times that the
Emergency Response Organization is activated after hours, holidays, or weekends.)

Next message due to Offsite Agencies at Time: _____

Operations Shift Manager/CR _____ Time: _____

Emergency Coordinator/TSC _____ Time: _____

**Emergency Classification Termination
Criteria**

IF The following guidelines **applicable to the present emergency condition** have been met or addressed,

THEN An emergency condition may be considered resolved when:

- _____ 1. Existing conditions no longer meet the existing emergency classification criteria and it appears unlikely that conditions will deteriorate further.
 - _____ 2. Radiation levels in affected in-plant areas are stable or decreasing to below acceptable levels.
 - _____ 3. Releases of radioactive material to the environment greater than Technical Specifications are under control or have ceased.
 - _____ 4. The potential for an uncontrolled release of radioactive material is at an acceptably low level.
 - _____ 5. Containment pressure is within Technical Specification requirements.
 - _____ 6. Long-term core cooling is available.
 - _____ 7. The shutdown margin for the core has been verified.
 - _____ 8. A fire, flood, earthquake, or similar emergency condition is controlled or has ceased.
 - _____ 9. Offsite power is available per Technical Specification requirements.
 - _____ 10. All emergency action level notifications have been completed.
 - _____ 11. Hydro Central has been notified of termination of Condition B for Keowee Hydro Project. {2}
- ◆ **REFER TO** Section 6 of the Emergency Telephone Directory, (Keowee Hydro Project Dam/Dike Notification).
- _____ 12. The Regulatory Compliance Section has evaluated plant status with respect to Technical Specifications and recommends Emergency classification termination.
- _____ 13. Emergency terminated. Request the Control Room Offsite Communicator to complete an Emergency Notification Form for a Termination Message using guidance in RP/0/1000/015A, (Offsite Communications From The Control Room), and provide information to offsite agencies.

Date/Time Initial

- ◆ Return to Step 3.16.1.

1. Condition A Response - Immediate Actions

- ☐ 1.1 **IF** Condition A, Imminent or Actual Dam Failure (Keowee or Jocassee) exists,
THEN Perform the following actions:
 - ☐ 1.1.1 Provide the following **protective action recommendations** to Oconee County and Pickens County for imminent/actual dam failure.
 - A. Provide the following recommendation for Emergency Notification Form Section 15 (B) Evacuate:
 - 1. Move residents living downstream of the Keowee Hydro Project dams to higher ground.
 - B. Provide the following recommendation for Emergency Notification Form Section 15 (D) Other:
 - 1. Prohibit traffic flow across bridges identified on your inundation maps until the danger has passed.
- ☐ 1.2 Return to applicable Enclosure (4.1 or 4.2).
 - ☐ 1.2.1 **IF** A General Emergency has been declared,
THEN **GO TO** Step 1.5 of Enclosure 4.1, (General Emergency).
 - ☐ 1.2.2 **IF** A Site Area Emergency has been declared,
THEN **GO TO** Step 1.5 of Enclosure 4.2, (Site Area Emergency).

2. Condition A Response - Subsequent Actions

- ☐ 2.1 Notify Hydro Central and provide information related to the event.
 - 2.1.1 **REFER TO** Section 6 of the Emergency Telephone Directory, (Keowee Hydro Project Dam/Dike Notification). {2}
- ☐ 2.2 Relocate Keowee personnel to the Operational Support Center (OSC) if events occur where their safety could be affected.
 - ☐ 2.2.1 **IF** Keowee personnel are relocated to the OSC,
THEN Notify Hydro Central.
 - A. **REFER TO** Section 6 of the Emergency Telephone Directory, (Keowee Hydro Project Dam/Dike Notification). {2}

NOTE: A loss of offsite communications capabilities (Selective Signaling and the Wide Area Network - WAN) could occur within 1.5 hours after Keowee Hydro Dam failure. Rerouting of the Fiber Optic Network through Bad Creek should be started **as soon as possible**.

- ☐ 2.3 Notify Telecommunications Group in Charlotte to begin rerouting the Oconee Fiber Optic Network.

2.3.1 **REFER TO** Selective Signaling Section of the Emergency Telephone Directory (page 9).

- ☐ 2.4 Request Security to alert personnel at the Security Track/Firing Range and Building 8055 (Warehouse #5) to relocate to work areas inside the plant.

NOTE:

- Plant access road to the Oconee Complex could be impassable within **1.5 hours** if the Keowee Hydro Dam fails. A loss of the Little River Dam (Newry Dam) or Dikes A-D will take longer to affect this road.
- PA Announcements can be made by the Control Room using the Office Page Override feature or Security.

- ☐ 2.5 Make a PA Announcement to relocate personnel at the following locations to the World Of Energy/Operations Training Center.

_____ Oconee Complex

_____ Oconee Garage

_____ Oconee Maintenance Training Facility

- ☐ 2.6 Dispatch operators to the SSF and establish communications.

- ☐ 2.7 Return to applicable Enclosure (4.1 or 4.2).

☐ 2.7.1 **IF** A General Emergency has been declared,
THEN **GO TO** Step 1.13 of Enclosure 4.1, (General Emergency).

☐ 2.7.2 **IF** A Site Area Emergency has been declared,
THEN **GO TO** Step 1.12 of Enclosure 4.2, (Site Area Emergency).

Enclosure 4.8
ERO Pager Activation By Security

RP/0/B/1000/002
Page 1 of 1

1. Symptoms

- 1.1 Activation of the ERO Pagers using the ERO Pager Activation Panel in the TSC was unsuccessful.

2. Immediate Actions

- 2.1 Activate the Emergency Response Organization (Technical Support Center, Operational Support Center, and Emergency Operations Facility) by completing the following actions.:

- 2.1.1 Contact Security.

- A. Dial 3636 (Dial 2309 if no response is received).

Security Officer Name _____

- 2.1.2 Read the following information to the Security Officer:

- A. The Emergency Response Organization (Technical Support Center, Operational Support Center, and Emergency Response Facility) is being activated for an emergency relating to Unit # _____.

NOTE: Activate the Alternate TSC and OSC in the Oconee Office Building, Rooms 316 and 316A, if a fire in the Turbine Building, flooding conditions, security events, or onsite/offsite hazardous materials spills have occurred or are occurring.

- B. _____ Primary TSC/OSC will be used

OR

_____ Alternate TSC/OSC will be used

- C. This is a _____ Blue Delta (Drill) activation

OR

This is a _____ Blue Echo (Emergency) activation

NOTE: Flooding/dam failure/earthquake conditions assume bridges may be impassable to reach emergency facilities. Provide the code below for these conditions.

- D. This is a _____ Blue Delta Bridges (Drill) activation

OR

This is a _____ Blue Echo Bridges (Emergency) activation

1. PIP O-01-01395
2. PIP O-01-03460
3. PIP O-01-03696



Oconee Nuclear Site
Engineering Manual

Section Title: EM-5.1 - Engineering Emergency Response Plan

Revision No.: 5

Reference:

Approved By:	<i>Bruce Hamilton</i>	Approved Date: <i>3/11/02</i>
Revised By:	<i>L K M Smith</i>	Revised Date: <i>3-5-02</i>
Reviewed	<i>M. Q. Thorne</i>	Original Date: 05/27/92
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 ENGINEERING MANUAL
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(See Modification Manual - Section 7.4)		
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1.0 Purpose

The purpose of this directive is to identify The Engineering Division responsibilities during an emergency at Oconee Nuclear Station. This directive is an implementation directive to the site emergency plan. Upon revision, a copy of this directive must be forwarded to Emergency Planning within seven (7) working days of its approval.

2.0 References

1. Oconee Nuclear Site Emergency Response Plan
2. NSD 117 Emergency Response Organization, Training, and Responsibilities

3.0 Definitions

3.1 Essential Personnel

Personnel needed to mitigate the emergency as determined by the EOF, TSC, or OSC.

3.2 Engineering Emergency Response Person

Engineering personnel assigned to those positions in the EOF, TSC, or OSC listed in Sections 6.0 and 7.0 of this directive.

4.0 Responsibilities

4.1 Engineering Division Manager

The Engineering Division Manager shall be responsible for the implementation of this directive. During a site assembly he/she shall be responsible to account for all engineering personnel to the Security Shift Supervisor or designee.

4.2 Engineering Group Manager

During a site assembly each Engineering Group Manager shall be responsible to account for each person in his/her Group to the Engineering Division Manager or designee.

4.3 Engineering Supervisor

During a site assembly each Engineering Supervisor shall be responsible to account for each person on his/her team to his/her Engineering Group Manager or designee.

4.4 Engineering Emergency Response Person

When notified of EOF/TSC/OSC activation, the engineering emergency response persons will report to their assigned position in the EOF, TSC, or OSC. Notification during normally scheduled work hours will be by an announcement on the station PA system. Notification during unscheduled work hours will be by pager or Community Alert Network using the following:

PAGER CODES:

- Blue Delta – EOF/TSC/OSC activated for a drill.
- Blue Echo – EOF/TSC/OSC activated for an emergency.

Note: During flooding/dam failure/earthquake conditions assume bridges may be damaged; use caution.

Blue Delta Bridges – Pager message used when bridges may be damaged and EOF/TSC/OSC activation is needed. Use caution.

Blue Echo Bridges – Pager message used when EOF/TSC/OSC activated for an emergency and the bridges may be damaged; use caution.

Each engineering emergency response person will carry a pager which will be turned on when leaving the station and left on at all times. He/she will remain fit for duty at all times while serving duty as an engineering emergency response person, and will stay within required response times for his/her facility. For specifics, see NSD 117.

4.5 Employee

During a site assembly each employee will proceed to his/her site assembly location (generally the person's work area) and report to his/her supervisor within the specified time.

5.0 SITE ASSEMBLY AND EVACUATION

5.1 Site Assembly

5.1.1

When a site assembly is commenced, a warbling tone will be broadcast over the Station PA system and the outdoor Site Assembly Horn will sound. All Engineering personnel shall immediately proceed to their site assembly location and report to his/her supervisor. Any person who cannot report to his/her designated area within eight (8) minutes of the commencement of the site assembly shall contact his/her supervisor by telephone for assembling instructions.

5.1.2

Personnel inside the Protected Area (PA) who must assemble at a location inside the PA or who cannot make it to their assembly point outside the PA shall card in at the nearest card reader, notify their supervisor of their location, and wait for further instructions.

5.1.3

Personnel working in an RCZ in protective clothing should leave the work area and go to the appropriate Change Room. Once in the Change Room area, they should card in (swipe their security badge) and contact their supervisor for accountability. Personnel should then follow the instructions of the RP personnel in the Change Room or RCZ.

5.1.4

Each Engineering Section Manager/Supervisor shall account for all personnel in his/her Section/Team and report the result to his/her Engineering Group Manager or designee. Unaccounted for personnel shall be reported by name. This report should be made within 10 minutes of the commencement of the site assembly. Do NOT leave phone mail messages when reporting.

