Duke Energy

W. R. McCollum, Jr.
Vice President

Duke Energy
Oconee Nuclear Station
7800 Rochester Highway
Seneca, SC 29672
(864) 885-3107 OFFICE
(864) 885-3564 FAX

September 24, 2001

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 2001-08

Please find attached for your use and review copies of the revision to the Oconee Nuclear Station Emergency Plan: Volume C Revision 2001-08, September 2001.

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

September 24, 2001

OCONEE NUCLEAR SITE
INTRASITE LETTER

SUBJECT: Emergency Plan Implementing Procedures
Volume C, Revision 2001-08

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

REMOVE	ADD
Cover Sheet - Rev. 2001-07	Cover Sheet Rev. 2001-08
Table of Contents, Page 1 & 2	Table of Contents, Page 1 & 2
RP/0/B/1000/022 - 09/18/00	RP/0/B/1000/022 - 09/18/01
Engineering Directive 5.1 - 04/17/01	Engineering Directive - 09/12/01
Radiation Protection Manual Section 11.7 - 04/15/99	Radiation Protection Manual Section 11.7 - 08/29/01

DUKE POWER

EMERGENCY PLAN
IMPLEMENTING PROCEDURES
VOLUME C

APPROVED:

W. W. Foster, JR.T.B.
W. W. Foster, Manager
Safety Assurance

09/24/2001
Date Approved

09/24/2001
Effective Date

VOLUME C
REVISION 2001-08
SEPTEMBER, 2001

VOLUME C
TABLE OF CONTENTS

VOLUME C
TABLE OF CONTENTS

(Rev.06-97)

INFORMATION ONLY

Duke Power Company
PROCEDURE PROCESS RECORD

(1) ID No. RP/0/B/1000/022

Revision No 007

PREPARATION

Station Oconee Nuclear Station

(3) Procedure Title Procedure for Site fire Damage Assessment and Repair

(4) Prepared By ~~Z. L. Taylor~~ Date 9/4/01

(5) Requires 10CFR50.59 evaluation?
- X Yes (New procedure or revision with major changes)
- ☐ No (Revision with minor changes)
- ☐ No (To incorporate previously approved changes)

(6) Reviewed By Richard Ledford (QR) Date 9/6/01

Cross-Disciplinary Review By _____ (QR)NA~~X~~ Date 9/6/01

Reactivity Mgmt. Review By _____ (QR)NA~~X~~ Date 9/6/01

(7) Additional Reviews

QA Review By _____ Date _____

Reviewed By (OPS) William M. Bateman Date 9/10/01

Reviewed By (EE) Robert Taylor Date 9/17/01

(8) Temporary Approval *(if necessary)*

By _____ (SRO/QR) Date _____

By _____ (QR) Date _____

(9) Approved By C W Boyd Date 9/18/01

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 Listed 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)***

Duke Power Company Oconee Nuclear Station **Procedure for Site Fire Damage Assessment and Repair** **Reference Use**	Procedure No. RP/**0**/B/1000/022 Revision No. 007 Electronic Reference No. OX002WPJ

Procedure for Site Fire Damage Assessment and Repair

NOTE: This procedure in 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 A major damaging fire occurs as described in the Oconee Site Appendix "R" scenarios:

Enclosure 5.1: Turbine and Auxiliary Building Fire Scenario Description
Enclosure 5.2: Turbine Building Fire Scenario Description
Enclosure 5.3: Reactor Building Fire Scenario Description
Enclosure 5.4: Fire in the West Penetration Room or SSF Cable Trench Scenario Description
Enclosure 5.5: Fire at CT-4 Transformer Scenario Description

1.2 Portions of the protected area require evacuation/personnel relocation or a site evacuation/personnel relocation may be required due to plant damage.

2. Immediate Actions

NOTE: The following immediate actions are performed by Operations from the Control Room .

2.1 If required, the Fire Brigade is dispatched to put out the fire per the ONS Fire Plan.

2.2 Warn all Site personnel of fire location.

2.3 Activate the outside Site Assembly Horn to notify personnel outside the reach of the PA System.

2.4 Activate the Technical Support Center, Operations Support Center, and Emergency Operations Facility.

3. Subsequent Actions

3.1 Operations Group: At the direction of the TSC maintain the unit(s) in hot shutdown while performing simultaneously the actions required per the following procedures:

- EOP/1,2,3/A/1800/001, (Emergency Operating Procedure)
- OP/0/A/1102/024, (Operational Guidelines following Fire in Auxiliary Building, Turbine Building or Vital Area)
- AP/0/A/1700/025, (Standby Shutdown Facility Emergency Operating Procedure)

- OP/0/A/1102/025, (Cooldown Following a Fire)

3.2 If the TSC/OSC is not habitable (or may become so) due to fire, smoke, temperature, or radiological concerns, it should be relocated as soon as practical to the alternate location as agreed to by the Emergency Coordinator and OSC Manager. Continued availability of lighting, ventilation, and communications equipment must be considered. Refer to RP/0/B/1000/25, OSC Coordinator Procedure for details.

3.3 Dispatch assessment teams to determine extent of site damage and report findings back to the OSC.

3.3.1 OSC determines if repair procedures exist for damaged equipment, and notifies the TSC. Procedures listed on Enclosure 5.6, (List of Site Appendix "R" Fire Procedures) as well as other appropriate Maintenance Procedure should be used.

3.3.2 If procedures do not exist to make the necessary equipment repairs in order to achieve cold shutdown within 72 hours, the TSC will initiate required actions to evaluate, engineer, and proceduralize as appropriate the methods of repair.

3.4 Once the damage assessment is complete, the OSC ensures additional personnel required to bring the unit(s) to Cold Shutdown within approximately 72 hours of the initiating event are identified and available.

3.4.1 Workforce will be allocated for repairs per referenced procedures listed on Enclosure 5.6, (List of Site Appendix "R" Fire Procedures). These personnel are only to be dispatched as deemed necessary by OSC Manager.

3.4.2 Site specific departmental repair responsibilities are listed in Enclosure 5.7, (Site Specific Departmental Repair Responsibilities for TSC and OSC) for the TSC and OSC.

3.4.3 Since repair activities continue for an extended time, the OSC will ensure timely callout of relief personnel for repair workers and OSC members. OSC staffing may be altered as necessary.

3.4.4 Refer to Enclosure 5.8, (Maintenance Telephone List of Appendix "R" Supervision).

3.5 The OSC obtains feedback from the Fire Brigade concerning fire status and accessible work staging locations. The locations are listed on Enclosure 5.9, (Fire Damage Repair Work Locations). As these areas become accessible, work location supervisors, with Safety and RP support, are sent to make surveys. The following information is reported to the OSC:

- special safety precautions necessary due to structural damage, electrical shorts, etc.
- need for lighting
- need for ventilation

- RP requirements
- repair procedure applicability (which steps may be omitted)

3.6 Refer to Enclosure 5.10, (Repair Priorities & Descriptions) for a brief description & priority list of equipment repairs.

3.7 Refer to Enclosure 5.11, (Repair Work Flow Diagram) for an estimated timeline to be used as a guide in establishing equipment repair priorities.

3.8 Have the OSC Maintenance Manager inform Site Services Group to locate the necessary equipment and cable reels from enclosure 5.12, (Appendix "R" Material List) and begin moving these to the safe work location listed in Enclosure 5.9, (Fire Damage Repair Work Locations).

As described in Enclosure 5.9, (Fire Damage Repair Work Locations) initial staging of major equipment is performed according to MP/0/A/3009/012 (Emergency Plan for replacement of HPI, LPI, LPSW motors following a Fire in the Turbine or Auxiliary Building) and IP/0/A/0050/002, (Fire Damage Control Procedure). This includes:

- moving HPIP and LPIP motors from Bldg. #8093 (WHSE # 3) to the Hot Shop
- moving LPSWP motors from Bldg. #8093 (WHSE # 3) to the Unit 1 Heater Bay
- moving the emergency switchgear trailer from Bldg. #8019 (WHSE # 2G)to the Unit 1 & 2 electrical blockhouse
- moving valve control panels from Bldg. #8093 (WHSE #3) to the West Penetration Rooms' outside doors moving 4160V power cables and valve control cables from Bldg. #8019 (WHSE # 2G) to the Unit 1 & 2 electrical blockhouse, West Penetration Room doors, and SSF
- lifting cable trench covers at the North end of the SSF

3.9 Have the OSC Maintenance Manager coordinate delivery and set up of portable generators, lighting and ventilation. Refer to Enclosure 5.13 (Append "R" Maintenance Support Equipment) for a list of available equipment.

- It is assumed that lighting and power are lost at all in-plant work locations, and that ventilation equipment is necessary for motor replacement work in the HPI and LPI pump rooms. Actual conditions will be determined by RP and Safety surveys described in Step 3.5.

- The OSC Maintenance Manager will need to notify NMS-South to setup and operate the generators. Refer to Enclosure 5.8, (Maintenance List of Appendix R Supervision).

- Initial lighting and ventilation equipment is to be set up according to Enclosure 5.14, (Deployment of Lighting and Ventilation Equipment). Safety representatives and supervisors of work in affected locations are to assist the Maintenance Manager.

- Other equipment needs are set up by location work crews as necessary.

3.10 When it is decided by the TSC to proceed with unit(s) shutdown to cold shutdown, the Supt. Of Operations will notify Operations to begin unit(s) cooldown utilizing OP/O/A/1102/025, (Cooldown Following a Fire) and OP/1,2,3/A/1102/010, (Controlling Procedure for Unit Shutdown).

3.11 When the EOF Director reduces the Emergency Classification such that the OSC is no longer required, control of fire damage repairs are turned over to the Work Control Organization.

4. Appendix R Abstract

10CFR50, Appendix "R" requires that nuclear stations maintain the ability to repair major fire damage such that the plant has 72 hours to reach "cold shutdown". The Appendix "R" postulated fire scenarios for Oconee Nuclear Site assume for conservatism, that before any repair action is initiated, that 8 hours has elapsed from the initial indications of a fire. This would leave 64 hours for repair and cooldown to cold shutdown on the affected unit(s). This implies that the fire brigade fights the fire for the initial 8 hours and no other functions are carried out. This will most probably not be the case; therefore as soon as possible repairs shall be initiated. Refer to Enclosures 5.1 - 5.5 for detailed scenario descriptions.

