



Duke Energy

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W. R. McCollum, Jr.
Vice President

January 10, 2002

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 B, Revision 2002-01

Please find attached for your use and review copies of the revision to the Oconee Nuclear Station Emergency Plan:

Volume B Revision 2002-01 January 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, Georgia 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-

January 10, 2002

OCONEE NUCLEAR SITE

SUBJECT: Emergency Plan Implementing Procedures
Volume B, Revision 2002-01

Please make the following changes to the Emergency Plan, Volume B
by following these instructions.

REMOVE

Cover Sheet Rev. 2001-06
Table of Contents page 1
CP/1&2/A/2002/005 - 02/14/01
CP/3/A/2002/005 - 02/14/01

ADD

Cover Sheet Rev. 2002-01
Table of Contents page 1
CP/1&2/A/2002/005 - 12/13/01
CP/3/A/2002/005 - 12/13/01

DUKE POWER
EMERGENCY PLAN
IMPLEMENTING PROCEDURES
VOLUME B



APPROVED:

W. W. Foster, Manager
Safety Assurance

01/10/02

Date Approved

01/10/02

Effective Date

VOLUME B
REVISION 2002-01
January 2002

VOLUME B
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CP/2/A/2002/004C	Operating Procedure For The Post Accident Liquid Sampling System (PALSS)	03/15/01
CP/3/A/2002/004C	Operation Procedure For The Post-Accident Liquid Sampling System (PALSS)	03/15/01
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Revision 2002-01
January, 2002

Duke Power Company
PROCEDURE PROCESS RECORD

(1) ID No. CP/1&2/A/2002/005

Revision No. 16

Continuous Use

INFORMATION ONLY

REPARATION

(2) Station Oconee Nuclear Station

(3) Procedure Title Post Accident Caustic Injection Into the Low Pressure Injection System

(4) Prepared By Sherril G. Hackey Date 12-13-01

- (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 Joan Carroll (QR) Date 12/13/01

Cross-Disciplinary Review By _____ (QR) NA NA Date _____

Reactivity Mgmt. Review By _____ (QR) NA NA Date _____

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

(7) Additional Reviews

QA Review By _____ Date _____

Reviewed By _____ Date _____

Reviewed By _____ Date _____

(8) Temporary Approval (if necessary)

By _____ (OSM/QR) Date _____

By _____ (QR) Date _____

(9) Approved By Bryan J. Turner Date 12/13/01

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

- 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, if necessary)

Post Accident Caustic Injection into the Low Pressure Injection System

- NOTE:**
1. This entire procedure supports an AP or EOP action. The procedure will require AP/EOP validation per NSD 705.
 2. A control copy of this procedure shall be routed to the Emergency Preparedness Team within 3 working days after any approved changes.

1. Purpose

- 1.1 This procedure is to provide instruction for determining the amount and method of caustic addition into the LPI System during a LOCA.

- 1.2 Principle

Caustic is injected into the LPI System during a LOCA to neutralize the borated water used in the Reactor Building Emergency Spray System to pH 7.0 - 8.0.

The neutralization will inhibit the generation of hydrogen gas and promote a higher partition factor for iodine.

2. Limits and Precautions

- 2.1 The following safety equipment shall be worn when connecting/disconnecting caustic tote bins:
 - 2.1.1 Chemical goggles
 - 2.1.2 Face shield
 - 2.1.3 Corrosive resistant suit, neoprene or chemrel
 - 2.1.4 Corrosive resistant boots, neoprene or PVC
 - 2.1.5 Corrosive resistant gloves, neoprene or PVC
- 2.2 Chemical hazards shall be known prior to use. For additional information refer to the MSDS sheets.
- 2.3 Under accident conditions, valve alignments shall **NOT** be made and injection shall **NOT** begin without prior authorization from the Operations Emergency Coordinator **OR** the Technical Support Center (TSC)/Operational Support Center (OSC)!

NOTE: An initial caustic add of 15 inches will neutralize an RCS inventory of 80,000 gallons with a boron concentration of 1800 ppm. This is a conservative initial add to allow immediate response to a large break LOCA.

- 2.4 An initial caustic add of 15 inches can be made without performing CSM 5.2, Enclosure 6.3 (Caustic Addition Calculations).
- 2.5 In the event of a caustic spill, call 4911.
- 2.6 ITS 5.4.1.a and SLC 16.13.7 require that pH be measured **AND** that the addition of caustic to Reactor Coolant commence within 30 minutes **AFTER** switchover to Recirculation Mode of Core Cooling to adjust the pH to a range of 7.0 to 8.0 **WITHIN** 24 hours.

During recirculation mode, long-term core cooling is provided by injection of water from the Reactor Building Emergency Sump to the core by the Low Pressure Injection (LPI) pumps (1 LP-19 & 20 or 2 LP-19 & 20 are open). Switchover to recirculation mode is accomplished with minimal level in the BWST.