5.1.5

Each Engineering Group Manager shall account for all personnel in his/her Group and report the result to the Engineering Division Manager or designee. Unaccounted for personnel shall report by name. This

report should be made within 15 minutes of the commencement of the site assembly. Do NOT leave phone mail messages when reporting.

5.1.6

The Engineering Division Manager or designee shall account for all Engineering personnel and report the result to the Security Shift Supervisor or designee. Do not report unaccounted for personnel by name at this time. This report shall be made within 20 minutes of the commencement of the site assembly.

5.1.7

During unscheduled work hours, each employee on site shall report to his/her assigned assembly area. If a Supervisor is present, the supervisor will call directly to the Security Shift Supervisor and report accountability within 15 minutes. If no Supervisor is present, the senior employee (or lone employee) will call the Security Shift Supervisor directly and report accountability. If working in an RCZ in protective clothing, proceed to the appropriate Change Room. Report to the individual in charge of the change room. If no one is in charge of the change room, call the Security Shift Supervisor directly and report accountability.

5.2 Site Evacuation Instructions

Initial Notification:

5.2.1

Site evacuation will be activated only after a site assembly. When it has been deemed necessary to evacuate the site, an announcement will be made on the PA system and a Lotus Note sent to group evacuation coordinators giving instructions for an evacuation.

5.2.2

The Engineering Evacuation Coordinator monitors LOTUS Notes during an emergency, passes evacuation information on to Engineering group administrative assistants, and gets acknowledgement back that the information has been received.

The Evacuation Coordinator also lets Engineering Managers know that they need to provide 24 hour coverage for their areas during the emergency, gets that information from the managers, and relays it to the TSC Engineering manager in the TSC.

5.2.3

The Engineering Section Manager/Supervisors will determine which, if any, essential personnel should not evacuate. This will be based on the needs communicated from the TSC or OSC.

5.2.4

The Engineering Section Managers/Supervisors, based on needs communicated from the TSC or OSC, will establish shift lead persons and a continuous 24 hour staffing schedule, and communicate this schedule to all personnel in their section/team.

5.2.5

The Engineering Section Managers/Supervisors will give evacuation instructions to all personnel in their sections/teams and implement the evacuation plan.

Accountability Notification:

5.2.6

The Engineering Section Managers/Supervisors will report to their respective Engineering Group Manager or designee if transportation assistance is needed. They will report which personnel, if any, have been deemed essential and their location along with their shift lead persons and continuous 24 hour staffing schedule to the Engineering Evacuation Coordinator and their respective Group Manager.

5.2.7

The Engineering Sections Managers/Supervisors or designee will report the status of their sections/teams to the Group Evacuation Coordinator.

NOTE: Subsequent Evacuations will be coordinated from the designated relocation area(s) per NSD 114.

6.0 Technical Support Center

6.1

The Technical Support Center (TSC) is located on the Unit 2 side of the Units 1&2 control room. When reporting to the TSC, pick up ED and TLD, go to the Unit 1 or 2 Control Room Lobby, and frisk for possible contamination before entering the Control Room.

EMERGENCY RESPONSE SRWP NUMBER: 33 (For drills and emergency response)

If evacuation from the TSC becomes necessary, report to the alternate TSC on the third floor, room 316, of the Oconee Office Building. Assume the same duties as in the Primary TSC.

6.2 Technical Assistant to Emergency Coordinator

6.2.1

The Technical Assistant to Emergency Coordinator will report to the Emergency Coordinator. This position is staffed by the Mechanical and Civil Engineering Section (MCE). This position should be staffed within 75 minutes of the emergency declaration.

6.2.2

The Technical Assistant to Emergency Coordinator's main duty will be to maintain a log of activities in the TSC. This log will include systems and components status, decisions, and announcements made in the TSC. The Technical Assistant to Emergency Coordinator will also perform any other duties assigned by the Emergency Coordinator.

6.3 TSC/OSC Liaison

6.3.1

The TSC/OSC Liaison will report to the Emergency Coordinator. This position is staffed by Engineering within 75 minutes.

6.3.2

The TSC/OSC Liaison is responsible for communicating task priority and status information between the TSC and OSC.

6.4 Technical Assistant to TSC/OSC Liaison:

6.4.1

The Technical Assistant to TSC/OSC Liaison will report to the TSC/OSC Liaison. This position is staffed by Modification Engineering. Individuals staffing this position will be contacted by the Community Alert Network (CAN) system.

6.4.2

The Technical Assistant to TSC/OSC Liaison will maintain the Plant status board in the TSC. The Technical Assistant to TSC/OSC Liaison will perform any other duties as assigned by the TSC/OSC Liaison.

6.5 Nuclear Engineer

6.5.1

Reactor Systems Engineering will provide personnel for this position. This position is required by regulation with the person being available in the TSC within 75 minutes of the emergency declaration. This person is required to be in place prior to Control Room turnover to the TSC. The Nuclear Engineer will report to the TSC Engineering Manager in the TSC.

6.5.2

A second person from Reactor Systems Engineering will be called by the Community Alert Network System.

6.5.3

The Nuclear Engineer(s) will provide engineering support and recommendations in the following areas:

1. Reactor core physics
2. Shutdown margin calculations
3. Transient assessment functions via the transient monitors
4. Safety review function
5. Core damage assessment.

6.6 TSC Engineering Manager:

6.6.1

The TSC Engineering Manager should report to the TSC within 75 Minutes of emergency declaration and report to the Emergency Coordinator. The MCE Section is responsible for assuring this position is filled.

6.6.2

The TSC Engineering Manager will be responsible for providing engineering support required by the TSC. He/she will be responsible for resolving engineering problems. Also he/she will assure that any needed mechanical or electrical systems engineering personnel are contacted and given instruction on the necessary actions to be taken.

6.6.3

The TSC Engineering Manager will be responsible for making contact with the Accident Assessment Team in the Corporate Office to provide additional assessment expertise to the Technical Support Center.

6.7 Offsite Dose Assessment

6.7.1

The TSC Dose Assessment Liaison will report to the Emergency Coordinator in the TSC. He/she will be responsible for providing offsite Dose Assessment as needed and is to **report within 45 minutes of the emergency classification.**

6.7.2

The Offsite Dose Assessors report to the TSC Dose Assessment Liaison within 75 minutes of the emergency classification and provide dose assessment as needed.

6.8 Engineering Manager Assistant

6.8.1

This individual should report to the TSC within 75 minutes of emergency declaration and report to the TSC Engineering Manager.

6.8.2

The Engineering Manager Assistant will be responsible for providing Primary and BOP systems support required by the TSC and will report to the TSC Engineering Manager.

7.0 Operational Support Center

7.1

The Operational Support Center (OSC) is located at the back of the Unit 3 Control Room. When reporting to the OSC, carry ED and TLD, go to the Unit 3 Control Room Elevator Lobby, and frisk for possible contamination before entering the Control Room.

EMERGENCY RESPONSE SRWP NUMBER: 33 (For drills and emergencies)

7.2

If evacuation from the OSC becomes necessary, report to the alternate OSC located on the third floor, room 316A, of the Oconee Office Building. Assume the same duties as in the Primary OSC.

7.3 Equipment Engineering Support for OSC

7.3.1

The RES Engineering Support duty person is required to report to the OSC within 75 minutes of emergency declaration. This position will report to the OSC Manager.

7.3.2

RES Engineering Support will be responsible for providing Electrical Engineering support for any work performed by the OSC. Should any Mechanical/Civil Engineering needs arise from the OSC, this person will inform the appropriate party.

8.0 Emergency Operations Facility:

8.1

The Emergency Operations Facility (EOF) is located in Clemson on Isaqueena Trail next to Duke's Southern Operation Center. TLDs and EDs are not required for this facility.

8.2 Offsite Dose Assessment

8.2.1

The Offsite Dose Assessment persons will report to the Radiological Assessment Manager in the EOF. They will be responsible for providing Offsite Dose Assessment as needed.

8.3 Technical Briefers:

8.3.1

The Technical Briefers will be notified as needed by the Joint Information Center (located at the EOF). They will report to the Technical Briefers Section Head in the Joint Information Center.

8.3.2

The Technical Briefers will be responsible for reading news releases or predeveloped messages for technical accuracy and responding to calls by following the rumor control procedure.

8.3.3

The Technical Briefers will keep the Technical Briefer Section Head informed of calls being received and assist in coordinating activities as needed.

8.3.4

The Technical Briefer position is filled by persons from across the organization who possess the skills needed.

9.0 Enclosures

9.1 Oconee Technical Support Center Guideline

Enclosure 9.1 - Oconee Technical Support Center Guideline

Rev. 0

Gregg Swindlehurst	8/6/01
TSCG Section A	Date
Stephen Parrish	8/6/01
TSCG Section B	Date
Ron Harris	8/9/01
TSCG Section C	Date
Stephen Parrish	8/6/01
TSCG Section D	Date
Gregg Swindlehurst	8/6/01
TSCG Section E	Date
Ken Grayson	8/8/01
TSCG Section F	Date
Ron Harris	8/9/01
TSCG Section G	Date
Stephen Parrish	8/6/01
TSCG Section H	Date
Stephen Parrish	8/6/01
TSCG Section I	Date
Camilo Abellana	8/9/01
TSCG Section J	Date
Jeff Rowell	8/9/01
TSCG Section K	Date
Ed Burchfield	8/9/01
TSCG Section L	Date
Vance Bowman	3/1/02
TSCG Section M	Date

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1.0 INTRODUCTION

The purpose of the Technical Support Center Guideline (TSCG) is to present accident mitigation guidance and facilitate ad hoc accident evaluation and decision making. The guidance contained herein provides the TSC with pertinent background information and candidate actions. Alternate methods not discussed herein may be used at the discretion of the TSC.

2.0 DIAGNOSIS AND MITIGATION

The TSCG consists of individual sections linked to specific TSC requested actions. Each requested action is linked to specific EOPs and/or AOPs. The sections are:

- A. Starting or bumping a RCP following loss of SCM
- B. Steaming a steam generator with water in the steam line
- C. Refill the EWST
- D. Evaluate outside air booster fan operation
- E. Natural circulation cooldown considerations
- F. Makeup and monitoring of the SFP
- G. Makeup and monitoring of CCW intake pipe inventory
- H. Conserve BWST inventory
- I. CFT core cooling following loss of decay heat removal
- J. Mitigate LPI pump interaction and LPI pump restart
- K. Energize the ASW switchgear from an operating Oconee unit
- L. Limitations on aligning HPI suction from the SFP
- M. Ensure total LPSW recirculation flow is ≤ 9000 GPM during CCW dam failure

Each section contains the following subsections:

1.0 SAFETY CONCERN

A brief statement highlighting the requested action or safety issue requiring TSC consideration.