Eight hours are allocated for preparation. During this time, an initial work force is called in by the OSC. Security is notified to allow workers into the plant. If a Site Area Emergency or General Emergency is declared, the TSC arranges for state and local agencies to allow workers through the traffic control points.

Since repair activities continue for an extended time, the OSC Manager assures timely call out of relief personnel for repair workers. The OSC Manager also directs arrangement of relief for the OSC members. OSC staffing may be altered as necessary.

Repairs for the TB/AB Fire encompass those for the other scenarios. This fire is assumed to damage systems in the Turbine Building, electrical block houses (except CT-4 Transformer), and the Auxiliary Building (except the West Penetration Room). All AC power is lost. To bring all three units to cold shutdown, it may be necessary to:

- replace motors on HPIP's 1A, 2A, and 3A
- replace motors on LPIP's 1C, 2C, and 3A
- replace motors on LPSWP's 1A and 3A
- provide 4160V power to the replaced motors; power and cooling water to a CCWP motor
- provide power and controls for each unit's PORV, Core Flood isolation valves CF-1&2, Decay Heat suction valves LP-1&2, RCS Post-Accident sampling valves, and Condenser outlet valves
- install local instrumentation for HPI, LPI, and LPSW systems

This procedure is intended for use after major fire damage as described in the enclosures, however if another plant evolution (i.e. natural disaster, etc.) creates the need of restoration of site equipment as described in any of the listed procedures, the methodology of workforce and equipment repair as addressed in this procedure can be used.

Within 3 1/2 hours of the loss of power to the CCWP's, a submersible pump is installed at the intake to provide water to the SSF. This is not considered an Appendix "R" fire damage repair; it is a separate SSF operability requirement.

Within 36 hours of the loss of power to the SFP cooling system the emergency plan for Refilling Spent Fuel Pools contained in MP/0/A/3009/012 shall be implemented. This is not considered an Appendix 'R' repair; it is a separate Spent Fuel requirement.

5. Enclosures

5.1 Turbine and Auxiliary Building Fire Scenario Description

5.2 Turbine Building Fire Scenario Description

5.3 Reactor Building Fire Scenario Description

5.4 Fire in the West Penetration Room or SSF Cable Trench Scenario Description

5.5 Fire at CT-4 Transformer Scenario Description

5.6 List of Site Appendix "R" Fire Procedures

5.7 Site Specific Departmental Repair Responsibilities for TSC and OSC

5.8 Maintenance Telephone List of Appendix "R" Supervision

5.9 Fire Damage Repair Work Locations

5.10 Repair Priorities & Descriptions

5.11 Repair Work Flow Diagram

5.12 Appendix "R" Material List

5.13 Appendix "R" Maintenance Support Equipment

5.14 Deployment of Lighting and Ventilation Equipment

Turbine and Auxiliary Building Fire - Scenario Description

This fire starts in the Turbine or Auxiliary Building. It is bounded by the Reactor Buildings' walls, fire walls around the West Penetration Rooms, and the fire wall between CT-4 transformer and the Unit 1 & 2 Electrical Blockhouse. Unattached structures are not affected.

As in all the scenarios, off-site power is lost and not recovered. The fire causes immediate damage to systems in the fire area, including loss of the main feeder buses and 6900V RCP buses (station blackout). Equipment subject to fire damage is assumed to fail and/or actuate spuriously, whichever is worst-case.

The reactors are shut down. Hot shutdown conditions are maintained from the SSF until repairs are made to allow cooldown.

Repairs cannot begin for 8 hours. During this time the Emergency Plan is activated, the SSF-dedicated submersible pump is installed, the fire is controlled, manpower and equipment are called to the site, and preparations for repairs are made.

Repair details are presented in Enclosure 5.10, (Repair Priorities and Descriptions). *HPI is restored to provide RCS inventory control, and valves for RV head venting and pressure control made operable, prior to starting cooldown. Natural circulation cooldown is performed using SSF ASW and the MS atmospheric dump valves. CF-1 & 2 are made operable and closed before RCS pressure is decreased below CFT pressure (600 psig). *CCW, *LPSW, and *LPI are restored as prerequisites to establishing LPI cooling. LPI is then used to cool down from 250 °F to cold shutdown. RCS sampling valves and CCW condenser outlet valves are also restored.

* including power to pump motors, valve controls, and instrumentation; as necessary for each system

Turbine Building Fire - Scenario Description

The fire is the same as the TB/AB Fire, except that it is bounded on the west by the Auxiliary Building wall. The open structure of the Turbine Building makes this a more likely event, however.

Plant control is the same as for the Turbine and Auxiliary Building Fire.

Repair scope is decreased, since HPIP and LPIP motor replacement is not necessary. Restoration of Auxiliary Building valve controls and instrumentation remains necessary due to loss of power.

Enclosure 5.3

Reactor Building Fire - Scenario Description

This scenario is presented for reference only. No repairs are necessary to achieve cold shutdown.

The fire is confined to a limited area within the Reactor Building. Shield walls and structural spacing prevent spread of the fire.

Main feeder bus and RCP power is automatically restored from Keowee via the overhead power path.

Various failures occur, depending upon the fire's location. All are mitigated by redundant systems (including SSF-operated equipment) or operator action. Reactor Building entry is necessary for manual valve operation if CF-1, CF-2, LP-1, or LP-2 power cables burn.

EFW is used for cooldown until LPI is established.

Fire in the West Penetration Room or SSF Cable Trench - Scenario Description

This is actually a grouping of several scenarios with the same effect - a loss of off-site power (given), coupled with loss of SSF-to-plant electrical ties.

The fire is confined within a West Penetration Room (where SSF cabling enters the plant), or within a SSF-to-plant cable trench. The fire affects a single unit, unless it is in the SSF-to-Unit 3 cable trench. In this case the fire also burns CCWP power cabling, which intersects the SSF-to-Unit 3 cable trench, so that a total loss of station CCW occurs.

Main feeder bus and RCP power is automatically restored from Keowee via the overhead power path.

A fire in a West Penetration Room (WPR), or in the Unit 1 or 2 cable trench, requires no repairs for cooldown. EFW is used until LPI cooling is established. If WPR cables are burned, Reactor Building entries are made to manually operate CF 1 & 2 and LP 1 & 2.

Fire in the Unit 3 cable trench causes loss of station CCW. Lack of CCW can bring about loss of LPSWP suction, in-plant ASWP suction, EFW inventory, and SSF water supply.

Repairs consist of restoring power to one CCWP - a power cable is pulled to the Unit 3 4160V switchgear. The SSF-dedicated submersible pump is also installed at the CCW intake. It provides:

- suction for the jockey pump, which substitutes for LPSW cooling of the HPIP motors and the turbine driven EFWPs
- suction for the in-plant ASWP and SSF
- cooling/sealing water for the CCWP.

On all three units, cooldown is begun with EFW. If EFW inventory becomes depleted, ASW is used to continue cooldown to 250°F. LPI cooling is established for cooldown to cold shutdown. Constraints are:

- The jockey pump must be started within 5 hours of loss of CCW flow, before the EWST is depleted. This time may be extended by isolating HPSW cooling/sealing water to CCWPs.
- If atmosphere dumps are used, EFW inventory will be depleted in a minimum of 12 hours at HSD, or 6 hours during cooldown.
- Since control of Unit 3's SSF-ASW valves is not available, in-plant ASW would be used. SSF-ASW could be used on Units 1 and 2.
- If LPSWP suction has been lost, the CCWP must be started prior to establishing LPI cooling.

Enclosure 5.5

Fire at CT-4 Transformer - Scenario Description

No repairs are required for cooldown.

Fire is confined within the CT-4 room. CT-4 becomes inoperable.

Main feeder bus and RCP power is automatically restored from Keowee via the overhead power path. EFW is used for cooldown until LPI cooling is established.

Repair Procedures

MP/0/A/3009/012	Emergency Plan for Replacement of HPI, LPI, LPSW Motors Following a Fire in Turbine Building or Auxiliary Building
MP/0/A/1300/020	Pump Ingersol Rand - High Pressure Injection - Removal and Replacement of Pump and Motor
MP/0/A/1300/040	Pumps - Alignment and Coupling to Motor
MP/0/A/3009/XXX (series)	Various ONS and Keowee Hydro Station Motor Inspection and Maintenance Procedures
IP/0/A/0050/002	Fire Damage Control Procedure
IP/0/A/0050/001	Procedure to Provide Emergency Power to An HPI Pump Motor From The ASW Switchgear
IP/0/A/0050/06	Appendix R Motor Operated Valve Cable Verification

Submersible Pump Procedures

MP/0/A/1300/059	Pump - Submersible - Emergency SSF Water Supply - Installation
IP/0/A/0050/003	Procedure to Provide Power for SSF Submersible Pump