- 2.7 Safety and caustic addition equipment is stored in the brown storage container located in the Auxiliary Building, Unit 1 & 2 Chemical Addition Area.
- 2.8 Keys to the brown storage container are stored with the caustic addition procedures in the OSC Chemistry Emergency Procedure Files and in the fireproof cabinet located in the Primary Chemistry lab office. All personnel in Primary Chemistry and Radwaste have also been issued individual keys.
- 2.9 Power to the caustic addition pump is provided through 1XL located near the LPI hatch area. For power supply diagram, see Enclosure 5.6.

3. Procedure

- 3.1 Upon notification from Operations Emergency Coordinator **OR** TSC / OSC take the following actions to align the caustic addition system to the appropriate unit:

NOTE: The following steps may be performed simultaneously to conserve time.

- Verify eyewash station and safety shower operable.
- Mark the current liquid level directly on the translucent tote bin container.
- Measure down from the liquid level mark 15 inches and mark this level directly on the tote bin.

- IF** necessary, move the tote bin into position.
 - Remove dust cover from swagelock fitting on tote bin.
 - Remove dust cover from swagelock fitting at CA-36 (Caustic Pump Suction Tell Tale) (Bottom of 1&2 Caustic Mix Tank downstream of CA-35, Elev 783).
- 3.1.1 For Unit 1 **only**, make valve alignments per Enclosure 5.1 to allow caustic injection into the Low Pressure Injection (LPI) pump suction on Unit 1.
- 3.1.2 For Unit 2 **only**, make valve alignments per Enclosure 5.2 to allow caustic injection into the Low Pressure Injection (LPI) pump suction on Unit 2.

NOTE: Protective clothing shall be worn prior to Step 3.1.3.

- 3.1.3 Connect stainless steel flex hose to the Swagelock quick-connect fitting upstream of Ca-36 (Caustic Pump Suction Tell Tale) (Bottom of 1&2 Caustic Mix Tank downstream of CA-35, Elev. 783).
- 3.1.4 Connect stainless steel flex hose to the Swagelock fitting on tote-bin.
- 3.1.5 Vent the caustic tote bin by removing the tote bin fill cap.
- 3.1.6 Open the caustic tote bin outlet valve.
- 3.1.7 Notify Operations **OR** the OSC (if activated) that valve alignments for caustic injection are complete and ready to be initiated.

Operations or OSC Notified _____ Date/Time ____ / ____

NOTE: Use low dose waiting area as possible during addition.

- 3.1.8 **WHEN** notified by Operations, start the caustic addition pump at maximum flow setting. The caustic pump switch is located on the Chemical Addition Control Panel. The maximum pump capacity is approximately 2 gallons per minute.
- 3.1.9 Notify Operations **OR** the OSC (if activated) that caustic injection has begun.

Operations or OSC notified _____

NOTE: The caustic pump has an average pump rate of 1.2 gallons per minute. To pump the initial setting of 15 inches will require 1.5 hours.

- 3.1.10 Calculate the total amount of caustic (in gallons) to be added for the neutralization of the borated water added to the system by using CSM 5.2 (Enclosure 6.3).
- 3.1.11 Convert gallons from Step 3.1.10 to inches (in the 350 gallon tote bin) by dividing the number of gallons to be added by 8.1. Record the values below:

Gallons to be added _____ Inches to be added from the tote bin _____
- 3.1.12 Mark the calculated liquid level directly on the tote bin by measuring down from the original "current liquid level" mark made in Step 3.1.
- 3.1.13 **WHEN** the caustic tote bin level reaches the desired level (as marked in Step 3.1) **OR WHEN** the caustic tote bin is empty, **STOP** caustic addition pump using the switch located on the Chemical Addition Control Panel.
- 3.1.14 Close tote bin outlet valve.
- 3.1.15 Close CA-36 (Caustic Pump Suction Tell Tale) (Bottom of 1&2 Caustic Mix Tank downstream of CA-35, Elev 783).
- 3.1.16 Record time and volume added on Enclosure 5.5.
- 3.1.17 **IF** necessary, replace the caustic tote bin as follows:
 - 3.1.17.1 Replace tote bin fill cap.
 - 3.1.17.2 Disconnect empty tote bin from swagelock fitting on stainless flex hose.
 - 3.1.17.3 **IF** necessary, move tote bins and remove dust cover from swagelock fitting on new tote bin.
 - 3.1.17.4 Connect stainless flex hose to the new tote bin.
 - 3.1.17.5 **IF** pumping is to continue, mark the tote bin per Section 3.1 for the amount to be added from the new tote bin and go to Step 3.1.5.
- 3.1.18 Notify OSC that caustic addition to the LPI is complete and no further additions are in progress at this time.

OSC Notified _____ Date/Time _____ / _____
- 3.1.19 After caustic addition is complete, allow LPI recirculation time of at least 2 hours.