2.0 PROCEDURE ENTRY CONDITIONS

This section lists the plant conditions, consistent with the procedure entry conditions, that are considered in development of the guidance. These bulleted items highlight these applicable plant conditions and/or initiating events.

3.0 REQUESTED ACTION

3.1 Requested Action Summary

This section summarizes the requested actions and their purpose.

3.2 Background

This section provides technical background and information pertaining to plant conditions and the requested actions. Information considered common knowledge is typically not included, unless necessary to characterize or support potential actions.

3.3 Implementation

This section details the requested actions. It contains information such as applicable procedures, system and component details and requirements, observations and system expert opinion.

3.4 Expected Plant Response

This section summarizes plant response to implementation of the requested action.

A. STARTING OR BUMPING A RCP FOLLOWING LOSS OF SCM

1.0 SAFETY CONCERN

Bumping or restarting a RCP may result in transferring unborated or underborated primary coolant to the core that may result in a critical condition.

2.0 PROCEDURE ENTRY CONDITIONS

EOP guidance exists to bump/restart a RCP given the following plant conditions:

- Evidence of a loss of coolant and/or SG tube leak.
- Loss of heat transfer.
- Loss of or degraded natural circulation cooling.
- HPI cooling.
- Following recovery of subcooled margin (SCM)
- Evidence of hot leg voiding
- Evidence of boiler-condenser mode (BCM) cooling
- No RCPs on or large void in loop opposite with one RCP on

The above conditions were considered in preparation of the following guidance.

3.0 Requested Action

3.1 Requested Action Summary

Bump or restart a RCP in an idle loop.

The purpose of restarting or bumping a RCP in an idle loop is to promote primary-to-secondary heat transfer by either establishing forced circulation cooling or assisting natural circulation cooling.

3.2 Background

Restarting or bumping a RCP following loss of SCM risks introducing excessive positive reactivity by pumping unborated or underborated coolant to the core. An RCP bump consists of a pump restart of sufficient duration to allow pump motor amps to stabilize (approximately 10 seconds) followed by an immediate trip of the pump.

For a range of SBLOCA break sizes that exceed the capacity of the HPI system, yet require steam generator heat transfer to cooldown and depressurize, the RCS may experience BCM cooling. With the RCS in a saturated condition, core decay heat causes boiling to occur and steam to be transferred to the hot legs. BCM mode develops when the steam void that initially forms in the top of the hot leg expands down into the steam generator tubes where it is condensed. The primary coolant is condensed by EFW or MFW delivered through the auxiliary header when the steam void expands below the elevation of the auxiliary header nozzles. This is referred to as EFW-BCM. When the steam void expands below the secondary pool level in the steam generator, primary coolant will condense due to pool-BCM. Both EFW-BCM and pool-BCM are effective forms of heat transfer, and are either cyclic or stable in nature.

However, both forms of BCM can cause underborated water to accumulate in the steam generator tubes, lower steam generator head and cold leg up to the RCP spill-over. This occurs because only a small percentage of the boron is transported with the steam that is condensed during BCM cooling. The volume

of this underborated RCS condensate would be swept into the core upon bumping a RCP. The consequences of a RCP restart could introduce greater than \$5 of reactivity and be as severe as a rapid power excursion with the potential for significant fuel damage and RCS pressure boundary damage.

The most likely indication of boron maldistribution is inconsistent boron sample results. However, the capability to quantify the size of a region of unborated or underborated water is limited. If BCM has occurred the volume of condensed RCS coolant consisting of unborated or underborated water should be assumed large.

The potential for a rapid boron dilution event decreases as the RCS boron concentration decreases with cycle burnup. Towards the end-of-cycle when the boron concentration is lower, RCS conditions exist which permit safely bumping or restarting a RCP in a formerly idle loop assumed to have undergone some boiler condenser heat transfer.

If hot leg level remains above the elevation of the auxiliary header, it can be concluded BCM cooling has not occurred. In other words, primary coolant level greater than the auxiliary header elevation precludes significant accumulation of unborated or underborated primary coolant. Likewise, if no feedwater has been supplied to a steam generator it can be concluded that BCM has not occurred.

Insufficient boron mixing in the RCS can also exist for the following conditions. With a single RCP in operation and a large void indicated in the opposite loop, no mixing in the idle loop should be assumed. The void may prevent reverse flow, and an underborated region may therefore exist in the idle loop. An RCP bump or restart must not be attempted in this plant configuration without careful consideration of the potential for a reactivity insertion event.

3.3 Implementation

Three sets of guidance are provided. The first considers a loss of SCM and a void in the hot leg, but is subject to one of the following conditions: 1) the void is not large enough to result in unborated/underborated primary condensate or 2) the void extends into the tube region, but the SG has not been fed. The second set of guidance considers adequate mixing of the primary coolant during natural circulation to allow for a pump bump or restart. Lastly, guidance is provided for time in core life where boron concentration is less due to burnup. For certain conditions RCP restart can be performed since a significant boron dilution event cannot occur. A combination of RCP cold leg temperature or SG pressure, pre-accident boron concentration, and elapsed time are used to determine when bumping or restarting a RCP is recommended.

No Boiler Condenser Mode Confirmed

- A RCP may be bumped or restarted if one of the following is true:
 - a. Hot leg level remained > 389 inches (value includes allowances for instrument uncertainty)

The primary coolant level has remained at an elevation greater than the EFW upper header. This value reflects an elevation at the secondary face of the upper tube sheet.

It can be concluded that a significant volume of unborated/underborated condensate has not accumulated in the tubes if the hot leg void has not penetrated the SG tube region.
 - b. If during HPI forced cooling neither SG has been fed while the RCPs were off and adequate core exit subcooling has been restored, a RCP may be restarted. Without feedwater being delivered BCM cannot occur and there is no concern.

Adequate Natural Circulation Mixing Confirmed

- A RCP may be restarted if all of the following conditions are satisfied:

1. Subcooled natural circulation has existed in both loops for > 2 hours, and,
2. There is no indication of increasing reactivity during natural circulation on available nuclear instrumentation.

If the above conditions are satisfied adequate boron mixing in each loop exists and a region of unborated or underborated primary coolant does not exist.

Criteria for RCP Bump/Restart Due to Low Initial Boron Concentration

One of two figures may be used to determine if bumping or restarting a RCP is advisable following BCM cooling. The first figure is a function of RCS cold leg temperature and elapsed time. The second figure is a function of SG pressure and elapsed time since reactor trip. If cold leg temperature indication is available in the loop with a pump to be bumped/restarted Figure 1 should be used. If cold leg temperature indication is unavailable, but SG pressure indication is available then Figure 2 should be used. The following criteria must be satisfied prior to using either Figure.

- Verify all control rods are fully inserted
- Verify reactor power was $\geq 70\%$ prior to reactor trip
- Verify time since reactor trip is within analyzed limits (< 48 h)

Figure 1 uses RCS cold leg temperature as a function of elapsed time since reactor trip for various RCS boron concentration pre-conditions. Figure 2 uses SG pressure as a function of elapsed time since reactor trip for various RCS boron concentration pre-conditions. The figures are generated assuming the following:

- All control rods are fully inserted
- Assumes 70% full power equilibrium xenon.
- Includes 50 ppmB concentration measurement uncertainty in initial RCS concentration (prior to accident)
- In Figure 1, a 9 °F uncertainty allowance for RCS temperature indication. In Figure 2, a 110 psi uncertainty allowance for SG pressure indication.

To use either Figure 1 or Figure 2, determine:

1. For Figure 1 determine the lowest indicated cold leg temperature.
For Figure 2, determine the lowest indicated SG pressure during the accident.
2. The pre-accident RCS boron concentration, and
3. the elapsed time since reactor trip.
4. Given the above considerations, if the lowest indicated RCS cold leg temperature or SG pressure is greater than the line corresponding to the pre-accident RCS boron concentration, a RCP may be bumped or restarted per the EOP.

If any of the above conditions are not met, evaluation by site and G.O. nuclear engineering can be requested.

3.4 Expected Plant Response

Plant response to bumping or restarting a RCP will depend upon the plant conditions prior to a bump/restart. When a RCP is bumped or restarted with a hot leg void, expect the void to collapse as it is quenched in the SG. If the RCP is bumped, RCS pressure will decrease rapidly as a result. One RCP at a

time should be bumped for a period of time sufficient to allow the pump motor amps to stabilize (approximately 10 seconds). If plant conditions do not indicate the presence of natural circulation cooling following the pump bump, the other RCPs may each be bumped one time. If bumping the RCPs does not start natural circulation cooling, then refer to: E. Natural Circulation Cooldown Considerations.

If the RCP is restarted, RCS pressure will decrease. A loss of SCM may occur with the initial decrease in system pressure and require the RCP to be tripped shortly after it is restarted. If adequate SCM remains, plant response should then be consistent with forced circulation cooling. However, if a large void exists in the loop opposite the operating RCP, forced circulation cooling may be prevented.