Spent Fuel Pool Water Level Recovery

MP/0/A/3009/012A	Emergency Plan for Refilling Spent Fuel Pools

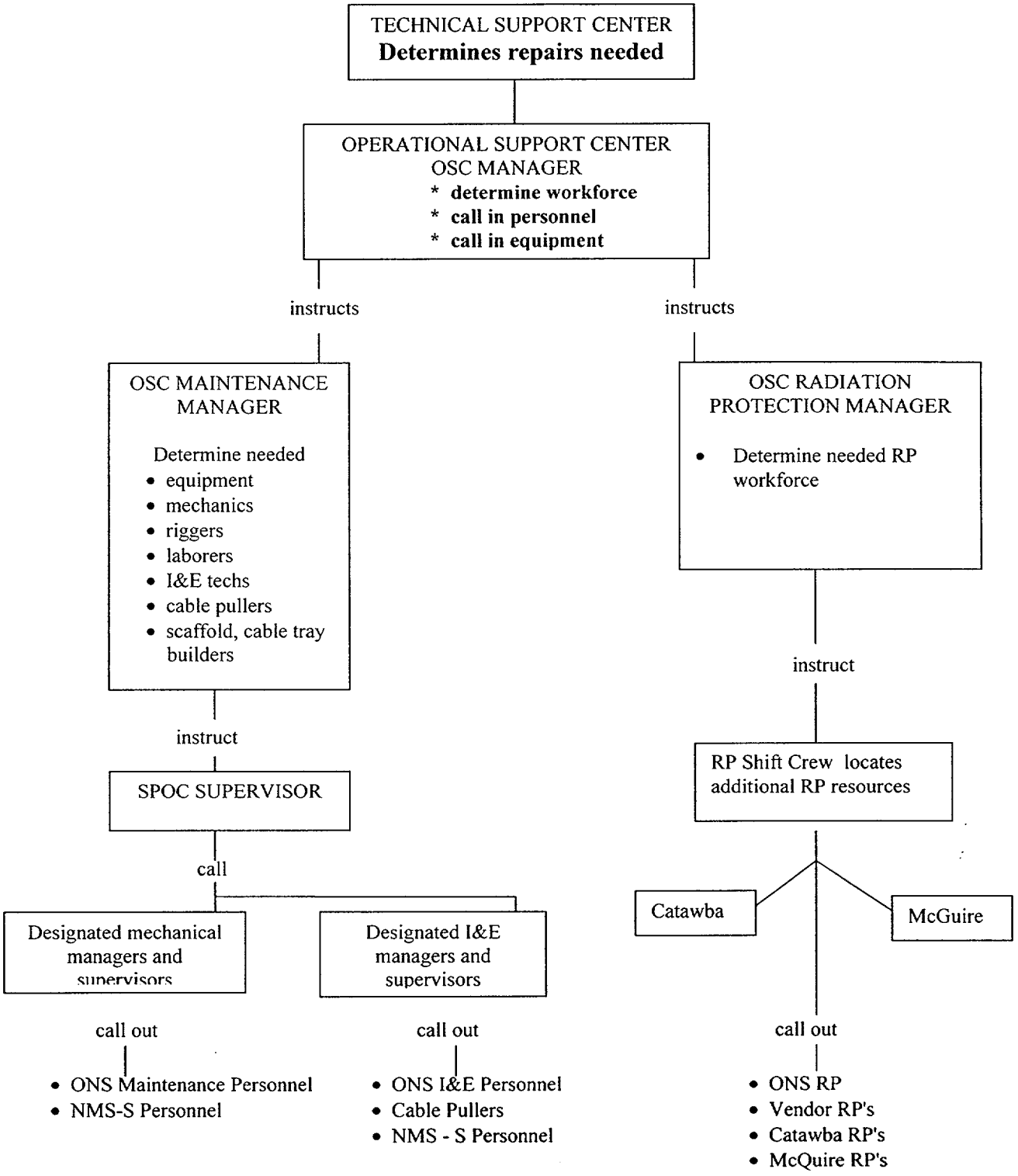
Operations Controlling Procedures

OP/0/A/1102/024	Operational Guidelines Following Fire in Auxiliary Building, Turbine Building, or Vital Area
OP/0/A/1102/025	Cooldown Following a Fire
OP/0/A/1104/052	SSW System
AP/0/A/1700/025	Standby Shutdown Facility Emergency Operating Procedure
EP/1/A/1800/001	Emergency Operating Procedure
EP/2/A/1800/001	Emergency Operating Procedure
EP/3/A/1800/001	Emergency Operating Procedure

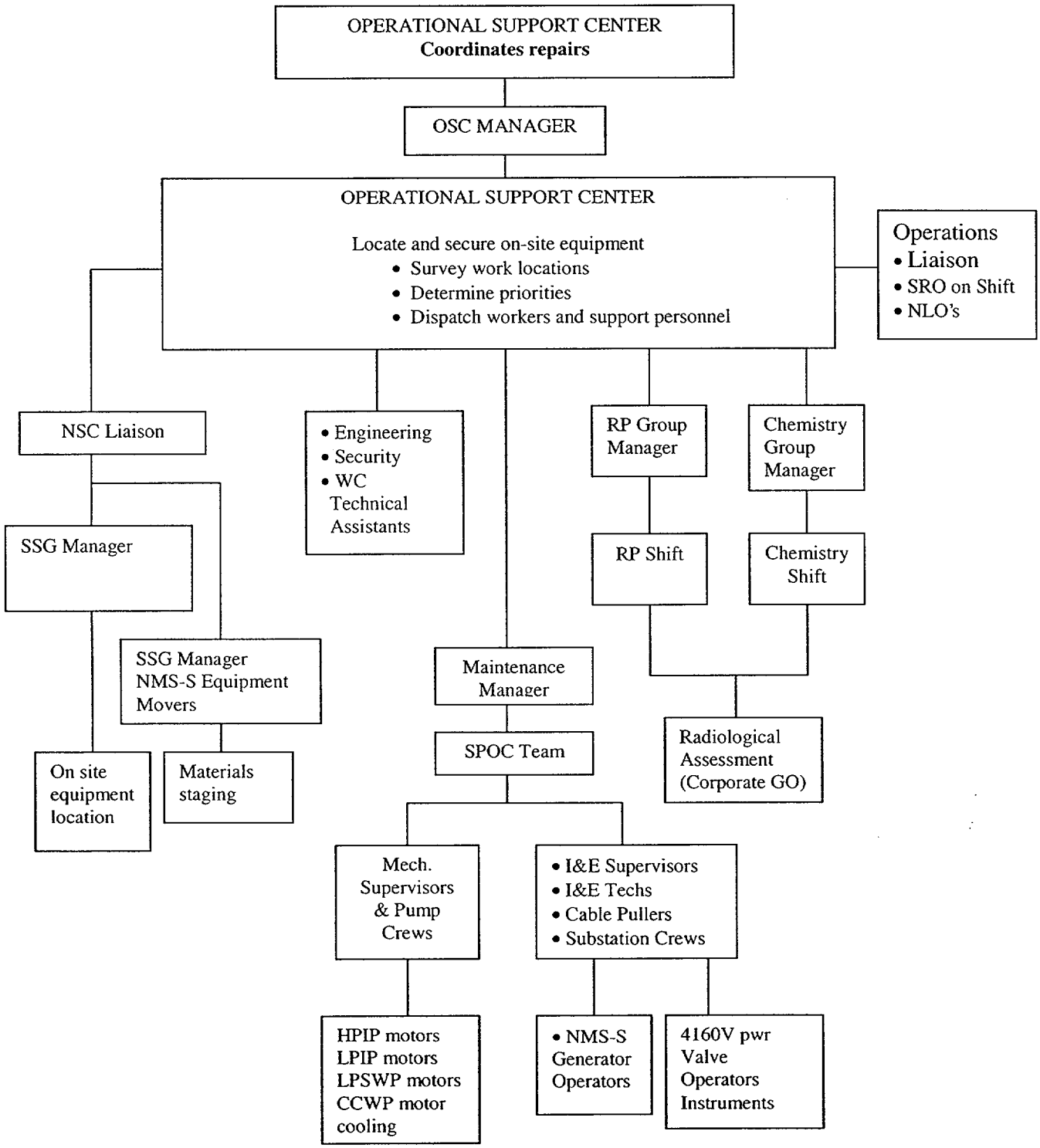
Chemistry Procedures

CP/O/A/2002/04E:	Reactor Coolant Sampling During Appendix "R" Accident

Detailed Maintenance and RP Repair Responsibilities for TSC/OSC



Overall Departmental Repair Responsibilities for TSC/OSC



Enclosure 5.8

Maintenance Telephone List of Appendix "R" Supervision

GROUP	GROUP CONTACT	Office #	Beeper #	Home Phone #
I&E Maintenance Electrical Relaying and Metering Keowee Hydro (ONS) M&TE Switchyard Coordination Admin Support	**Scott Batson** **Alternates:** ➢ Doug Hunter ➢ Alan Green	885-3274 885-3155 885-3099	777-9336 778-8580 778-6173	864-878-6261 864-638-3687 Contact ONS switchboard
ONS Rotating Equipment Maintenance *Pumps / Motors* *HVAC* *Diesel Generators* *Compressors* *PMII* *Turbine / Generators*	**Regis Repko** **Alternates:** ➢ Doug Moore ➢ Charlie Brewer	885-4878 885-2904 885-4609	777-9360 777-8274 778-2591	864-654-5648 864-647-9172 864-654-7205
ONS General Maintenance *Fuel Handling* *Reactor Services* *Cranes* *SPOC* *Heat Exchangers* *Misc. Mechanical*	**Michael Parker** **Alternates:** ➢ Duty SPOC Supervisor	885-3595 3101/3135	777-9336	864-654-5841
ONS Valves Maintenance *Valves* *Civil* *Fluid Leak Management* *Outage Management*	**Craig Tompkins** **Alternates:** ➢ Troy Beatty ➢ Jerry Bolding	885-4018 885-3309 885-3933	777-9408 777-9038 778-6503	864-654-6854 864-882-6821 Contact ONS switchboard
Mod/Special Projects Manager *Modifications* *Welding* *Hangers* *Machine Shop* *Fab Shop* *Critical / Complex Coordination* *Innage Coordinators* *Material Condition (Non-Project)*	**Philip Culbertson** **Alternates:** ➢ Bill McAlister ➢ Trip McClure	885-4025 885-3100 885-3170	778-2103 778-8176 778-1648	864-654-5836 864-972-0300 864-647-6117

Enclosure 5.8

Maintenance Telephone List of Appendix "R" Supervision

Site Services *Portable lights, generators etc*	**ONS Duty Roster - Site Services Duty Person**	Refer to ONS Web Home Page		
	➢ T. Larry Crouse	885-4003	777-4379	864-639-4905
	➢ Duran D. Denny	885-4035	777-4380	864-972-1082
NMS - South ***Equipment Operators & Additional Personnel***	**ONS Duty Roster - ESS Equip**	Refer to ONS Web Home Page		
	➢ Gains Bowers	885-3920	778-2439	864-868-5410
	➢ Bill Sams	885-4474	778-2458	864-638-7969
Electric Transmission (South)	**Transmission Control Center**	1-800-326-6537 or 8-382-9404		
	Alternate: ➢ Jerry A. Allen	8-234-4027	778-8640	864-269-7540
Nuclear Supply Chain *Materials/ Procurement Engr*	**Larry E. Walker**	885-3731	777-9724	864-882-5895
	Alternate:			
	➢ Robert L. Henderson	885-2087	778-7628	

The following areas may require access to facilitate bringing the unit (s) to clod shutdown within 72 hours of the initiating event:

Building Nos. (Location)	Work Performed
8093(WHSE # 3)	Appendix "R" Materials
8019(WHSE # 2G)	Emergency 4160V switchgear
8019(WHSE # 2G)	Cables for 4160V power, valve control
8095 - Hot Shop	Staging HPIP, LPIP, motors
8095 - Hot Shop Tunnel	Unit 1 & 2 HPI Hatch Area
	Handling HPIP motors
Unit 3 HPI Hatch Area	
Unit 1 & 2 HPI Pump Room	HPIP motors, instrumentation
Unit 3 HPI Pump Room	
Unit 1 & 2 LPI Hatch Area	Handling LPIP motors
Unit 3 LPI Hatch Area	
Unit 1 North LPI Pump Room	LPIP motors, valve operators,
Unit 3 South LPI Pump Room	Instrumentation
Unit 3 North LPI Pump Room	Instrumentation
AB 1st Floor Corridor	Towing U3 HPI/LPI pump motors:
	Instrumentation
Roadway running north/south between Auxiliary Building and SSF	Transporting pump motors and valve control panels; cable pulling pathways
TB Breezeway West Entrance	LPSWP motor entry
TB ground floor at 1C2 heater	
Unit 1 & 2 LPSW Pump Area	
Unit 3 LPSW Pump Area	LPSWP motors
TB basement LPSWP pathways	Towing LPSWP motors
see MP/0/A/3009/012, (Emergency Plan for Replacement of HPI, LPI, LPSW motors Following a Fire in Turbine Building or Auxiliary Building)	
TB/AB basement 4160V cable pathways see IP/0/A/0050/008, (Fire Damage Control Procedure)	Pulling cables
TB basement east of condensers	Condenser outlet valves
CT-4 transformer	4160V power
Roadway east of TB	Transforming switchgear and cables, pulling cable to CCWP
CCWP service structure	Connecting power cables to CCWP
Unit 1, 2, and 3 West Penetration Room outside doors and stairways	Valve control panels
Unit 1 and 2 East Penetration Rooms	Valve control cables
Unit 1, 2, and 3 West Penetration Rooms	Valve control cables; instrumentation
Unit 1, 2 and 3 BWST's	Instrumentation

NOTE:
1. The equipment listed in this enclosure are in order of repair priority, with #1 being the most important.
2. Specific equipment restorations will depend on damage equipment assessments and particular fire, not necessarily on the pre-supposed scenario descriptions.

1. HPIP Motor Replacements

HPIP motor replacements are the longest duration, most challenging repairs. In addition, use of the HPI system is necessary to begin cooldown.

Controlling Procedure: MP/0/A/3009/012, (Emergency Plan for Replacement of HPI, LPI, LPSW Motors Following a Fire in Turbine Building or Auxiliary Building).

HPIP 1A, 2A, and 3A motors are replaced.

Oil is drained from the Unit 3 HPIP motor (only).* A forklift moves each motor through the BLDG. #8093 (WHSE #3) door to the Hy-Dynamic crane, which takes it into the Hot Shop. A forklift moves dollies from BLDG. #8093 (WHSE #3) to the Hot Shop, where they are lowered into the Hot Shop tunnel. Each motor is lowered onto its dolly, Unit 3's first, then manually towed to the appropriate HPI Hatch Area. The Unit 1 & 2 motors are both taken to the south side of the Unit 1 & 2 Hatch Area.

Availability of electric power affects these staging activities. Without power, rollup doors at the Hot Shop are opened manually. The Hy-Dynamic removes the Hot Shop tunnel hatch and lowers motors into the tunnel. With power, the Hot Shop crane handles loads in the Hot Shop. Manual hoists are provided for handling hatches and motors in the HPI Hatch Areas, if the installed electric hoists are inoperable.

Parallel to initial staging activities, pathways are cleared from the Hot Shop to the HPI Hatch Areas. HPI hatches are removed. Electricians cut the old HPIP motor power cables, and pump crews begin removing the old motors.

When removed, the old motors are placed out of the way in the HPIP rooms or hatch areas. New motors are then installed and aligned according to MP/0/A/1300/020, (Pump Ingersol Rand-High Pressure Injection - Removal and Replacement of Pump and Motor).

The replacement motors are air-cooled, so that cooling water hookup is not required. Motor instrumentation is not reconnected. While careful motor-to-pump alignment is necessary, the usual Q.A. documentation of HPIP work is not required. On Unit 3 only, oil must be replaced after the new motor is set.

Power to the motors is restored according to IP/0/A/0050/002, (Fire Damage Control; Procedure), (see Restoration of 4160V Power to Pump Motors). After new power cables are pulled, electricians connect them to the motors. The motors are "bumped" to check for correct rotation before running the pump.

- Oil is drained because the Unit 3 motor is tipped on its side for handling. This is necessary due to low overhead clearance in the Auxiliary Building corridor.
- The Unit 3 motor is handled first because of the longer distance it must be towed.

2. LPSWP Motor Replacement

LPSW flow to LPI coolers is required at about 250 degrees F in the RCS, when LPI cooling is begun. Other LPSW cooling loads, though not essential for cooldown, make LPSWP motor replacements important.

Controlling Procedure: MP/0/A/3009/012, (Emergency Plan for Replacement of HPI, LPI, LPSW Motors Following a Fire in Turbine Building or Auxiliary Building).

LPSWP 1A and 3A motors are replaced.

After HPIP motors are moved, a forklift moves the two LPSWP motors and dollies to Bldg. #8093 (WHSE # 3) rollup door. These are loaded onto a crane truck, which is driven through the Turbine Building Heater Bay rollup door. The boom truck lowers the LPSWP motors and dollies to the basement through grating east of feedwater heater 1C2. (If the heater bay crane is operable, it may be used to lower LPSWP motors through the normal access holes.)

Activities parallel to LPSWP motor staging are similar to those for HPIP motors. The LPSWP motor pathways in the TB basement are shown in MP/0/A/3009/012, (Emergency Plan for Replacement of HPI, LPI, LPSWP Motors Following a Fire in Turbine Building or Auxiliary Building). Procedures used to remove, replace, and align the motors are MP/0/A/2000/003, (ONS and Keowee Hydro Station Motor Inspection and Maintenance), and MP/0/A/1300/040, (Pumps - Alignment and Coupling to Motor). Power is restored according to IP/0/A/0050/002, (Fire Damage Control Procedure).

3. LPIP Motor Replacements

LPIP motor replacement is completed after LPSWP motor replacement, but only because LPSWP motors are given priority during staging. LPI is required for cooldown below about 250°F.

Controlling Procedure: MP/0/A/3009/012, (Emergency Plan for Replacement of HPI, LPI, LPSW Motors Following a Fire in Turbine Building or Auxiliary Building).

LPIP 1C, 2C, and 3A motors are replaced.

This job is essentially the same as HPIP motor replacements, with the following exceptions:

- After LPSW motors are moved, a forklift moves the LPIP motors to the Hot Shop.
- LPIP motors are all handled in their normal orientation; no oil draining is required.
- Procedures used for pump motor removal, replacement, and alignment are MP/0/A/2000/003, (ONS and Keowee Hydro Station Motor inspection and Maintenance) and MP/0/A/1300/040, (Pumps-Alignment and Coupling to Motor).

4. Restoration of 4160V Power to Pump Motors

Power restoration has shorter duration than motor replacements. The CCWP is required to supply suction to LPSWP's.

Priorities between the pump motors are:

1) HPIP's
2) CCWP
3) LPSWP's
4) LPIP's

Procedure: IP/0/A/0050/002, (Fire Damage Control Procedure)

Power is restored to the eight replaced HPIP/LPIP/LPSW motors, and to a CCWP motor.

A special 4160V power control system has been designed for this purpose. It consists of 9 trailer-mounted 4160V breakers and a control panel (the emergency switchgear) powered from CT-4 transformer. DC control power for the breakers is supplied from the SSF. 4160V power cables are pulled from the emergency switchgear to the pump motors.

Several staging activities are conducted. A road tractor pulls the emergency switchgear trailer from Bldg. #8019 (WHSE # 2G) to its parking area just southeast of the Unit 1 & 2 electrical blockhouse*. A crane truck picks up 4160V cable reels from Bldg. #8019 (WHSE # 2G) and moves them to the blockhouse. Another crane truck picks up the DC-control cable reel (along with those for valve operators) and takes it to the SSF. Cable reel stands are moved with the cables. Pipes for cable reel handling are obtained from the pipeyard.

A Demag or Grove crane lifts two sections of cable trench cover - one on each side of the roadway between the SSF (north end) and the Hot Shop. This allows cable pulling for the DC control cable, as well as the valve operator cables. Care is taken to avoid interference with pump motor staging.

Scaffolding is erected for safe access to terminal points on top of CT-4. After the emergency switchgear is moved, cable trays (stored on the switchgear trailer) are erected over the breakers.

Cable is pulled manually, following pathways described in IP/0/A/0050/002, (Fire Damage Control Procedure). Cable for the eight HPIP/LPIP/LPSWP motors is stored on three reels, so that simultaneous cable pulling is not possible. Cable is first pulled to the three HPIP motors, followed by the LPSWP and LPIP motors. Cable for the CCWP is on a separate reel. A hole for CCWP cable pulling may be cut in the security fence near the Radwaste Interium Facility if the time duration to get the gate open is too long.

Transmissions Substations technicians connect cables at CT-4 and the emergency switchgear. Electricians make connections at the motors and SSF (DC control cable). Power cables are connected at the motors first.

In a separate mechanical job, cooling water is restored to the CCWP motor according to MP/0/B/1300/059, (Pump-Submersible-Emergency SSF Water Supply-Installation). A line from the SSF submersible pump is connected to the motor's HPSW cooling line.

- The emergency switchgear can not be exposed to rain or fire-fighting water. If necessary, it is wrapped with Herculite which is available at Bldg. #8093 (WHSE # 3).

5. Valve Operability Restoration

Individual valve priorities depend upon plant conditions, as stated below:

(1) 1/2/3 RC-66 PORV
IF both RCP's on the PZR loop are inoperable, **AND** PZR auxiliary spray cannot be aligned, this valve must be used for RCS pressure control during cooldown.

(2) 1/2/3 RC-159, 160 RV Head Vents
IF no RCP's are operable, these valves are required for venting during natural circulation cooldown.

(3) 1/2/3 CF-1, 2 Core Flood Tank Isolation Valves
These valves must be closed before the RCS is depressurized below 600 psig.