- 3.1.20 **WHEN** authorized by the TSC/OSC, have sample taken (per appropriate procedure) to determine the resultant pH of the reactor coolant.
- 3.1.21 **IF** pH is < 7.0,
- Calculate (refer to CSM 5.2, Enclosure 6.3) the amount of caustic (in gallons) to be added to complete the neutralization of the borated water added to the system.
 - Convert this number to inches (in the 350 gallon tote bin) by dividing the number of gallons to be added by 8.1 gallons/inch.
 - Record the values below:
Gallons to be added: _____ Inches to be added from tote bin: _____
- 3.1.22 **IF** pH is > 7.0, go to Step 3.1.26.
- 3.1.23 Mark the current liquid level directly on the translucent tote bin container.
- 3.1.24 Measure down from this mark the number of inches calculated in Step 3.1.21 above. Mark this level directly on the tote bin.
- 3.1.25 Repeat Steps 3.1.1 through 3.1.22 until all necessary caustic (as determined by TSC/OSC) has been added.
- 3.1.26 After all necessary caustic has been added and upon authorization from the TSC/OSC, return the system to normal as follows:
- 3.1.26.1 Replace tote bin fill cap.
 - 3.1.26.2 Disconnect empty tote bin from swagelock fitting on stainless flex hose.
 - 3.1.26.3 For Unit 1 **only**, make alignments per Enclosure 5.3 to return valves to normal position.
 - 3.1.26.4 For Unit 2 **only**, make alignments per Enclosure 5.4 to return valves to normal position.

4. References

- 4.1 Dwg. No. OFD-110A-1.8 Chemical Addition System (Primary Side Chemical Addition)
- 4.2 Dwg. No. OFD-102A-1.1 and OFD-102A-2.1 Low Pressure Injection System, Borated Water Supply and LPI Pump Suction.
- 4.3 CSM 5.2
- 4.4 ITS 5.4.1.a
- 4.5 SLC 16.13.7

5. Enclosures

- 5.1 Valve Alignment for Caustic Injection on Unit 1
- 5.2 Valve Alignment for Caustic Injection on Unit 2
- 5.3 Normal Valve Alignment for Caustic Injection System on Unit 1
- 5.4 Normal Valve Alignment for Caustic Injection System on Unit 2
- 5.5 Caustic Mixing and Injection Record
- 5.6 Unit 1&2 Caustic Pump Power Supplies

Enclosure 5.1
Valve Alignment for
Caustic Injection on Unit 1

CP/1&2/A/2002/005
Page 1 of 1

NOTE: This enclosure is AP/EOP related.

Date _____

<i>DV</i>	<i>Init</i>	<i>Position</i>	<i>Valve No.</i>	<i>Valve Name</i>	<i>Location</i>
		Closed	2CA-98	Caustic to Unit #2 LPI Block (Chm)	Unit 1&2 LPI Hatch Area, AB Rm. 119, Elev 771, Col. T-74
		Closed	1CA-58	Caustic to U1 LPI Suct Tell Tale (Chm)	Unit 1&2 LPI Hatch Area, AB, Elev 771, Col. T-72
		Open	1CA-39	Caustic to Unit #1 LPI Block (Chm)	Unit 1&2 LPI Hatch Area, AB Rm 118, Elev 771, Col. T-72
		Open	1CA-62	Caustic to Unit #1 LPI Block (Ops)	Unit 1&2 LPI Hatch Area, AB Rm. 119, Elev 771, Col. T-72
		Open	1LP-51	LPI Sample Recirc Isolation (Ops)	Unit 1&2 LPI Hatch Area, AB Rm. 061, Elev 771, Col. T-71
		Open	CA-103	Caustic Recirc Line and Press Gauge Block	Downstream of 1&2 Caustic Pump and CA-37, Elev 783, Col. Q-67
		Closed	CA-96	Caustic Recirc Block	Recirc Line tapping off between CA-103 & CA-112 returning to Caustic Mix Tank, Elev 783
		Closed	CA-35	Caustic Pump Suction	Next valve after CA-34 Tank and upstream of Caustic Pump, Elev 783
		Closed	CA-37	Caustic Header to Waste Evap. Feed Tank Block	AB Hallway, Elev 783, near Col. P-74, 6 ft. overhead
		Open	CA-112	Caustic Pump Press Gauge Isol	First valve downstream of PG-27 (Pressure Gauge) behind Caustic Mix Tank on West Wall, Elev 783
		Open	CA-36	Caustic Pump Suction Tell Tale	Bottom of 1&2 Caustic Mix Tank downstream of CA-35, Elev 783

Enclosure 5.2
Valve Alignment for
Caustic Injection System on Unit 2

CP/1&2/A/2002/005

Page 1 of 1

NOTE: This enclosure is AP/EOP related.