Figure 1: RCP Bump/Restart Criteria

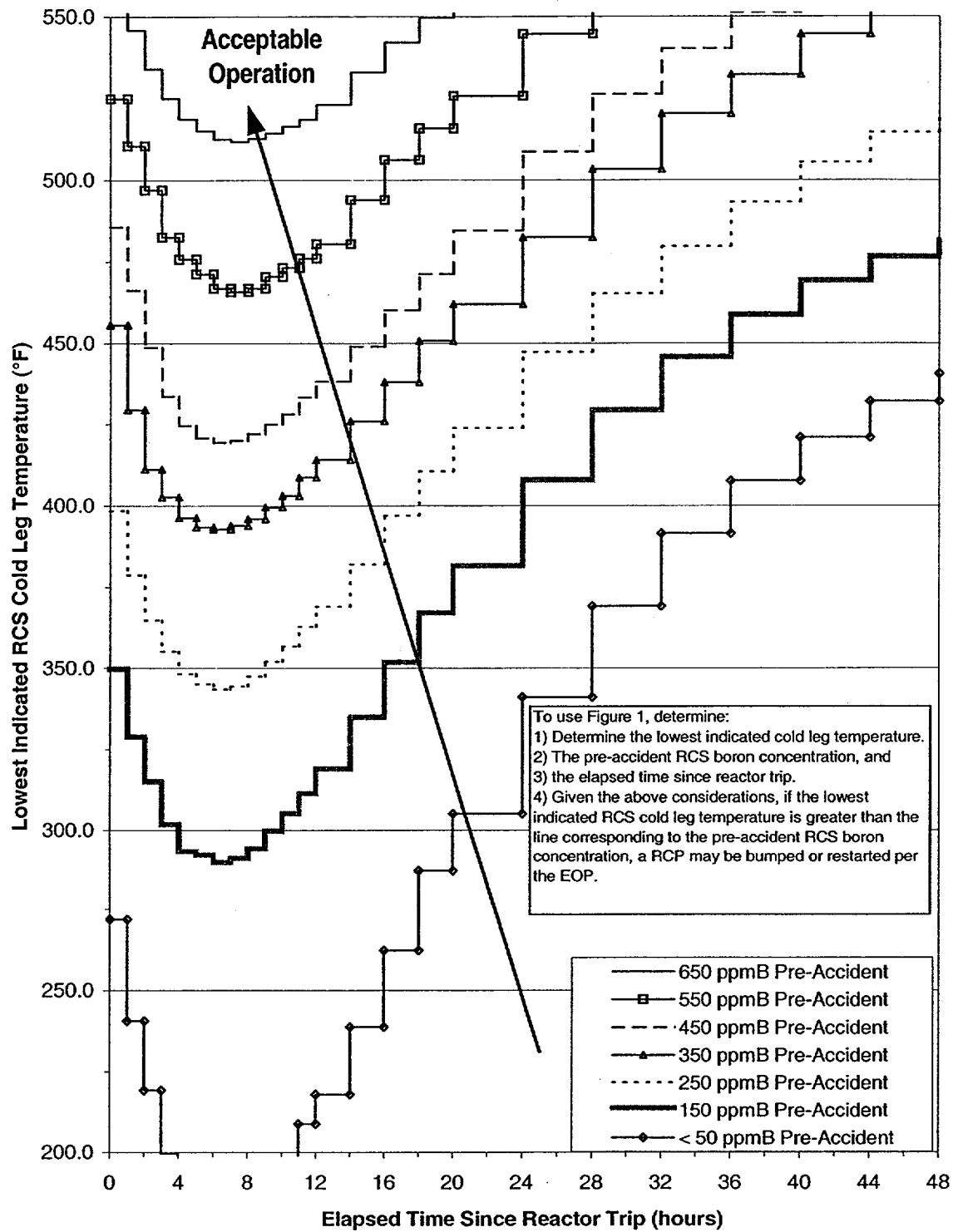
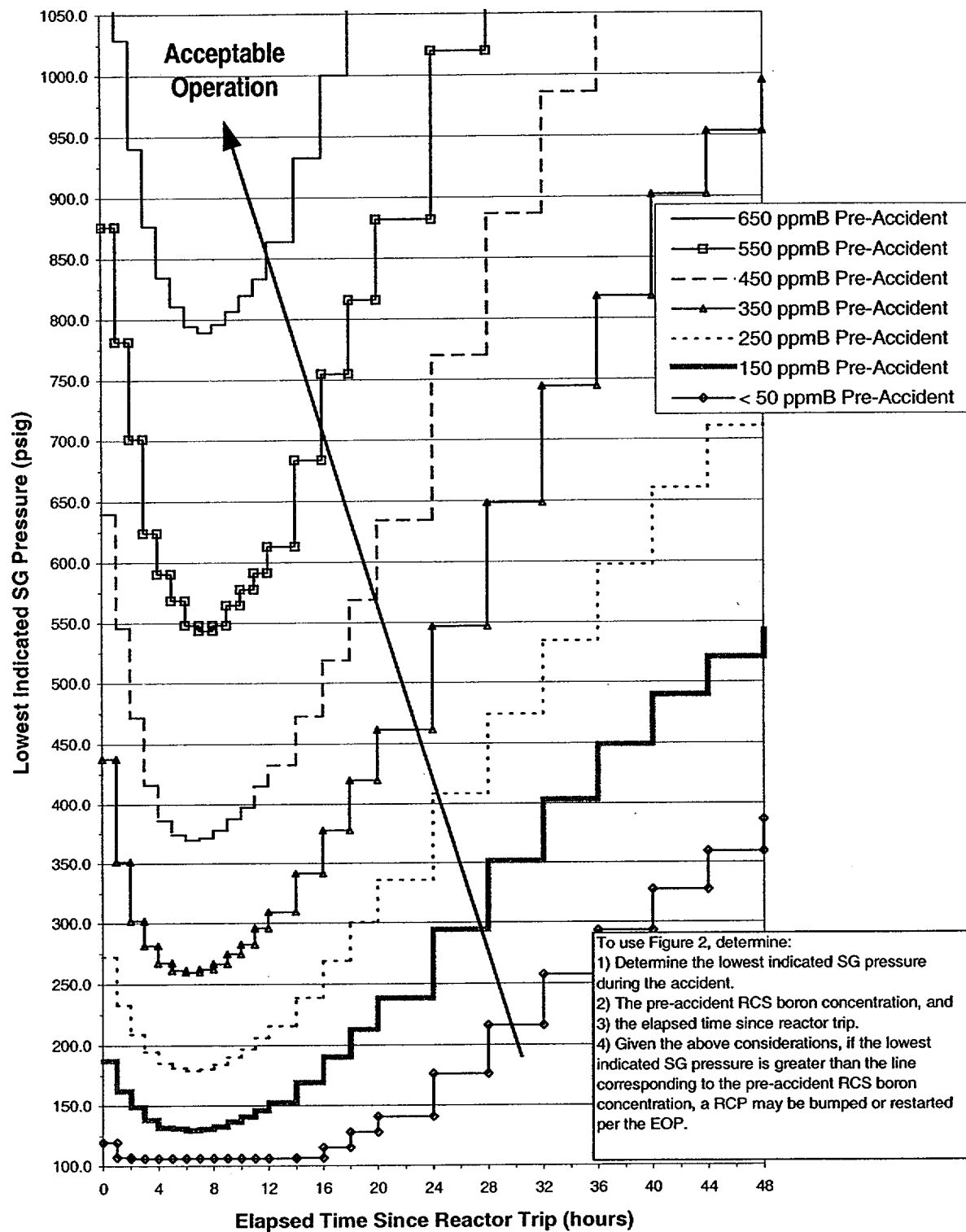


Figure 2: RCP Bump/Restart Criteria



B. STEAMING A STEAM GENERATOR WITH WATER IN THE STEAM LINE

1.0 SAFETY CONCERN

Potential loss of secondary pressure control due to waterhammer causing steam line rupture and/or loss of turbine-driven pump steam supply.

2.0 PROCEDURE ENTRY CONDITIONS

The following conditions are considered in preparation of the following guidance.

- Evidence of a SG tube leak.
- SG level of 96 %OR or greater.
- Inadequate core cooling.
- HPI cooling cooldown.

3.0 REQUESTED ACTION

3.1 Requested action Summary

- Steam a SG with indication of water in the steam line.

3.2 Background

Opening a valve to reduce secondary pressure and cooldown the primary system with water in the steam line risks: 1) waterhammer, 2) losing steam supply to pump turbines, and/or 3) transferring water to pump turbines. A waterhammer event could ultimately result in loss of secondary pressure control due to pipe break or failure of a valve to reseal.

At SG levels of 96 %OR and greater it is possible that water has leaked-by the outlet annulus via a SG level instrument tap near the top of the baffle. The water will pool in the outlet annulus until it spills into the steam line. The steam line exits the steam generator horizontally for ~10 feet before turning and increasing in elevation 10 feet or greater. The water level in this section of the pipe will be approximately the same as in the steam generator. When steam generator level drops below the upper tap location, water will begin to drain back into the steam generator. Consideration should be given to some water remaining in the steam line immediately exiting the SG despite a reduction in SG level.

Expect condensation to occur over the length of the steam lines under low flow or stagnant conditions. The steam lines are horizontal or downward sloping the entire length of the run to the turbine after the initial rise in elevation at the steam generator exit. Therefore, the condensate will not accumulate in a "water catch" piping arrangement other than at the SG exit.

With water leaking by the instrument tap, the water will pool in the length of pipe exiting the SG. The level in this pipe will be approximately the same as the level indicated in the SG. With a level established in the pipe, high steam velocity is then necessary to form a plug of water. High steam velocity is also required to entrain liquid in a partially liquid filled pipe. A controlled cooldown using the ADVs or the Turbine Bypass System does not typically generate steam velocities large enough to entrain liquid or form a plug in a steam line with a residual level of water (in cases where indicated SG level has decreased below 96 %OR). The velocity necessary to do so depends upon the liquid level in the steam line as well, but once the line has been drained steaming the SG is allowable as very high steam velocities are required with lower levels.

If there is indication of SG levels approaching 120 inches above the instrument tap elevation, then water has spilled into the steam line above the exit. Full range indication is uncompensated and unreliable in

this condition of operation. However when full range SG level indicates an increasing trend in SG level, well above the instrument tap elevation (500 inches or greater), it can be assumed water has spilled into the length of pipe rising above the exit (approximately 10 feet). The SG should not be steamed at all in this instance, even if the OR level decreases below 96 %OR.

If neither steam line is available, HPI cooling should be used to cool down the unit.

3.3 Implementation

If SG level is greater than 96% OR (or equivalent temperature compensated XSUR level) do not steam the SG.

If full range indication does not indicate SG levels continued to increase above the instrument tap level to a level greater than 450 inches (69 %FR), and SG level has reduced to a level less than 96 %OR, the SG may then be steamed.

Otherwise, HPI cooling should be used to cooldown the unit if water is suspected in both steam lines.

3.4 Expected Plant Response

Secondary pressure control should not be lost if the guidance is followed during RCS cooldown. Controlling to the prescribed cooldown rate precludes liquid entrainment and/or plug formation in the steam line piping exiting the SG.

C. REFILL THE EWST

1.0 SAFETY CONCERN

Loss of HPSW resulting in loss of backup cooling water to HPI pump motor coolers, cooling water to the TDEFW pump, and/or loss of fire suppression capability.

2.0 PROCEDURE ENTRY CONDITIONS

The following conditions are considered in preparation of the following guidance.

- Loss of offsite power.
- Station blackout.
- Turbine Building flooding.
- Loss of LPSW
- EWST level low.

3.0 REQUESTED ACTION

3.1 Requested Action Summary

- Provide power to a HPSW pump.
- Refill EWST using offsite fire department engine.
- Use Keowee Hydro Station portable backup jockey pump on the discharge structure.

3.2 Background:

The EWST provides the following functions:

- The EWST is capable of delivering the demands of each fire suppression system individually. This constitutes a significant demand on the EWST, which cannot be sustained for very long.
- During loss of all AC power (station blackout), HPSW could provide cooling water to the turbine driven EFW pump.
- During loss of normal LPSW supply due to a Turbine Building flood: HPSW provide cooling water to the HPI pump motor coolers.
- Upon CCW pump restart after loss of LPSW, HPSW is needed to supply water via SSW piping to the CCW pumps for bearing lubrication and motor cooling.

Replenishing the EWST is a risk-significant operation. Failure to replenish the EWST increases the core damage frequency by a factor of three. Approximately 9% of the total core damage frequency involve failure of this action.