(4) Condenser Outlet Valves
These valves are opened when the CCWP is started.

(5) 1/2/3 LP-1, 2 Decay Heat Drop Line Valves
These valves must be opened to establish LPI cooling.

(6) 1/2/3 RC-162, 163, 179; 1/2 RC-164, 165 RCS Post Accident Sample Valves
Sampling is required for RCS boron and fuel failure analysis. These valves may be given a higher priority if RCS conditions are in question.

Procedure: IP/0/A/0050/002, (Fire Damage Control Procedure)

Electrically operated valves to be restored are 1/2/3 RC-66; 1/2/3 CF-1&2; 1/2/3 LP-1&2; 1/2/3 RC-159&160; 1/2/3 RC-162&163; 1/2 RC-164&165.

Pneumatic valves are 1/2/3 RC-179 and two condenser outlet valves.

A power/control system has been designed for the electrically operated valves. It consists of a valve control panel (VCP) for each unit, power cables from the SSF to the VCP's, and control cables from the VCP's to the valve operators or their RB electrical penetrations.

A forklift moves the VCP's, which are unit-specific, from Bldg. #8093 (WHSE # 3) to the West Penetration Rooms' outside doors. A crane truck brings valve control cable reels from the Bldg. #8019 (WHSE # 2G) to the VCP's (see Restoration of 4160V Power to Pump Motors).

Cable is pulled from the VCP's to the SSF Electrical Equipment Room. Cables from the VCP's are pulled up the West Penetration Room stairways to the electrical penetrations in the East and West Penetration Rooms (on Unit 3, West only). Cables are also pulled to two valve operators in both the North and South Unit 1&2 LPIP rooms.

Connections at the VCP's, penetrations, and valve operators are made by electricians.

The pneumatically operated valves are located in the respective units' A LPIP rooms, and in the Turbine Building basement. Operations determines which condenser outlet valves are to be restored. A nitrogen bottle (Bldg. #8093 (WHSE # 3)) is taken to each valve. I&E technicians connect the nitrogen supply and a pressure regulator to each valve operator.

6. Installation of Local Instrument

This is the shortest duration repair activity.

Priorities between systems are:

1) HPI
2) BWST (if being used)
3) LPSW
4) LPI

Procedure: IP/0/A/0050/002, (Fire Damage Control Procedure)

I&E technicians pick up replacement local instrumentation (from Bldg. #8093 (WHSE # 3) and install it for the below-listed parameters. This work is done in the AB 1st floor corridor, the HPI pump rooms, the LPI pump rooms, and at the BWST.

HPI:	RC makeup flow HPIP discharge pressure
LPI:	LPI flow LPIP discharge pressure LPI return temperature
LPSW:	LPSW flow to LPI cooler
BWST:	BWST level

7. Refilling the Spent Fuel Pools with Lake Water from Fire Trucks

This activity should be completed and ready within 36 hours of the loss of cooling to the spent fuel pool.

Procedure: MP/0/A/3009/012A, (Emergency Plan For Refilling Spent Fuel Pools.

Fire trucks will be used to take suction from the lake either at the Intake or Boat Ramp Basin and discharge through a filter unit to each Spent Fuel Pool.

A minimum of 3100' of 2 1/2" fire hose (total hose supply to be used from the offsite agencies), 1 filtration unit (stored at the SSF)(spare filters are in Warehouse 3, Zone A -3AA040020001), 1 gate Wye valve will be needed.

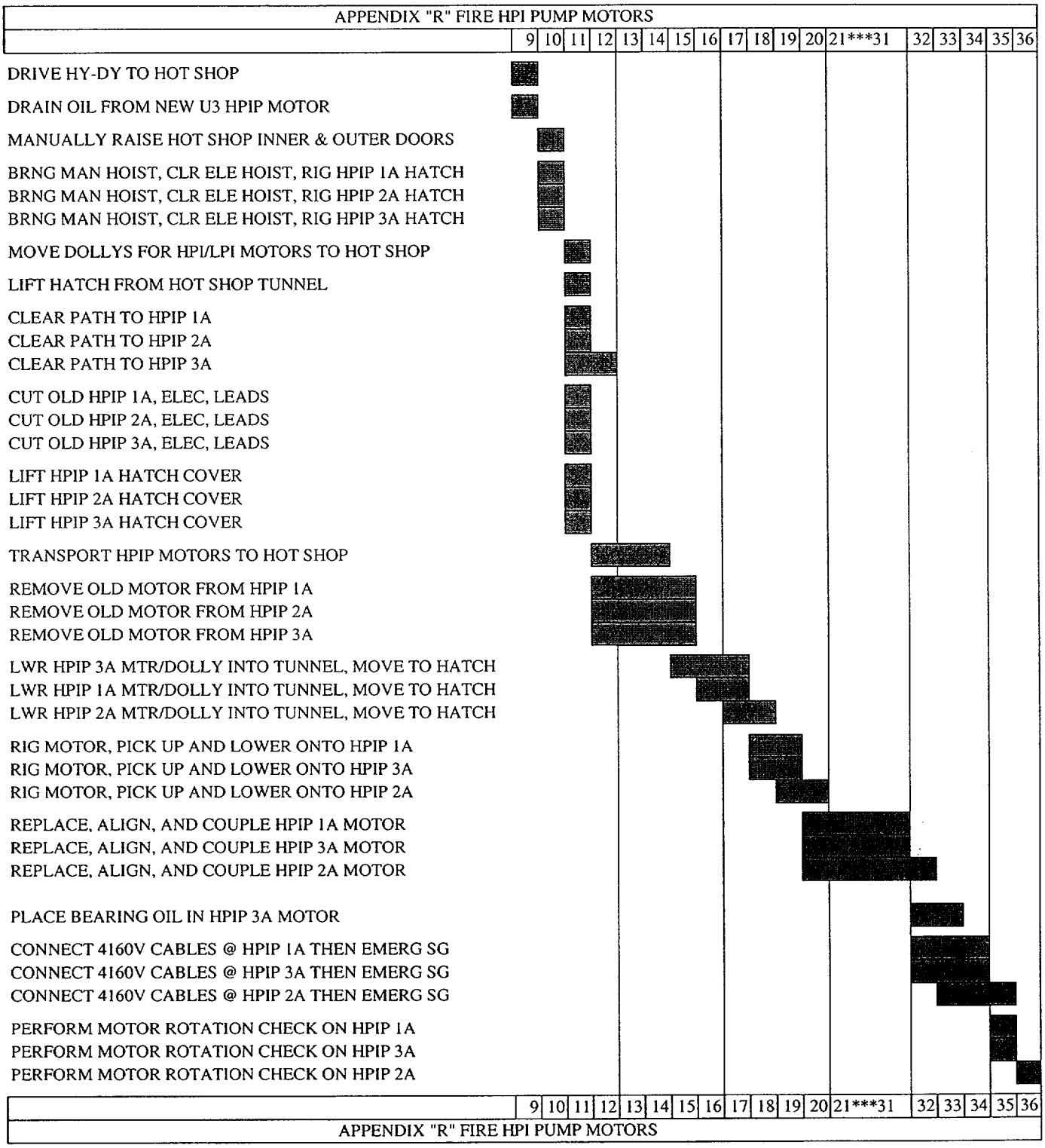
If the lake is >793.5' suction can be taken for the fire truck at the Intake Structure.

If the lake is <793.5' suction can be taken for the fire truck at the Boat Ramp Basin.