Date _____

<i>DV</i>	<i>Init</i>	<i>Position</i>	<i>Valve No.</i>	<i>Valve Name</i>	<i>Location</i>
		Closed	1CA-39	Caustic to Unit #1 LPI Block (Chm)	Unit 1&2 LPI Hatch Area, AB Rm 118, Elev 771, Col. T-72
		Closed	2CA-58	Caustic to #2 LPI Pump Suct Tell Tale (Chm)	Unit 1&2 LPI Hatch Area, AB Rm 119, Elev 771, Col. T-74
		Open	2CA-98	Caustic to Unit #2 LPI Block (Chm)	Unit 1&2 LPI Hatch Area, AB Rm. 119, Elev 771, Col. T-74
		Open	2CA-63	Caustic to Unit #2 LPI Block (Ops)	Unit 1&2 LPI Hatch Area, AB Rm. 119, Elev 771, Col. T-74
		Open	2LP-51	LPI Sample Recirc Isolation (Ops)	Unit 1&2 LPI Hatch Area, AB Rm. 063, Elev 771, Col. T-71
		Open	CA-103	Caustic Recirc Line and Press Gauge Block	Downstream of 1&2 Caustic Pump and CA-37, Elev 783, Col. Q-67
		Closed	CA-96	Caustic Recirc Block	Recirc Line tapping off between CA-103 & CA-112 returning to Caustic Mix Tank, Elev 783
		Closed	CA-35	Caustic Pump Suction	Next valve after CA-34 Tank and upstream of Caustic Pump, Elev 783
		Closed	CA-37	Caustic Header to Waste Evap. Feed Tank Block	AB Hallway, Elev 783, near Col. P-74, 6 ft. overhead
		Open	CA-112	Caustic Pump Press Gauge Isol	First valve downstream of PG-27 (Pressure Gauge) behind Caustic Mix Tank on West Wall, Elev 783
		Open	CA-36	Caustic Pump Suction Tell Tale	Bottom of 1&2 Caustic Mix Tank downstream of CA-35, Elev 783

**Normal Valve Alignment for
Caustic Injection System on Unit 1**

NOTE: This enclosure is AP/EOP related.

Date _____

<i>DV</i>	<i>Init</i>	<i>Position</i>	<i>Valve No.</i>	<i>Valve Name</i>	<i>Location</i>
		Closed	2CA-98	Caustic to Unit #2 LPI Block (Chm)	Unit 1&2 LPI Hatch Area, AB Rm. 119, Elev 771, Col. T-74
		Closed	2CA-63	Caustic to Unit #2 LPI Block (Ops)	Unit 1&2 LPI Hatch Area, AB Rm. 119, Elev 771, Col. T-74
		Closed	1CA-58	Caustic to U1 LPI Suct Tell Tale (Chm)	Unit 1&2 LPI Hatch Area, AB, Elev 771, Col. T-72
		Closed	1CA-39	Caustic to Unit #1 LPI Block (Chm)	Unit 1&2 LPI Hatch Area, AB Rm 118, Elev 771, Col. T-72
		Closed	1CA-62	Caustic to Unit #1 LPI Block (Ops)	Unit 1&2 LPI Hatch Area, AB Rm. 119, Elev 771, Col. T-72
		Closed	1LP-51	LPI Sample Recirc Isolation (Ops)	Unit 1&2 LPI Hatch Area, AB Rm. 061, Elev 771, Col. T-71
		Open	CA-103	Caustic Recirc Line and Press Gauge Block	Downstream of 1&2 Caustic Pump and CA-37, Elev 783, Col. Q-67
		Open	CA-97	Caustic Recirc Block	Downstream of CA-96 and upstream of DW-120 on Caustic Mix Tank Recirc Line, Elev 783
		Open	CA-96	Caustic Recirc Block	Recirc Line tapping off between CA-103 & CA-112 returning to Caustic Mix Tank, Elev 783
		Closed	LWD-267	Caustic Tank Outlet Drain	Base of Caustic Mix Tank West Side, Elev 783
		Closed	CA-34	Caustic Mix Tank Outlet	First valve from bottom of Caustic Mix Tank and upstream of Caustic Pump, Elev 783 Col. Q-68
		Closed	CA-35	Caustic Pump Suction	Next valve after CA-34 Tank and upstream of Caustic Pump, Elev 783
		Closed	CA-37	Caustic Header to Waste Evap. Feed Tank Block	AB Hallway, Elev 783, near Col. P-74, 6 ft. overhead
		Open	CA-112	Caustic Pump Press Gauge Isol	First valve downstream of PG-27 (Pressure Gauge) behind Caustic Mix Tank on West Wall, Elev 783
		Closed	CA-36	Caustic Pump Suction Tell Tale	Bottom of 1&2 Caustic Mix Tank downstream of CA-35, Elev 783