3.3 Implementation

Refill the EWST through a method delineated in:

AP/1/A/1700/010, Enclosure 6.1

Two methods are presented in the Enclosure. Options 1 and 2 will deliver a maximum flow of 1500 gpm. Consider the following when choosing a method:

Option 1: Use offsite fire department engine on the intake structure.

- Location on the intake near 2C CCW pump available for fire department engine.
- Fire department has length of hard pipe suction hose to reach 4 to 6 feet below water surface.
- Fire hydrant HY-26 available. (OFD-124C-1.4)

Option 2: Use offsite fire department engine on the discharge structure.

- Location on the CCW discharge available for fire department engine.
- Fire department has length of hard pipe suction hose to reach 4 to 6 feet below water surface.
- Fire hydrant HY-7 available. (OFD-124C-1.5)

3.4 Expected Plant Response

Employing a method detailed in procedure AP/**1**/A/1700/010 should result in maintaining or increasing EWST level.

D. EVALUATE OUTSIDE AIR BOOSTER FAN OPERATION

1.0 SAFETY CONCERN

Control Room habitability.

2.0 PROCEDURE ENTRY CONDITIONS

The following conditions are considered in preparation of the following guidance.

- 1/2/3RIA-39 CNTRL RM Gas Alarm actuated
- Outside air booster fans are operating

3.0 REQUESTED ACTION

3.1 Requested Action Summary

- Terminate outside air booster fan operation
- Continue outside air booster fan operation

3.2 Background:

The outside air booster fans are operated when a control room air handling unit return air radiation monitor (1/3RIA-39 (CNTRL RM Gas)) alarms. The outside air booster fans provide filtered air to positively pressurize the control room.

The outside air booster fans should not be disabled prior to terminating the radiation release. The in-line filters should remain operable for greater than 20 days. Therefore if radiation protection or available radiation monitoring indicates the event has not been terminated it is prudent to maintain the outside air booster fans operable.

The location of the source term is important to the decision. If release is a result of component or penetration failure in the Auxiliary Building, continued operation of the outside air booster fans is prudent. Bypassing the Auxiliary Building via the emergency or equipment hatches could result in a release effecting the booster fan suction source. If RIA-39 counts do not stabilize or reduce with booster fan operation, consideration should be given to isolating the outside air booster fans.

In addition, chlorine release or smoke near the fan suction could prompt isolating the fans depending on the magnitude of the source term.

3.3 Implementation

Determine location of source. If source is such that operation of the outside air booster fans result in continued and increasing 1/2/3RIA-39 CNTRL RM gas alarm counts, it may be prudent to terminate operation of the fans.

Consider extenuating circumstances which may effect Control Room habitability, such as fire or noxious gas, to evaluate continued operation of the outside air booster fans.

3.4 Expected Plant Response

Operation of the control room air booster fans should result in reducing counts on or stopping the 1/2/3RIA-30 CNTRL RM gas alarm.

E. NATURAL CIRCULATION COOLDOWN CONSIDERATIONS

1.0 SAFETY CONCERN

Loss of or degraded natural circulation.

2.0 PROCEDURE ENTRY CONDITIONS

The following conditions are considered in preparation of the following guidance.

- Loss of CCW intake canal.
- Fire.
- Loss of any fire zone due to (10 CFR 50 Appendix R) fire.
- Station blackout.
- Loss of all equipment (except cabling) in non-vital areas due to sabotage.
- Loss of equipment in the Turbine and Auxiliary Buildings due to a flood resulting from CCW System ruptures.
- Loss of equipment in the Turbine and Auxiliary Buildings due to a tornado missile event.
- Indication of loose parts alarms or sustained large magnitude noise in the RCS.
- Loss of subcooling margin.

3.0 REQUESTED ACTION

3.1 Requested Action Summary

- Evaluate natural circulation cooldown conditions.

3.2 Background:

The following summarizes various natural circulation cooldown scenarios and provides plant conditions and expected response to operator intervention. The guidance considers thermally coupled primary and secondary systems as a function of RCS SCM, loop asymmetry during natural circulation, phenomena which will interrupt natural circulation, and what is necessary to enhance or restart natural circulation.

Primary/Secondary Coupled – RCS is Subcooled

Subcooled natural circulation is indicated by:

1. T_{cold} coupled to the saturation temperature at the SG pressure,
2. Incore T/C temperature indication should track T_{hot} within approximately 10 °F, and
3. T_{hot} and T_{cold} temperature difference should be between 30 to 50 °F.
4. SG level at 50 %OR, 240 in XSUR.

The ΔT between T_{hot} and T_{cold} is expected to be 50 °F or less. The magnitude of the flow rate will decrease as the ΔT decreases and as core decay heat decreases.

Primary/Secondary Coupled – RCS is Saturated

Saturated natural circulation is indicated by:

1. T_{cold} coupled to the saturation temperature at the SG pressure.
2. Loss of SCM SG level

With the RCS saturated, incore T/C temperature will track T_{hot} whether natural circulation flow exists or not. The ΔT between T_{hot} and T_{cold} will vary between 50 °F and 0 °F, depending upon how much of the core heat is transferred to the primary coolant as latent heat of vaporization. The magnitude of the flow rate will decrease as the ΔT decreases as core decay heat decreases.

Primary/Secondary Coupled – One SG Operable, Subcooled or Saturated

If only one SG is operating during natural circulation only T_{hot} in the operating loop will indicate core outlet temperature. T_{cold} on the operating SG will be approximately equal to T_{sat} in the operating SG. T_{cold} in the isolated SG may not be equal to T_{sat} in the isolated SG. It will probably be colder due to ambient losses and due to cooler injection water (seal injection, MU, HPI). ΔT on the operating SG may be 10 °F higher than the 50 °F expected with two operating SGs. The loop with the idle SG may prevent primary depressurization.

Interruption of Natural Circulation

Natural circulation can be challenged and lost by three causes. Inadequate steam generator level and/or loss of steam generator steaming capability (including overfilling the SG) will result in degraded or loss of natural circulation. Hot leg voids collecting in the top of the hot leg will degrade or stop natural circulation. Generally, the benefits of maintaining or restoring primary-to-secondary heat transfer warrants operator action to do so.

Two sets of symptoms indicate whether natural circulation will be interrupted due to hot leg void formation. The first set are identified by a diagnosis of plant conditions that could result in void formation:

- Loss of RCS inventory
- Loss of subcooled margin that might result in water flashing to steam
- Contraction of the RCS inventory due to an overcooling event
- Cooldown and depressurization with an idle loop
- An outsurge of hot water from the pressurizer
- Accumulation of noncondensable gases following ICC or from any other source

The second set of symptoms include indications that heat transfer has been interrupted:

- Hot leg level < 537 inches (void large enough to interrupt natural circulation)
- RCS temperatures increasing, with CETC temperature diverging from hot leg RTDs
- Pressurizer level increasing due to void growth or thermal expansion (primarily if subcooled)
- Steam generator pressure decreasing due to injection of feedwater
- RCS temperature and pressure increasing along the saturation curve (if subcooling lost)

The first set of symptoms will likely lead to the second, with natural circulation being lost due to a hot leg void forming. As the void in the hot leg continues to expand into the steam generator tube region, boiler-condenser mode heat transfer will occur. Natural circulation can be regained after it has been lost, and the cooldown could be expected to occur in a cyclic manner.

Enhancing/Stimulating Natural Circulation

- Increase ΔT between primary and secondary
- Open hot leg high point vents if a void is indicated

- Bump or restart a RCP

Increasing the temperature difference between the primary and secondary increases the density differences between the hot legs and the SGs. This is accomplished by raising SG levels and/or steaming the SGs.

The optimum cooldown method includes balanced steaming of both steam generators in order to maintain a symmetric coolant temperature distribution.

Natural circulation will become intermittent and then will be lost as a hot leg void increases. The void can be vented to mitigate the cause and duration of the loss of natural circulation. This is effective in scenarios where a primary system break cannot provide sufficient cooling. The operator is instructed to open a high point vent if subcooled margin is lost and RCS pressure is increasing due to RCS heatup. If RCS pressurization persists, the pressurizer PORV is also opened to assist in removing decay energy and increasing HPI flow by decreasing RCS pressure.

If a hot leg void exists and SCM has not been lost, then once-through cooling is adequately removing decay heat and the primary may be thermally decoupled from the secondary. In this case, venting a hot leg void is not necessary. However, the void may be vented to restore natural circulation.

Bumping or restarting a RCP may also be utilized to mitigate voiding in the RCS. A RCP bump consists of a pump restart of sufficient duration to allow pump motor amps to stabilize (approximately 10 seconds) followed by an immediate trip of the pump. Bumping or restarting a RCP sweeps the void into the steam generator tubes where it condenses. RCS pressure decreases as the void is condensed and more of the RCS is exposed to the steam generator. Refer to TSCG Section A.

3.3 Implementation

Enhancing Natural Circulation

Evaluate the following actions that enhance natural circulation.

- SG levels may be raised up to 96 %OR.
- Steam SGs to increase ΔT between the primary and secondary.
- Maintain makeup to the RCS for losses and shrink (preserve loop thermal communication).

Restarting Natural Circulation

Evaluate the following actions, which may aid in restarting natural circulation:

- Maintain makeup to the RCS for losses and shrink (preserve loop thermal communication by minimizing hot leg void growth). This is necessary to restart natural circulation if the plant is in intermittent natural circulation or BCM cooling.
- Open hot leg high point vents to aid thermal connection between the hot legs and the steam generators if a hot leg void indicated.
- Bump or restart a RCP (refer to TSCG Section A).

3.4 Expected Plant Response

The plant will generally respond in a sluggish manner to operator intervention when in natural circulation cooling. However, if the plant is in BCM cooling, the plant can respond quickly to operator intervention.

When natural circulation exists, it can be enhanced by increasing the thermal center (raising SG level) or increasing ΔT between the primary and secondary (steaming the SG). Consideration should be given to raising SG levels above target setpoints but less than 96 %OR.

When natural circulation is degraded or intermittent, verify SG level and ensure steaming capacity is available. Makeup should be increased to enhance thermal coupling between the primary and the secondary. Intermittent natural circulation may exist initially or may follow natural circulation. It precedes BCM cooling if makeup is insufficient to match system losses and shrink.

If natural circulation has ceased, verify adequate RCS makeup and try to vent the RCS hot leg void. The plant may be in BCM cooling if the SGs remain operable and the primary and secondary systems are coupled. BCM cooling is an excellent mode of heat transfer, however a large region of underborated/unborated primary fluid may accumulate. As makeup matches break flow and system shrink (or the hot leg void is vented) the system will transition back to natural circulation though intermittent natural circulation.

F. MAKEUP AND MONITORING OF THE SFP

1.0 SAFETY CONCERN

Maintain and/or recover SFP inventory and boron concentration.