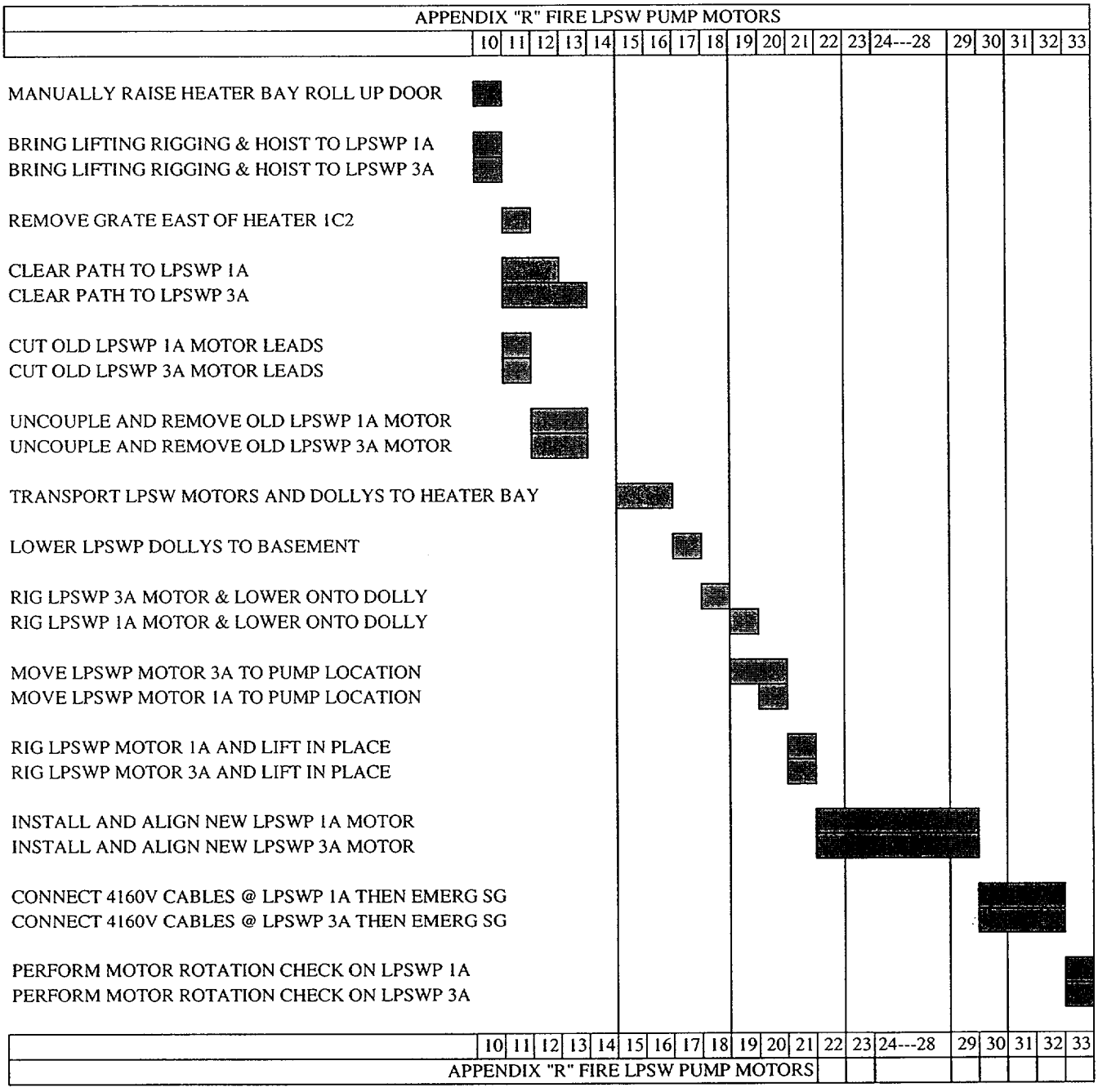
Enclosure 5.11

Repair Work Flow Diagram

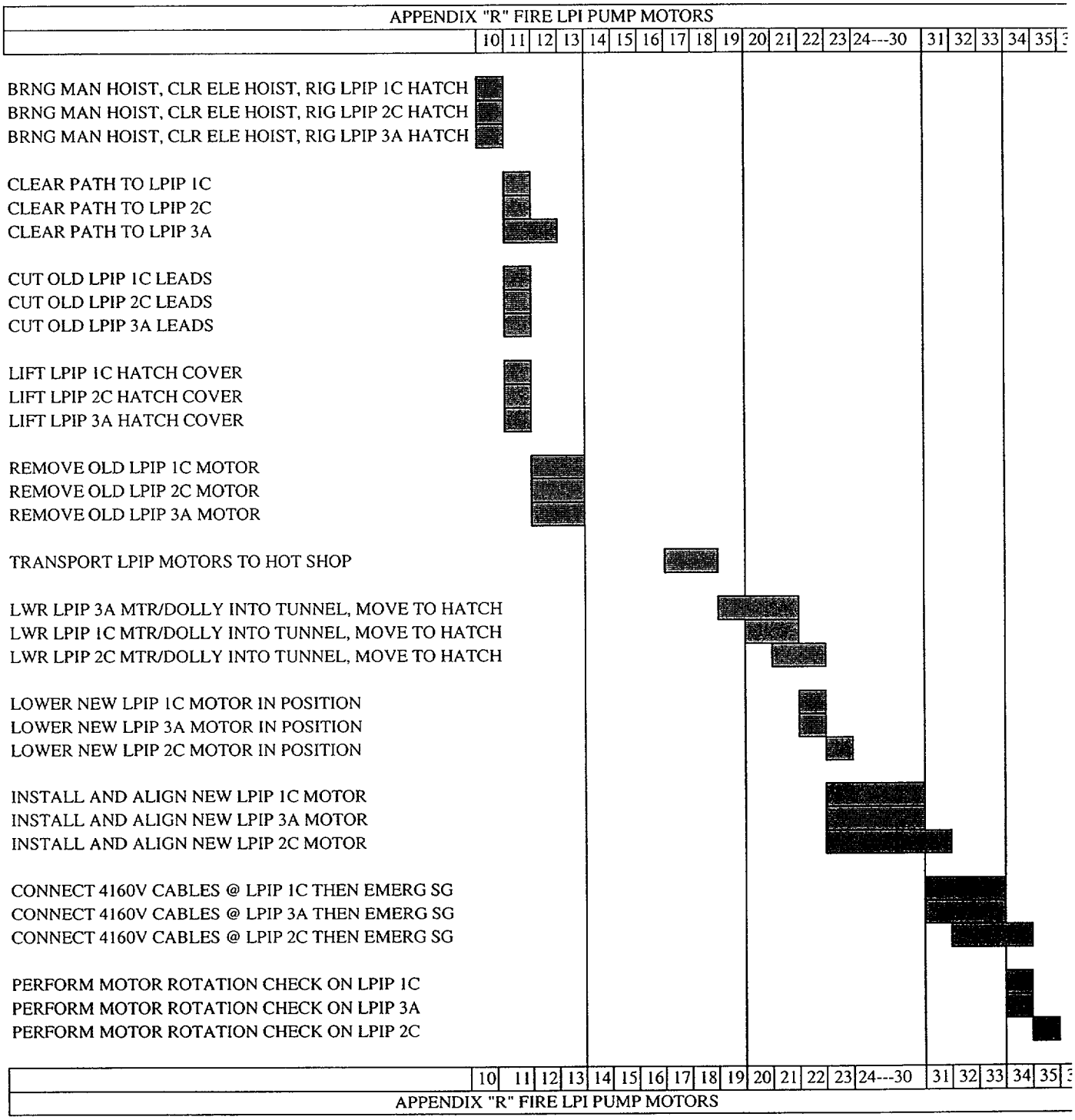
HPIP Motor Replacements



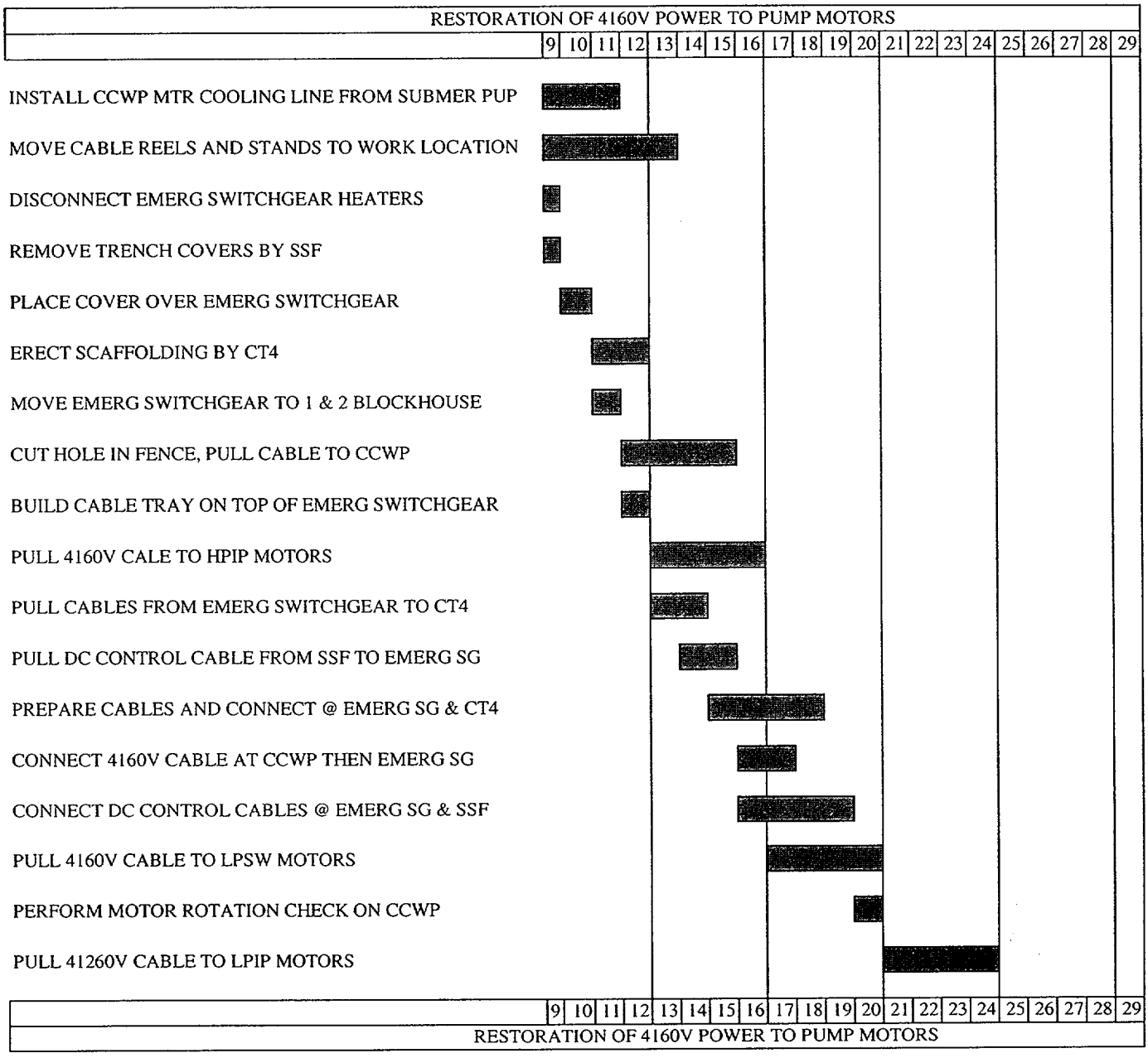
LPSWP Motor Replacements



LPIP Motor Replacements

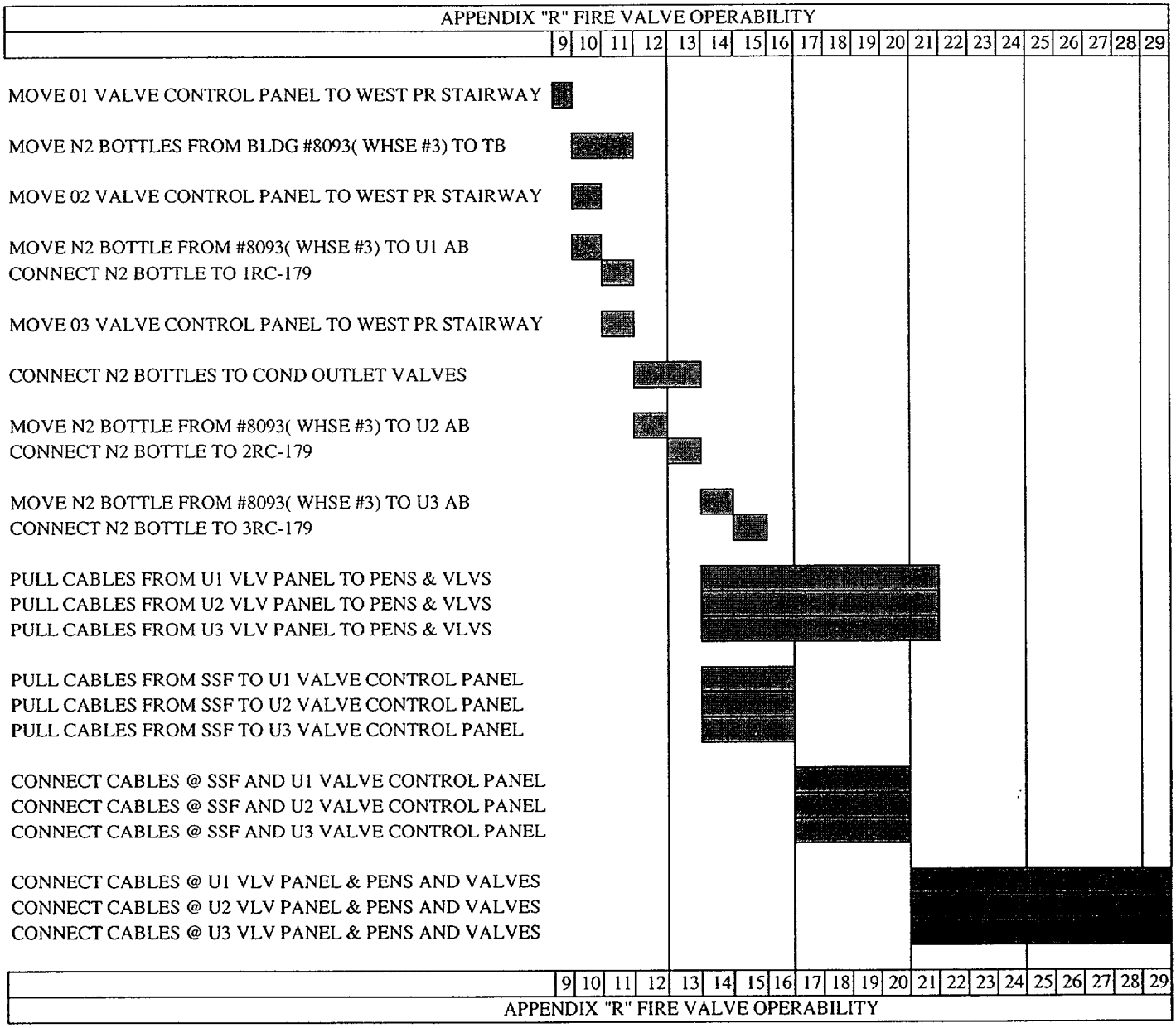


Restoration of 4160V Power to Pump Motors



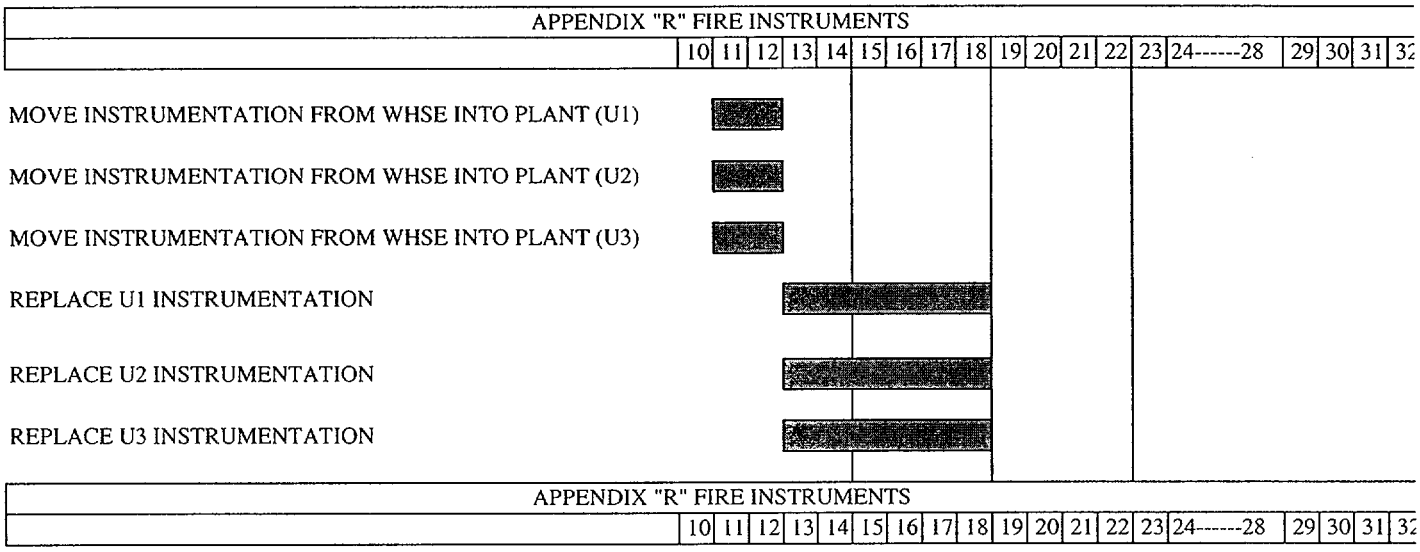
NOTE: This flow diagram is representative of the time allotted to repair all necessary valves from the damage assessment to maintain the unit(s) in stable hot shutdown conditions.

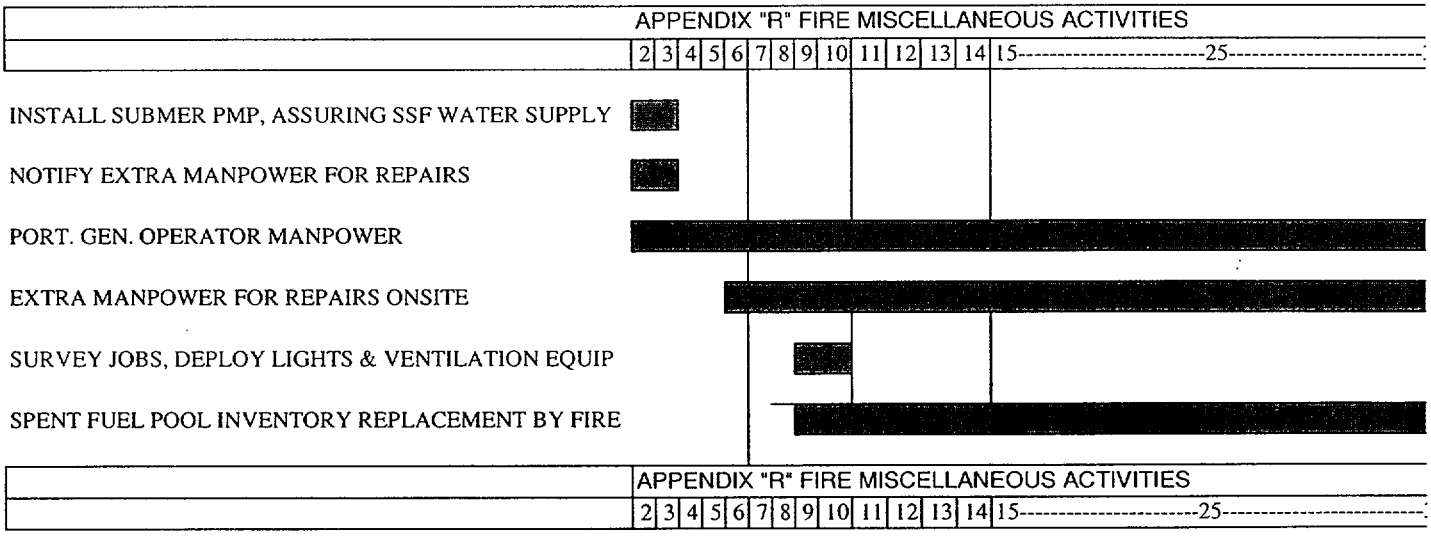
Valve Operability Restoration



Installation of Local Instruments and Miscellaneous Activities

NOTE: This flow diagram is representative of the time allotted to repair all necessary instrumentation from the damage assessment to maintain the unit(s) in stable hot shutdown conditions.





Enclosure 5.12

Appendix "R" Material List
(Designated Materials)

MECHANICAL		
Quanity	**Description**	**Building Nos.**
3	HPIP motors	8093 (WHSE # 3)
3	LPIP motors	8093 (WHSE # 3)
2	LPSWP motors	8093 (WHSE # 3)
8	Dollies for HPIP/LPIP/LPSWP motors	8093 (WHSE # 3)
16	18' tie-downs for motors/dollies	8093 (WHSE # 3)
3	Quad-leg chain slings for HPIP motors	8093 (WHSE # 3)
5	Multi-leg steel slings LPIP/LPSWP motors	8093 (WHSE # 3)