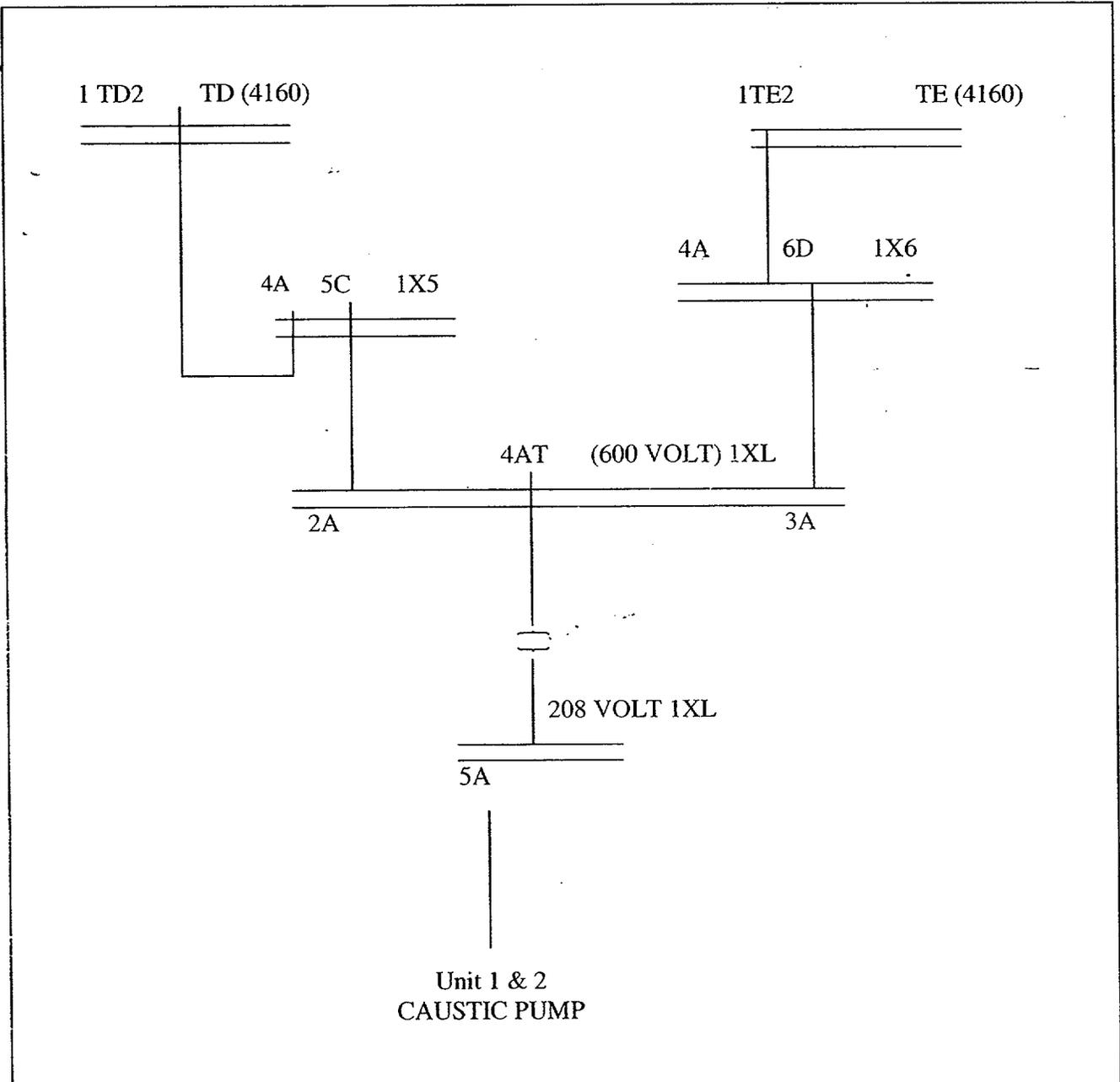
**Normal Valve Alignment for
Caustic Injection System on Unit 2**

NOTE: This enclosure is AP/EOP related.

Date _____

<i>DV</i>	<i>Init</i>	<i>Position</i>	<i>Valve No.</i>	<i>Valve Name</i>	<i>Location</i>
		Closed	1CA-39	Caustic to Unit #1 LPI Block (Chm)	Unit 1&2 LPI Hatch Area, AB Rm 118, Elev 771, Col. T-72
		Closed	1CA-62	Caustic to Unit #1 LPI Block (Ops)	Unit 1&2 LPI Hatch Area, AB Rm. 119, Elev 771, Col. T-72
		Closed	2CA-58	Caustic to #2 LPI Pump Suct Tell Tale (Chm)	Unit 1&2 LPI Hatch Area, AB Rm 119, Elev 771, Col. T-74
		Closed	2CA-98	Caustic to Unit #2 LPI Block (Chm)	Unit 1&2 LPI Hatch Area, AB Rm. 119, Elev 771, Col. T-74
		Closed	2CA-63	Caustic to Unit #2 LPI Block (Ops)	Unit 1&2 LPI Hatch Area, AB Rm. 119, Elev 771, Col. T-74
		Closed	2LP-51	LPI Sample Recirc Isolation (Ops)	Unit 1&2 LPI Hatch Area, AB Rm. 063, Elev 771, Col. T-71
		Open	CA-103	Caustic Recirc Line and Press Gauge Block	Downstream of 1&2 Caustic Pump and CA-37, Elev 783, Col. Q-67
		Open	CA-97	Caustic Recirc Block	Downstream of CA-96 and upstream of DW-120 on Caustic Mix Tank Recirc Line, Elev 783
		Open	CA-96	Caustic Recirc Block	Recirc Line tapping off between CA-103 & CA-112 returning to Caustic Mix Tank, Elev 783
		Closed	LWD-267	Caustic Tank Outlet Drain	Base of Caustic Mix Tank West Side, Elev 783
		Closed	CA-34	Caustic Mix Tank Outlet	First valve from bottom of Caustic Mix Tank and upstream of Caustic Pump, Elev 783 Col. Q-68
		Closed	CA-35	Caustic Pump Suction	Next valve after CA-34 Tank and upstream of Caustic Pump, Elev 783
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		Open	CA-112	Caustic Pump Press Gauge Isol	First valve downstream of PG-27 (Pressure Gauge) behind Caustic Mix Tank on West Wall, Elev 783
		Closed	CA-36	Caustic Pump Suction Tell Tale	Bottom of 1&2 Caustic Mix Tank downstream of CA-35, Elev 783