2.0 PROCEDURE ENTRY CONDITIONS

The following conditions are considered in preparation of the following guidance.

- Loss of spent fuel pool cooling.
- Tornado accident.
- SSF RC makeup required.

3.0 REQUESTED ACTION

3.1 Requested Action Summary

Makeup and/or monitoring the spent fuel pools

3.2 Background:

Maintaining SFP level is important for radiological, fuel integrity, reactivity management, and accident mitigation reasons. The SFP is designed for boiling heat transfer, however makeup for boil-off needs to be assured for radiological and fuel integrity concerns. In addition, makeup to the SFP may be required to make up for SSF demands. Makeup may be from a borated or unborated/underborated source. This will affect reactivity management and accident mitigation when the SFP is used as a source for SSF demands.

Monitors 1RIA-6 (Spent Fuel Pool) and 1RIA-41 (Spent Fuel Pool Bldg Gas Mon) should be monitored for an increase in radiation level inside the Units 1 and 2 SFP area. Monitor 3RIA-6 (Spent Fuel Pool) and 3RIA-41 (Spent Fuel Bldg Gas Mon) for an increase in radiation level inside the Unit 3 SFP area.

SFP heat load and SSF demands determine the urgency of monitoring and necessity for makeup. For example, following an outage, and at an initial 150 °F, the spent fuel pool time to boil is approximately 20 hours after loss of SFP cooling. If the SFP is verified intact (e.g. following a tornado or seismic event) sufficient time exists to provide makeup to the spent fuel pool.

Normal makeup is available from the BHUT, CBAST, BAMT and DW. Emergency makeup is available using offsite fire department equipment.

3.3 Implementation

Monitor SFP Level Locally

Monitor Hourly if:

- Level indication is not available, and no demand on SFP inventory (SSF RC makeup or HPI suction) in the first 15 hours following loss of SFP cooling.
- Level indication is available, and SFP inventory is a suction source for SSF or HPI with borated makeup established.

Monitor Continuously if (or as allowed considering radiological and environmental conditions):

- Level indication not available, and no demand on SFP inventory (not a SSF or HPI suction source), and greater than 15 hours (or within 4 hours of SFP calculated time-to-boil and no makeup source aligned) following loss of SFP cooling.

- Level indication is not available and SFP inventory is a suction source for HPI or the SSF with borated makeup established.
- Changing the makeup or SFP cooling alignments.

Normal Makeup Sources:

Procedures OP/1&2/A/1104/006/C and OP/3/A/1104/006/E are used when making up to the SFP from:

- RC BHUT 1,2,3A/B
- CBAST (Units 1,2,3)
- BAMT (Units 1&2,3)
- DW

Emergency Plan for Refilling Spent Fuel:

Procedure MP/0/A/3009/012A details makeup to the spent fuel pool using the offsite fire department.

3.4 Expected Plant Response

SFP level increases and/or is maintained. Radiation levels in the SFP area are constant or decreasing. Verify boron concentration in the SFP continues to satisfy shutdown margin.

G. MAKEUP AND MONITORING OF CCW INLET PIPE INVENTORY

1.0 SAFETY CONCERN

Preservation of SSF ASW pump and/or ASW pump suction supply.

2.0 PROCEDURE ENTRY CONDITIONS

The following conditions are considered in preparation of the following guidance.

- Tornado or loss of Lake Keowee event (SSF ASW, ASW).
- Fire, flood, or sabotage event (SSF ASW, ASW (potentially w/flood)).
- Station blackout. (SSF ASW)

3.0 REQUESTED ACTION

3.1 Requested Action Summary

1. Monitor Unit 2 CCW piping inventory, using SSF ASW/ASW pump suction pressure gauges.
2. If the Unit 2 CCW piping is intact, then makeup should be supplied by one or a combination of the following:
 - Running a Unit 2 CCW pump
 - Gravity flow from CCW discharge
 - Dedicated portable submersible pump
 - Cross connect the Unit 1 and Unit 3 CCW intake/discharge piping and Unit 2 CCW discharge piping to the Unit 2 inlet piping.

If the Unit CCW pipe integrity is questionable, then the method of making up will need to fit the system conditions.

3.2 Background:

The Unit 2 CCW inlet is the assured source of water satisfying the unit ultimate heat sink requirements. This mission is accomplished by serving as a source of supply water for SSF ASW demands. Worst case required ASW inventory to remove core decay is approximately 37 days if Units 1, 2, and 3 intake and discharge piping volumes are available (inventory available below 791 feet). Action may be required in as little as 6 hours.

With Unit 2 and either Unit 1 or 3 intake and discharge piping, core decay heat can be removed from 2 Units for 37 days. Action may be required in as little as 4 hours.

3.3 Implementation

- Monitor Unit 2 CCW intake pipe inventory

For loss of lake, loss of intake canal, tornado or other events requiring SSF ASW operation, evaluating CCW intake pipe inventory requires removing high point manways and using direct observation of level following loss of siphon. Prior to losing the siphon, use the SSF ASW pump suction gauge. The structural integrity of the pipe should be considered when obtaining the level observation/measurement.

- Makeup to Unit 2 CCW intake pipe inventory

The methods to provide makeup to the Unit 2 CCW intake are:

1. Running a Unit 2 CCW pump

- FOREBAY ELEV is above 67 feet
- SSW (HPSW) supply to CCW pump
- Power to CCW pump discharge valve
- CCW cross-over aligned to other units (as necessary)

2. Gravity flow from CCW discharge
3. Dedicated portable submersible pump

MP/0/A/1300/059

4. Cross connected with another unit and available water supply

3 Units intake and discharge pipes available:

Where the SSF ASW pump is in service and the station ASW pump is off, action must be taken within 24 hours of reactor trip to cross-connect the Unit's CCW intake and discharge unwatering pipes. This will assure 37 days of inventory where the SSF ASW pump is initially providing core decay heat removal.

Where the station ASW pump is in service with the SSF ASW pump off, action must be taken in 6 hours of reactor trip to cross-connect the Unit's CCW intake and discharge unwatering pipes. This will assure 37 days of inventory where the station ASW pump is initially providing core decay heat and the SSF diesel engine service water is routed to the yard drain.

Unit 2 and either Unit 1 or 3 CCW intake and discharge pipes available:

Where the SSF ASW pump is in service and the station ASW pump is off, action must be taken in 16 hours of reactor trip to cross-connect the available (not unwatered) Units' CCW intake and discharge unwatering pipes and to open or verify open 2CCW-75, 2CCW-78, 2CCW-79, 2CCW-86 and 2CCW-87 (if Unit 1 CCW intake pipe is unwatered). This will assure 37 days of inventory where the SSF ASW pump is initially providing core decay heat removal.

Where the station ASW pump is in service with the SSF ASW pump off, action must be taken within 4 hours of reactor trip to cross-connect the available (not unwatered) Units' CCW intake and discharge unwatering pipes and open or verify open 2CCW-75, 2CCW-78, 2CCW-79, 2CCW-86 and 2CCW-87 (if Unit 1 CCW intake pipe is unwatered). This will assure 37 days of inventory where the station ASW pump is initially providing core decay heat and the SSF diesel engine service water is routed to the yard drain.

5. Supply CCW intake from CCW discharge

3.4 Expected Plant Response

Unit 2 CCW intake pipe inventory is maintained to accommodate demands due to SSF operation and/or possible losses due to leakage from the system.

H. CONSERVE BWST INVENTORY

1.0 SAFETY CONCERN

- Loss of LPSW and BWST inventory depletion.

2.0 PROCEDURE ENTRY CONDITIONS

The following conditions are considered in preparation of the following guidance.

- Uncontrollable flooding of the Turbine Building.
- Loss of primary to secondary heat transfer control from Unit Control Rooms and aux shutdown panels.
- SSF ASW system and station ASW System unavailable.
- Using forced HPI cooling.

3.0 REQUESTED ACTIONS

3.1 Requested Action Summary

- Provide guidance to conserve BWST inventory to extend HPI cooling, considering the following potential actions:
 - Throttle HPI flow to balance decay heat.
 - Secure RBS system.
 - Vent the RB.

3.2 Background

BWST inventory constitutes the ultimate heat sink when primary-to-secondary heat transfer is lost and LPSW is unavailable. Forced HPI cooling is used to remove core decay heat when primary-to-secondary heat transfer is lost. Therefore, conserving BWST inventory by limiting what systems place demands on it extends the time available for forced HPI cooling. Aligning makeup to and replenishing the BWST inventory should be pursued while attempting to conserve the inventory.

HPI forced cooling is initiated by manually establishing HPI flow in the injection mode and latching open the PORV to create a relief flowpath. With subcooling margin all but one RCP is tripped to minimize the heat load on the system and maintain good circulation and mixing of injection flow.

HPI forced cooling results in energy relief to the RB. Without LPSW the RB structure and internal structures are the only heat sinks available to remove the energy from core decay heat, RCS metal, and secondary metal released by venting the RCS via the PORV. The controlled release of primary fluid to the building via the pressurizer PORV, safety valves or the hot leg high point vents via quench tank relief will result in increasing containment temperature and pressure. If there is no evidence of a high energy line break, and LPSW is unavailable, operation of the RBS system will only be marginally effective in removing energy from the atmosphere to containment structures. The RBS system should be isolated to minimize BWST drawdown rate.

Venting the RB removes energy primarily from the RB atmosphere. The RB purge system is not designed to operate under the differential pressure expected during HPI forced cooling. Venting would endanger the in-line filter package given environmental conditions present in the RB during HPI forced cooling. Likewise, venting RB may challenge the isolation valves ability to reseal. Lastly, removing air from the RB without replenishing it may complicate restarting RBS if required. If the air is removed and the atmosphere is predominantly saturated steam, spraying down containment could result in a differential

pressure greater than design. Given these concerns it is not recommended the RB be vented prior to establishing LPSW flow. If venting containment, purged air should be replenished with fresh air.

3.3 Implementation

Minimize BWST Drawdown

RBS should be isolated if there is no evidence of a HELB. Indication of a HELB would include: rapidly changing RB pressure and temperature, rapidly increasing RB sump level, and possibly increasing radiation levels in the building. If RB pressure remains less than 40 psig, RBS should remain isolated. HPI cooling, without a large HELB, will only produce a gradual worsening of Reactor Building conditions.

Depending on the predicted time to recover LPSW or acquire a makeup source for the BWST, consideration should be given to minimizing HPI flow. This can be done by matching HPI forced cooling flow with the core decay heat demand. This will result in losing SCM, but would further extend the BWST inventory. Refer to EP/1,2,3/A/1800/001 Section 502.

Venting the Reactor Building

Venting the RB risks subsequent loss of the ability to isolate, filter, and monitor any radiological release. As Reactor Building ultimate design pressure is near 144 psig, venting the Reactor Building should not be considered unless failure is deemed imminent.