8	Ball bearings for handling motors	8093 (WHSE # 3)
6	3-ton hand hoists HPIP/LPIP hatches and motors	8093 (WHSE # 3)
2	3-ton chain hoists for LPSWP motors	8093 (WHSE # 3)
2	Submersible Pumps - Primary	SSF
	Back-Up	8093 (WHSE # 3)
1	SFP Makeup Filtration Unit	SSF

Appendix "R" Material List
(Designated Materials)

ELECTRICAL		
Quantity	**Description**	**Building Nos.**
1	Emergency switchgear - trailer mounted	8019 (WHSE # 2G)
1	Manual Spring Charging Tool	8019 (WHSE # 2G)
1	Cable tray for emergency switchgear	8019 (WHSE # 2G)
21	Reels of cable for power to pump motors and valves	8019 (WHSE # 2G)
1	Motorized Cable Reel Trailer	8019 (WHSE # 2G)
17	Cable reel stands	8019 (WHSE # 2G)
-	Parts and materials for cable connections	8093 (WHSE # 3)
3	Valve control panels	8093 (WHSE # 3)
9	Nitrogen bottles for pneumatic valves	8093 (WHSE # 3)
9	Pressure regulators for pneumatic valves	8093 (WHSE # 3)
9	Sets of copper tubing for pneumatic valves	8093 (WHSE # 3)
-	Parts and materials for tubing connections	8093 (WHSE # 3)
12	Pressure indicators	8093 (WHSE # 3)
6	Pressure testers	8093 (WHSE # 3)
3	Thermometers	8093 (WHSE # 3)
-	Parts and materials for instrument connections	8093 (WHSE # 3)
120	Filters for SFP makeup filtration unit	8093 (WHSE # 3)
15	Cla-ton 500 watt light stands	8093 (WHSE # 3)