- NOTE:**
1. This enclosure is AP/EOP related.
 2. Operations alternates the power logic as outlined. Verification will be required to establish which alignment is in use at the time of question.



Duke Power Company
PROCEDURE PROCESS RECORD

(1) ID No. CP/3/A/2002/005

Revision No. 14

Continuous Use

INFORMATION ONLY

REPARATION

(2) Station Oconee Nuclear Station

(3) Procedure Title Post Accident Caustic Injection Into the Low Pressure Injection System

(4) Prepared By Shemi G. Hackey Date 12-13-01

- (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 Dean Cantrell (QR) Date 12/13/01

Cross-Disciplinary Review By _____ (QR) NA YAC Date _____

Reactivity Mgmt. Review By _____ (QR) NA YAC Date _____

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

(7) Additional Reviews

QA Review By _____ Date _____

Reviewed By _____ Date _____

Reviewed By _____ Date _____

(8) Temporary Approval (if necessary)

By _____ (OSM/QR) Date _____

By _____ (QR) Date _____

(9) Approved By Bryan J. Neung Date 12/13/01

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

- 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, if necessary)

Post Accident Caustic Injection into the Low Pressure Injection System

- NOTE:**
1. This entire procedure supports an AP or EOP action. The procedure will require AP/EOP validation per NSD 705.
 2. A control copy of this procedure shall be routed to the Emergency Preparedness Team within 3 working days after any approved changes.

1. Purpose

- 1.1 This procedure is to provide instruction for caustic addition into the LPI System during a Loss of Coolant Accident. (LOCA)

- 1.2 Principle

Caustic is injected into the LPI System during a LOCA to neutralize the borated water used in the Reactor Building Emergency Spray System to pH 7.0 - 8.0.

The neutralization will inhibit the generation of hydrogen gas and promote a higher partition factor for iodine.

2. Limits and Precautions

- 2.1 The following safety equipment shall be worn when connecting/disconnecting caustic tote bins:
 - 2.1.1 Chemical goggles
 - 2.1.2 Face shield
 - 2.1.3 Corrosive resistant suit, neoprene or chemrel
 - 2.1.4 Corrosive resistant boots, neoprene or PVC
 - 2.1.5 Corrosive resistant gloves, neoprene or PVC
- 2.2 Chemical hazards shall be known prior to use. For additional information, refer to the MSDS sheets.
- 2.3 Under accident conditions, valve alignments shall **NOT** be made and injection shall **NOT** begin without prior authorization from the Operations Emergency Coordinator **OR** the Technical Support Center (TSC) / Operational Support Center (OSC)!

NOTE: An initial caustic add of 15 inches will neutralize an RCS inventory of 80,000 gallons with a boron concentration of 1800 ppm. This is a conservative initial add to allow immediate response to a large break LOCA.

- 2.4 An initial caustic add of 15 inches can be made without performing CSM 5.2, Enclosure 6.3 (Caustic Addition Calculations).
- 2.5 In the event of caustic spill, call 4911.
- 2.6 ITS 5.4.1.a and SLC 16.13.7 require that pH be measured **AND** that the addition of caustic to Reactor Coolant commence within 30 minutes **AFTER** switchover to recirculation mode of core cooling to adjust pH to a range of 7.0 to 8.0 **WITHIN** 24 hours.

During recirculation mode, long-term core cooling is provided by injection of water from the Reactor Building Emergency Sump to the core by the Low Pressure Injection (LPI) pumps (3 LP-19 and 3 LP-20 are open). Switchover to recirculation mode is accomplished with minimal level in the BWST.

- 2.7 Safety and caustic addition equipment is stored in the brown storage container located in the Auxiliary Building, Unit 1 & 2 Chemical Addition Area. The following equipment should be retrieved for Caustic Addition:

Chemical Goggles	Tape Measure
Face Shield	Marking Pen (to mark level on Tote Bin)
Corrosive resistant suit	Bung Wrench
Corrosive resistant gloves	Leather Gloves

- 2.8 Keys to the brown storage container are stored with the caustic addition procedure in the OSC Chemistry Emergency Procedure Files and in the fireproof cabinet located in the Primary Chemistry lab office. All personnel in Primary Chemistry and Radwaste have also been issued individual keys.
- 2.9 Power to the caustic addition pump is provided through 3XL located near the LPI Hatch Area. For power supply diagram, see Enclosure 5.4.