3.4 Expected Plant Response

The energy storage and conduction capacity of the RB during HPI cooling is sufficient to preserve Reactor Building integrity. As such, neither RBS or venting the Reactor Building should be necessary. Therefore, BWST inventory can be conserved by minimizing demand, or isolating RBS.

I. CFT CORE COOLING FOLLOWING LOSS OF DECAY HEAT REMOVAL

1.0 SAFETY CONCERN

Use of CFTs to remove decay heat.

2.0 PROCEDURE ENTRY CONDITIONS

The following conditions are considered in preparation of the following guidance.

- Loss of decay heat removal.
- BWST inventory approaching depletion.
- BWST aligned for gravity flow to RCS.

3.0 REQUESTED ACTIONS:

3.1 Requested action Summary

- Drain CFTs to RCS to remove decay heat/makeup for boil off (when the BWST is unavailable).

3.2 Background

A CFT contains 1040 +/- 30 cu-ft of borated water. In a shutdown condition one or more CFTs may not be available. CFTs may be at Reactor Building atmospheric conditions or have a nitrogen overpressure of 50 psi or greater (OP/1(2,3)/A/1104/001, Core Flooding System).

The location of the RCS vent, the presence of steam generator nozzle dams, and RCS level should be considered when pressurizing and discharging the CFTs in a shutdown condition. If the RCS vent is in the upper SG, completely discharging a CFT with a pressurizer level of 360 inches could result in inventory loss out the vent. If SG nozzle dams are installed the CFTs must not be discharged.

The CFTs can be pressurized as necessary to discharge liquid volume for makeup. Each CFT should be discharged separately to maximize the liquid available to remove decay heat.

3.3 Implementation

CFT Discharge for Decay Heat Removal:

Refer to OP/1(2,3)/A/1104/001, Enclosure 4.14, for details regarding discharging the CFTs to the RCS.

Equipment required/considerations:

Inventory in the CFT.

Nitrogen high pressure header available.

Power supply to valves, 1/2/3CF-1 and/or 1/2/3CF-2.

The valves CF-1 and CF-2 can be operated locally. However, Reactor Building radiological and environmental conditions may preclude local operation.

The flow rate necessary to remove decay heat 1 day after shutdown from full power operation is 108 gpm and at 5 days the required flow rate is 62 gpm. Controlling CFT discharge to match decay heat will be difficult. CFT inventory should be discharged to preserve RCS level, but flow rates much greater than required to remove decay heat and maintain RCS level is likely. With the RV head removed, the difference in head generated by the initial CFT and RCS levels will produce CFT flows of several thousand GPM even if the CFT were vented to RB atmosphere.

CFT nitrogen pressure should be reduced to minimize rate of discharge prior to opening the discharge valves. Consideration of the RCS vent location will affect how the CFTs are discharged as well. If the RV head is removed, inventory will spill from the RV given coarse flow control from the CFT. However, if the RCS vent is in the pressurizer or the upper SG head, CFT discharge should be controlled to a level several hundred inches below the vent location. The flow rate from a single CFT is sufficient to match decay heat at 1 day of shutdown, therefore the CFTs should be discharged one at a time.

A CFT must not be discharged if SG nozzle dams are installed.

3.4 Expected Plant Response

CFT inventory can be used to makeup for boil-off following loss of DHR. Control of the injection rate will not be precise and a flow rate of less than 100 gpm is only required to makeup for decay heat. The CFTs should be discharged by pressurizing with nitrogen and pushing water through the injection lines as needed to maintain RCS level. The amount of fluid discharged will depend upon the location of the RCS vent. Do not attempt to discharge the CFTs if the nozzle dams are installed.

J. MITIGATE LPI PUMP INTERACTION AND LPI PUMP RESTART

1.0 SAFETY CONCERN

Protect LPI pumps during low flow operation.

2.0 PROCEDURE ENTRY CONDITIONS

The following conditions are considered in preparation of the following guidance.

- Two LPI pumps in operation and BWST inventory decreasing, requiring LPI/HPI “piggyback” operation to provide HPI suction from the RBES and restart of an LPI pump following deadhead operation
- SBLOCA
- HPI forced cooling
- SGTR

3.0 REQUESTED ACTION

3.1 Requested Action Summary

Evaluate restarting an LPI pump following a low flow condition or continued operation of LPI pumps at low flow conditions.

EOP cautions the operator and informs station management if LPI pumps are operated below minimum flow values:

- Any LPI pump operated at <100 gpm.
- Two LPI pumps operating in piggyback with NO LPI header flow and total indicated HPI flow <500 gpm.

Turn off an LPI pump.

3.2 Background:

The manufacturer’s recommended minimum flows: (recommended for accident condition only to minimize undue stresses)

- LPI flow > 100 gpm (5 continuous days)
- LPI flow > 200 gpm (one year continuous)

For some SBLOCAs, HPI cooling, or SGTR events, an interaction between the LPI pumps can occur during LPI/HPI-piggyback operation. In particular, under low flow conditions a weak-pump strong-pump interaction is established. The acceptability of the LPI/HPI piggyback alignment with two trains of LPI supplying suction to two HPI pumps through both LP-15 and LP-16 is a function of total HPI injection flow assuming no LPI flow injecting into the RCS. Analysis has been performed modeling the weak pump/strong pump interaction with both trains at a combined flowrate of 500 gpm. The analysis shows if pumps differ by as much as 7% in developed head that flow from the weaker pump will be limited. Periodic testing verifies that the “A” & “B” LPI pumps are within this 7% assumption. If two LPI pumps are operating in piggyback with no LPI header flow and total indicated HPI flow ≤ 500 gpm, it is recommended that one LPI pump be secured. A single LPI pump can provide sufficient flow for 2 HPI pumps.

Operating the LPI pumps below minimum flow will cause hydraulic instabilities. Operating the LPI pump for an extended period (@ <100 gpm) can lead to fluid flashing in the casing that can lead to cavitation and seal failure. This can be catastrophic.

Vendor recommendation is based on a similar pump that was operated at approximately 100 gpm for one month. This test showed no degradation in pump performance or component damage. To minimize undue pump stress, this manufacturer's recommendation must be adhered to.

3.3 Implementation

Re-energizing an LPI pump after it has been secured because it was deadheaded or if two LPI pumps operating in piggyback with no LPI header flow and total indicated HPI flow <500 gpm requires an evaluation.

- Depending on RCS conditions, specifically RCS pressure and the rate it is decreasing, it may be advisable to secure an LPI pump in support of piggyback. A single LPI pump can provide sufficient flow for 2 HPI pumps. If acceptable increase total indicated HPI flow to >500 gpm to maintain two LPI pumps in operation.
- The temperature of the fluid in the LPI pump is a function of the length of time the LPI pump has been operating at deadhead condition. It is advisable to restart the LPI pump when it can be assured that RCS pressure has decreased that will allow LPI injection. An LPI pump can develop approximately 180 psi of developed head.
- When restarting an LPI pump for piggyback operation after it has been secured due to deadhead operation, consideration must be given to the fact that the LPI pump may only have minimum recirc flow until LP-15 & 16 are opened. Minimize the time between pump restart and opening LP-15 or LP-16.

Approximate LPI Flow Rate Calculation

- The indicated LPI flow is inaccurate at low flowrates. For example the indicated flow can vary between 0.0 gpm to 1200 gpm if actual flow is <750 gpm. Based on LPI performance, it is expected that LPI flow should rapidly increase to >1000 gpm as RCS pressure decreases below shut off head (approximately 180 psig). LPI flow can be estimated based on the BWST draindown rate as follows (assuming a relatively constant rate of BWST level decrease):
 - The volume of the BWST is ≈ 7613 gals/ft.
 - $\text{LPI flow} = \{(\text{initial level} - \text{current level})/\text{time}\} (7613) = \text{sum of HPI and RBS flow}$
 - The instrument uncertainty analysis (worst case) are:

If RBS is operating, the flowrate should be throttled to ≤ 1500 gpm (when taking suction from BWST). The flow rate uncertainty is approximately 143 gpm.

HPI flow uncertainty is approximately 25 gpm if flow >500 gpm. For indicated HPI flow below 125 gpm, actual flow can be 0.0 gpm or > 189 gpm
 - Comparison of header flows allows one to diagnose the validity of the indicated flow.
 - Analysis shows that two HPI pumps can deliver approximately 550 gpm & 650 gpm @ RCS pressures of 1500 psig and 1200 psig respectively. This is assuming the HPI pumps developed head have degraded 10%.
 - RB pressure can influence LPI total developed head when aligned to the BWST.
 - RCS pressure must be considered in the evaluation.

3.4 Expected Plant Response

The guidance assures the minimum required flow for LPI pump during long term cooling. In addition, the guidance assures successful operation following restart of a pump after deadhead operation.

K. ENERGIZE THE ASW SWITCHGEAR FROM AN OPERATING OCONEE UNIT

1.0 SAFETY CONCERN

Restore power supply to the HPI and ASW pumps from Oconee unit not experiencing SBO.

2.0 PROCEDURE ENTRY CONDITIONS

Evaluate continued operation of LPI pumps at low flow conditions.

- An Oconee unit has tripped and is experiencing a station blackout (SBO)
- The main feeder bus cannot be energized through the startup transformer and the standby bus cannot be energized from either Keowee or CT-5
- Another Oconee Unit is generating and is energizing both its MFBs.

3.0 REQUESTED ACRION

3.1 Requested action Summary:

- Close the operating Oconee unit's standby breaker 1 (S1) to energize standby bus 1 (SB1) and power the auxiliary service water switchgear (ASWS) from the operating Oconee generator.
- Connect a HPI pump (HPIP), from the Oconee unit experiencing the SBO, to the ASWS.
- This would allow HPI forced cooling of the core, while power is being restored. Also the auxiliary service water pump (ASWP) would be available to provide inventory to the steam generators if needed for cooling.

3.2 Background:

During a loss of switchgear event, the underground emergency power path or a Lee combustion turbine can supply one HPIP and the ASWP through SB1 and the ASWS. The HPIP can maintain water on the core and the ASWP can supply water to the steam generators providing a heat sink for the reactor coolant system. If the underground emergency power path or a Lee combustion turbine can not energize the standby bus, the HPIP and the ASWP would not be available. If another Oconee unit were generating, that unit could energize SB1 by closing its S1 breaker. The S1 breaker close logic will allow the breaker to close as long as the standby bus is not energized. The ASWS could then be energized to provide power to a HPIP and the ASWP.

The typical load for a running Oconee Unit is 12–15MW. The auxiliary and startup transformers are rated at 33.6MVA. The addition load of one HPIP and an ASWP is < 1MVA or 137 amps. With both main feeder buses in service, the load on main feeder bus 1 would be within its limits. UFSAR 8.2.1 3 states that each unit's auxiliary startup transformer is sized to carry full load auxiliaries for one nuclear generating unit plus the engineered safeguards equipment of another unit. The operating load of a HPIP and an ASWP is considerably less than a unit's engineered safeguards load, thus there would be sufficient power available should the operating unit trip.