3. Procedure

- 3.1 Upon notification from Operations Emergency Coordinator **OR** TSC / OSC, take the following actions to align the caustic addition system to the appropriate unit:

NOTE: The following steps may be performed simultaneously to conserve time.

- Verify eyewash and safety shower operable.
- Mark the current liquid level directly on the translucent tote bin container.
- Measure down from the liquid level mark 15 inches and mark this level directly on the tote bin.
- IF** necessary, move the tote bin into position.
 - Remove dust cover from Swagelock fitting on tote bin.
 - Remove dust cover from Swagelock fitting at 3CA-36 (Caustic Pump Suction Tell Tale) (AB Elev 771 at base of Unit 3 NaOH pump).
- 3.1.1 Make valve alignments per Enclosure 5.1 to allow caustic injection into the Low Pressure Injection (LPI) pump suction on Unit 3.

NOTE: Protective clothing shall be worn prior to Step 3.1.2.

- 3.1.2 Connect stainless steel flex hose to the Swagelock quick-connect fitting upstream of 3CA-36 (Caustic Pump Suction Tell Tale). (AB 711 at base of Unit 3 NaOH pump)
- 3.1.3 Connect stainless steel flex hose to the Swagelock fitting on the tote bin.
- 3.1.4 Vent the caustic tote bin by removing the tote bin fill cap.
- 3.1.5 Open the caustic tote bin outlet valve.
- 3.1.6 Notify Operations **OR** the OSC (if activated) that valve alignments for caustic injection are complete and ready to be initiated.

Operations or OSC Notified _____ Date/Time _____ / _____
- 3.1.7 **WHEN** notified by Operations, start the caustic addition pump at maximum flow setting. The caustic pump switch is located on the Chemical Addition Control Panel. The maximum pump capacity is approximately 2 gallons per minute.

NOTE: Use low dose waiting area as possible during addition

- 3.1.8 Notify Operations **OR** the OSC (if activated) that caustic injection has begun.
Operations or OSC notified _____ Date/Time ____/____/____

NOTE: The caustic pump has an average pump rate of 1.2 gallons per minute. To pump the initial setting of 15 inches will require 1.5 hours.

- 3.1.9 Calculate the total amount of caustic (in gallons) to be added for the neutralization of the borated water added to the system by using CSM 5.2 (Enclosure 6.3).
- 3.1.10 Convert gallons from Step 3.1.9 to inches (in the 350 gallon tote bin) by dividing the number of gallons to be added by 8.1. Record the values below:
Gallons to be added _____ Inches to be added from the tote bin ____
- 3.1.11 Mark the calculated liquid level directly on the tote bin by measuring down from the original "current liquid level" mark made in Step 3.1.
- 3.1.12 **WHEN** the caustic tote bin level reaches the desired level (as marked in Step 3.1) **OR WHEN** the caustic tote bin is empty, stop caustic addition pump using the switch located on the Chemical Addition Control Panel.
- 3.1.13 Close tote bin outlet valve.
- 3.1.14 Close 3CA-36 (Caustic Pump Suction Tell Tale) (AB Elev. 771 at base of Unit 3 NaOH pump).
- 3.1.15 Record time and volume added on Enclosure 5.3.

- 3.1.16 **IF** necessary, replace the caustic tote bin as follows:
- 3.1.16.1 Replace tote bin fill cap.
 - 3.1.16.2 Disconnect empty tote bin from Swagelock fitting on stainless flex hose.
 - 3.1.16.3 **IF** necessary, move tote bins and remove dust cover from Swagelock fitting on new tote bin.
 - 3.1.16.4 Connect stainless flex hose to the new tote bin.
 - 3.1.16.5 **IF** pumping is to continue, mark the tote bin per Section 3.1 for the amount to be added from the new tote bin and go to Step 3.1.4.
- 3.1.17 Notify OSC caustic addition to U-3 LPI is complete and no further additions are in progress.
- OSC Notified _____ Date/Time ____ / ____
- 3.1.18 After caustic addition is complete, allow LPI recirculation time of 2 hours.
- 3.1.19 **WHEN** authorized by the TSC/OSC, have sample taken (per appropriate procedure) to determine the resultant pH of the reactor coolant.
- 3.1.20 **IF** pH is < 7.0:
- Calculate (refer to CSM 5.2, Enclosure 6.3) the amount of caustic (in gallons) to be added to complete the neutralization of the borated water added to the system.
 - Convert this number to inches (in the 350 gallon tote bin) by dividing the number of gallons to be added by 8.1 gallons/inch.
 - Record the values below:
Gallons to be added: _____ Inches to be added from tote bin: _____
- 3.1.21 **IF** pH is > 7.0, go to Step 3.1.25.
- 3.1.22 Mark the current liquid level directly on the translucent tote bin container.
- 3.1.23 Measure down from this mark the number of inches calculated in Step 3.1.20 above. Mark this level directly on the tote bin.