3.3 Implementation

1. Verify SB1 is not energized.
2. Ensure all breakers for SB1 are open.
3. Place CT4 BUS 1 "AUTO/MAN" transfer switch in "MANUAL".
4. Place Standby Bus 1 "AUTO/MANUAL" transfer switches in "MANUAL".

5. Close Breaker S1.
6. Have I&E perform procedure IP/O/A/0050/001, Procedure To Provide Emergency Power To An HPI Pump Motor From The ASW Switchgear.

3.4 Expected Plant Response

ASW Switchgear will be energized from an operating Oconee Unit. One HPI pump and the ASW pump can be operated as desired.

L. LIMITATIONS ON ALIGNING HPI SUCTION FROM THE SFP

1.0 SAFETY CONCERN

Loss of suction source to the HPI pumps when aligned to the SFP.

2.0 PROCEDURE ENTRY CONDITIONS

The following conditions are considered in preparation of the following guidance.

- An Oconee unit has tripped and is experiencing a station blackout (SBO)
- SSF RC makeup pump is not available
- An HPI pump can be powered from the ASW switchgear
- The BWST and LDST are not available as suction sources to the HPI pumps
- The SFP can be aligned as a suction source for the HPI pumps

3.0 REQUESTED ACTION

3.1 Requested action Summary:

- Provide guidance to monitor the SFP and ensure suction remains available to the HPI pumps based on limitations on the following parameters:
- SFP level
- HPI flow rate
- SFP temperature

3.2 Background:

If the BWST and LDST are not available as a suction source for the HPI pumps, it is possible to align the suction of an HPI pump to the SFP. Conditions in the SFP need to be monitored to ensure suction to the HPI pumps is not interrupted. Design calculations demonstrate that an HPI pump will have adequate NPSH when aligned to the SFP. However, suction could be interrupted based on the following two concerns:

- Siphon break at elevation 822 feet in the SFP:

The suction line as a siphon break at 822 feet. This consists of two 1/2 inch holes. If the SFP level decreases to 822 feet, suction to the HPI pumps will be interrupted. Thus, this is one limit that the TSC must consider.

- Flashing in the high point of the SFP suction line:

HPI flow can be interrupted if the pressure in the high point of the suction line from the SFP equals the vapor pressure based on SFP temperature. This is the primary concern when aligning HPI to the SFP. The factors that influence flashing are:

SFP temperature - If SFP cooling is lost, SFP temperature will increase. The higher the temperature, the less margin to flashing in the high point. The factor that influences SFP temperature is the decay heat load in the SFP.

SFP level - SFP level impacts flashing in that a lower SFP level results in lower elevation head and a lower pressure in the high point of the suction line. SFP level will decrease based on the HPI flow rate.

HPI flow rate - HPI flow rate impacts margin to flashing by its effect on the pressure in the high point of the SFP suction line. As HPI flow rate increases, the frictional losses in the suction pipe increase. Increased frictional losses decrease the pressure in the high point of the line, thus reducing the margin to the vapor pressure. The frictional losses due to the flow rate are a second order effect when compared to SFP level and temperature. Thus, the primary issue with SFP flow rate is its impact on SFP level.

3.3 Implementation

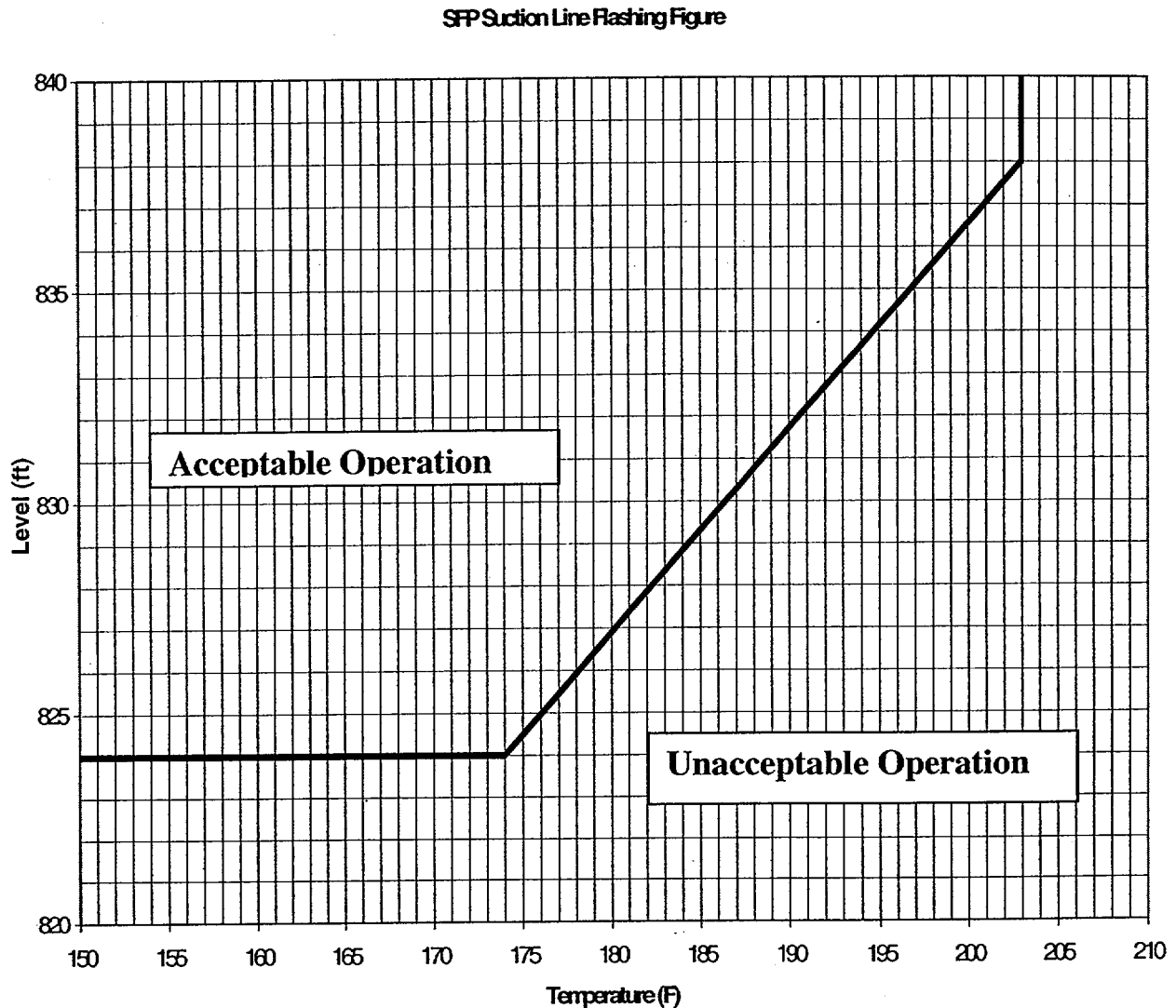
Siphon Break

If an HPI pump is aligned to the SFP, the pump should be secured prior to SFP level decreasing below 824 feet. The 824 feet criterion is selected to provide margin to the elevation of the siphon break (siphon break is at a SFP level of 822 feet).

Flashing at SFP Suction High Point

Flashing in the high point of the SFP suction line depends on SFP temperature, SFP level, and the HPI flow rate. Calculation OSC-3873, Rev. 4, provides data on the SFP as a suction source for the HPI pumps. The analyses in this calculation demonstrate that the frictional losses associated with the HPI flow rate are small. Thus, the conditions at which flashing occurs can be directly determined based on only SFP level and temperature. Also, for a given SFP level and temperature, the differences between the Units 1 and 2 SFP and the Unit 3 SFP are negligible. Thus, the same data to determine the flashing point can be used for both SFPs.

The following figure provides the flashing curve as a function of SFP temperature and SFP level. For a given SFP temperature, the level must be maintained greater than the level in the following curve.



- Monitor SFP level and temperature initially on a one half hour frequency and project changes in temperature and level to ensure continued suction remains to the HPI pumps. Adjust monitoring frequency based on projections of SFP temperature and level.
- HPI flow rate should be adjusted based on RCS requirements taking into consideration the impact of changing flow rates on SFP level.

3.4 Expected Plant Response

HPI flow is successfully established from the SFP. Monitoring is in place to determine when HPI flow from the SFP should be terminated.

M. ENSURE TOTAL LPSW RECIRCULATION FLOW IS ≤ 9000 GPM DURING CCW DAM FAILURE

1.0 SAFETY CONCERN

Total LPSW flow is maintained ≤ 9000 gpm during a CCW Dam failure scenario. Flow to various LPSW loads may require throttling to achieve desired flow rate.

2.0 PROCEDURE ENTRY CONDITIONS

This guidance is used during Case B of AP/1/A/1700/013 (Dam Failure Without Loss of CCW Intake Canal). The Symptoms for entering AP/1/A/1700/013 are:

- Visual observation of decreasing lake level or dam failure
- Telephone communication of a Keowee or Little River dam failure
- "CCW LAKE LEVEL LOW" statalarm (1SA-09/B-10)
- "FOREBAY ELEV" decreasing toward 70 feet

3.0 REQUESTED ACTION

Determine which LPSW loads should be throttled to ensure total LPSW recirculation flow is ≤ 9000 gpm.

3.1 Background:

In the event of a Loss of Lake Keowee, the preferred method of decay heat removal is via the CCW System recirculation mode. In this alignment, the Unit 1&2 and Unit 3 LPSW systems are cross-connected and one LPSW pump operated to supply the required loads for all three units. The LPSW System is aligned so that the normal discharge paths are isolated such that flow is forced in the reverse direction through the Unit 1 RCW coolers and back to the CCW crossover.

Per OSC-5739, total LPSW flow is limited to 9000 gpm to ensure excessive velocities are not generated in the tubes of the RCW Coolers and to reduce the likelihood of undesirable internal LPSW recirculation in certain system configurations.

3.2 Implementation:

Since total LPSW flow is limited to 9000 gpm and only one LPSW pump is operating, each unit is allowed 3000 gpm of LPSW flow. The only available LPSW loads on each unit are listed below as well as the LPSW throttle valve associated with each load.

- "B" RBCU and RBACs - 1/2/3LPSW-21
- "A" LPI Cooler - 1/2/3LPSW-4 or 1/2/3LPSW-251
- "B" LPI Cooler - 1/2/3LPSW-5 or 1/2/3LPSW-252

The above loads must be throttled as required on each unit to maintain total LPSW pump flow ≤ 9000 gpm.

3.3 Expected Plant Response

Total LPSW flow as indicated on the operating LPSW Pump's discharge flow gauge should indicate ≤ 9000 gpm.