- 3.1.24 Repeat Steps 3.1.1 through 3.1.21 until all necessary caustic (as determined by TSC/OSC) has been added.
- 3.1.25 After all necessary caustic has been added and upon authorization from the TSC/OSC, return the system to normal as follows:
 - 3.1.25.1 Replace tote bin fill cap.
 - 3.1.25.2 Disconnect empty tote bin from Swagelock fitting on stainless flex hose.
 - 3.1.25.3 Make alignments per Enclosure 5.2 to return valves to normal position.

4. References

- 4.1 Dwg. No. OFD-110A-3.8 Chemical Addition System (Primary Side Chemical Addition)
- 4.2 Dwg. No. OFD-102A-3.1, Low Pressure Injection System, Borated Water Supply and LPI Pump Suction.
- 4.3 CSM 5.2
- 4.4 ITS 5.4.1.a
- 4.5 SLC 16.13.7

5. Enclosures

- 5.1 Valve Alignment for Caustic Injection on Unit 3
- 5.2 Normal Valve Alignment for Caustic Injection System on Unit 3
- 5.3 Caustic Mixing and Injection Record
- 5.4 Unit 3 Caustic Pump Power Supplies

Enclosure 5.1
Valve Alignment for
Caustic Injection on Unit 3

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NOTE: This enclosure is AP/EOP related.

Date _____

<i>DV</i>	<i>Init</i>	<i>Position</i>	<i>Valve No.</i>	<i>Valve Name</i>	<i>Location</i>
		Open	3CA-103	Caustic Recirc Line & Press Gauge Block	AB Rm. 150, at Caustic Mix Tank north side downstream of PG27 & upstream of 3CA-103
		Closed	3CA-96	Caustic Recirc Block	AB Elev 771 at Unit 3 NaOH Pump Discharge
		Closed	3CA-35	Caustic Pump Suction	AB Elev 771 at base of Unit 3 NaOH pump
		Open	3CA-36	Caustic Pump Suction Tell Tale	AB Elev 771 at base of Unit 3 NaOH pump
		Open	3CA-112	Caustic Pump Pressure Gauge Isolation	AB Elev. 771 adjacent to but west of Unit 3 NaOH mix tank
		Closed	3CA-58	Caustic to #3 LP Pump Suction Tell Tale	AB Elev 783 Col. Q-91, near CC Cooler Room
		Open	3CA-39	Caustic to Unit #3 LP Block (Chm)	AB Hall, Elev 783 Col. Q-91, near CC Cooler Room
		Open	3CA-62	Caustic to Unit #3 LPI Block (OPS)	AB Elev 783 Col. Q-91, near CC Cooler Room
		Open	3LP-51	LPI Sample Recirc. Isolation Valve (Ops)	AB Elev 783 Col. R-90 near CC Cooler Room

**Normal Valve Alignment for
Caustic Injection System on Unit 3**

NOTE: This enclosure is AP/EOP related.

Date _____

<i>DV</i>	<i>Init</i>	<i>Position</i>	<i>Valve No.</i>	<i>Valve Name</i>	<i>Location</i>
		Open	3CA-103	Caustic Recirc Line & Press Gauge Block	AB Rm. 150, at Caustic Mix Tank north side downstream of PG27 & upstream of 3CA-103
		Open	3CA-97	Caustic Recirc Block	AB Elev 771 overhead at Unit 3 NaOH mix tank
		Open	3CA-96	Caustic Recirc Block	AB Elev 771 at Unit 3 NaOH Pump Discharge
		Closed	3LWD-267	Caustic Tank Outlet Drain	AB Elev 771 at tank drain pipe of Unit 3 NaOH pump
		Closed	3CA-34	Caustic Mix Tank Outlet	AB Elev 771 at base of Unit 3 NaOH pump
		Closed	3CA-35	Caustic Pump Suction	AB Elev 771 at base of Unit 3 NaOH pump
		Closed	3CA-36	Caustic Pump Suction Tell Tale	AB Elev 771 at base of Unit 3 NaOH pump
		Open	3CA-112	Caustic Pump Pressure Gauge Isolation	AB Elev 771 adjacent to but west of Unit 3 NaOH mix tank
		Closed	3CA-58	Caustic to #3 LPI Pump Suct Tell Tale	AB Elev 783 Col. Q-91, near CC Cooler Room
		Closed	3CA-39	Caustic to Unit #3 LPI Block (Chm)	AB Hall, Elev 783 Col. Q-91, near CC Cooler Room
		Closed	3CA-62	Caustic to Unit #3 LPI Block (OPS)	AB Elev 783 Col. Q-91, near CC Cooler Room
		Closed	3LP-51	LPI Sample Recirc. Isolation Valve (Ops)	AB Elev 783 Col. R-90 near CC Cooler Room

Unit 3 Caustic Pump Power Supplies

- NOTE:**
1. This enclosure is AP/EOP related.
 2. Operations alternates the power logic as outlined. Verification will be required to establish which alignment is in use at the time of question.