Sources*		
Equipment Type	**Location/Owner**	**Details**
Portable generators	Site Services Group (SSG)	2 - 30 KVA Generators • 2 - 5.0 KW Generators • 1 - 200 KVA Generator •
	Wenwood:	Several portable generators
Portable lights (28)	8093 (WHSE # 3)	15 Cla-ton 500 watt light stands
	Security:	13 Cla-ton 500 and 1000 watt light stands several sets of string lights
	Tool Issue:	Several sets of low voltage lights
		Several drop lights
Ventilation blowers (6 amps)	Fire Brigade:	2 Supervac P164SE (115V, 6.6)
	First Aid Room:	2 Supervac P164S (115V, 5.4 amps)
	Maint. Supp. Building:	2 Supervac (115V/230V, 230.4/10.2 amps)
	Tools Issue: 8096/8055 (WHSE # 3C/5A,B)	About 25 units on site, Various models and sizes
Extension lines (as needed)	ONS Supply:	Materials for fabricating lines
	Tool Issue:	Various extension lines

* Listed in order of preference

• On Site Services Group **ON-SITE** emergency equipment list

Sources*		
Equipment Type	**Location/Owner**	**Details**
Fork lifts (4)	ONS Warehouse SSG Equipment:	1 - 8000 lb • 1 - 18000 lb • 1 - 5000 lb •
Hy-Dynamic (1)	ONS Maintenance	22 Ton Hy-Dynamic Rough Terrain •
Demag or Grove Crane	SSG Equipment:	78 ton
Crane truck (3) (or, "boom truck")	SSG Equipment:	1 - Boom Truck 2 - Boom Trucks •
Dump Truck	SSG Equipment:	1 - Dump Truck •
Road tractors (2)	SSG Equipment:	1 - Yard Tractor 1 - Road Tractor •
Lowboy Trailer	SSG Equipment:	1 - Equipment Hauling
Road Trailer	SSG Equipment:	2 - Equipment and Materials •
Loader/Backhoe	SSG Equipment:	1 - Loader/backhoe •
Welding Machines	SSG Equipment:	2 - Mobile •
Air Compressor	SSG Equipment:	1 - 1300 CFM
Sump Pumps	SSG Equipment:	2 - Gas Powered •
Core Drill Machine	SSG F Equipment:	Air Operated •
Cable Reel Cart	SSG Equipment:	Homemade (Motorized Winch) • DPC #02883
Pipes for cable reels	8019 (WHSE # 2G) & ONS Pipeyard	17

* Listed in order of preference
• On Site Services Group **ON-SITE** emergency equipment list

Sources *		
Equipment Type	**Location/ Owner**	**Details**
Scaffolding for CT4 (~ =13 ft. high scaffold to buswork access plate on west side of CT 4)	SSG,	Scaffolding in use of temporarily stored at various plant locations
"Herculite" for covering emergency switchgear RP monitoring	ONS, 8093 (WHSE #3) (Plant supply, managed by min-max program)	
'		
Equipment	ONS RP, CNS RP, MNS RP	
Anti-contamination clothing	Change Rooms, ONS Supply, Complex Warehouse (marked "Emergency Use Only")	
* Listed in order of preference		
• On Site Services Group **ON-SITE** emergency equipment list		

Enclosure 5.14

Deployment of Lighting and Ventilation Equipment

LIGHTING STAND LOCATIONS	QUANTITY
* Hot Shop (Building 8095)	1
• Hot Shop tunnel (Building 8095)	1
• Unit 1 and 3 AB 1st floor corridor	2
* Unit 1 & 2, and Unit 3 HPI hatch areas	2
* HPIP's 1A, 2A, and 3A	3
Unit 1 & 2, and Unit 3 LPI hatch areas	2
LPIP's 1C, 2C, and 3A	3
• Unit 1, 2, and 3 West Penetration Rooms	3
• Unit 1 and 2 East Penetration Rooms	2
CT-4 transformer	1
LPSWP's 1A and 3A	2
LPSWP motor pathways to TB basement: Col. K-14 (betw. 1C1 & 1C2 heaters); col. K-21; col. M-33.	3
4160V cable pathways in TB basement: col. E-25; col. H-40; col. M-31 (at TB/AB door)	3
Total number of temporary lights:	28

NOTES:
a) Vehicle lights are used at outdoor locations.
b) "*" high priority equipment (initial set-up)
c) "•" drop lights or string lights may be substituted.
Enclosure 5.13, (Appendix "R" Maintenance Support Equipment) lists equipment power requirements, generator capacities, and extension line locations.

VENTILATION BLOWER LOCATIONS	QUANTITY
* HPIP's 1A, 2A, and 3A	3
• LPIP's 1C, 2C, and 3A	3
Total number of temporary blowers:	6

NOTES:
d) "*" high priority equipment (initial set-up)
e) "•" drop lights or string lights may be substituted
f) Enclosure 5.13, (Appendix "R" Maint. Support Equip.) lists equipment power requirements, generator capacities, and extension line locations.

CONTROL
COPY

Engineering Directive 5.1

Review M. A Howe
Emergency Planning

Approval Bruce Hamilton
Engineering Manager

Original Date 5/27/92

Revised Date 9/12/01

DUKE POWER COMPANY
OCONEE NUCLEAR STATION
ENGINEERING EMERGENCY RESPONSE PLAN

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

Oconee Nuclear Site Emergency Response Plan
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 Primary Systems Engineer and Balance of Plant (BOP) Systems Engineer

6.8.1 These individuals should report to the TSC within 75 minutes of emergency declaration and report to the TSC Engineering Manager.

6.8.2 These individuals 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

INFORMATION ONLY

Radiation Protection Section
Manual 11.7
Approval
Original Date 09/13/89
Revision Date 8/29/01
Revision Number 001

Oconee Nuclear Station
Radiation Protection

Environmental Monitoring For Emergency Conditions

1. Purpose

1.1 To provide a systematic method for identifying airborne plumes or liquid effluents and obtaining field data indicative of the radiation exposure to the general public, following a release of radioactive material.

1.2 This procedure is an Emergency Plan Implementing Procedure (EPIP). It must be forwarded to the Emergency Planning Group within three working days of approval by the responsible group. {PIP 4-O-93-0701}

2. References

2.1 HP/0/B/1009/001, Emergency Equipment Inventory and Instrument Check

2.2 Duke Power Company Radio Operators Manual

2.3 NUREG-0654, Rev. 1, "Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants"

2.4 FEMA REP-2, Rev. 1, "Guidance on Offsite Emergency Radiation Measurement Systems, Phase 1 - Airborne Release"

2.5 Code of Federal Regulations, Title 10, Part 20

2.6 Lowrance GlobalNav Installation And Operation Instructions

2.7 PIP 4-O-93-0701, Distribution of Emergency Plan Procedures

2.8 Offsite Dose Calculation Manual

3. Limits And Precautions

3.1 The Field Monitoring Teams (FMTs) members should comply with SRWP 98 (current copies are located in Emergency Equipment). Depending upon conditions, the Field Monitoring Coordinator (FMC) or the Radiological Assessment Manager can change these criteria.

3.2 Upon activation of the Emergency Response Organization, the FMC will report to the Site and will direct the Field Monitoring Teams (FMTs) under the guidance of the Radiological Assessment Manager. After teams are activated, the FMC will report to the EOF. It is desired that the FMC **NOT** assume FMT duties while at the Site.

3.3 The Field Monitoring Teams (FMTs) should park vehicles completely off the road when sampling and use emergency flashers while stopped.

3.4 Once a release has occurred, vehicle windows should be kept closed with ventilation OFF or ventilation on RECIRCULATION to minimize contamination, until the plume area is identified.

3.5 Each FMT shall maintain open radio communications with the FMC.

3.6 **IF** radio becomes inoperable, telephone:

- Dose Assessment at TSC (ONS) – (864) 885-3705
- FMC at EOF (MNS/CNS) - (704) 382-0735/0736 or
- FMC at EOF (ONS) - (864) 624-4387
- Radiological Assessment Manager at EOF (ONS) – (864) 624-4373 or (864) 624-4374

3.7 Ensure count rate meter is ON and is monitored during transport to the sampling locations.

3.8 **IF** any equipment becomes inoperable, notify the FMC and await further instructions.

3.9 Personnel **NOT** trained for emergency response may assist a trained Radiation Protection technician to do surveys and/or drive the vehicle.

3.10 The radio operator should follow the radio operation guidance described in the Duke Power Company Radio Operators Manual; providing pertinent, general information. Care should be taken to **NOT** provide detailed, specific plant information.

3.11 During a drill, repeat the statement, "This is a drill, this is a drill" with each radio transmission.

3.12 Environmental sampling during emergency conditions shall **NOT** replace, but rather supplement normal environmental monitoring.

3.13 The Radiological Assessment Manager and/or FMC will determine the need for ingestion of Potassium Iodide (KI) tablets based upon the potential for release and exposure to radioiodine. Although they are effective in blocking radioiodine when taken after exposure, they are most effective if taken about 2 hours before exposure occurs:

3.13.1 **IF** thyroid CDE is expected to exceed 25 rem, in most cases the use of KI is warranted. 1000 Iodine DAC-hours is equivalent to 25 rem to the thyroid. DACs are as follows:

Isotope	DAC (uCi/ml)
I-131	2E-8
I-133	1E-7
I-135	7E-7

3.14 All procedures stored at satellite locations shall be verified to be current by comparing each copy to the control copy stored in the Emergency Procedure cabinet. The FMC will be responsible for the verification by way of radio communications.

3.15 Should additional personnel be needed for Field Monitoring, the Off-Site Communications Manager at the EOF can call the DOE to provide assistance.

4. Procedure

4.1 Field Monitoring Team (FMT) Activation:

NOTE: For any backup sampling vans from other stations, the call sign shall be preceded by the station name, e.g. (Station) Sample Van 1.

4.1.1 Form as many survey teams and sampling van teams as possible, based upon the number of personnel available and field monitoring required.

4.1.2 The initial survey FMT will perform a survey of the security area boundary fence, as directed by the FMC.

NOTE: Emergency materials/equipment available to FMTs are listed in HP/0/B/1009/001 (Emergency Inventory and Instrument Check).

4.1.3 Activate remaining FMTs in accordance with Enclosure 5.1.

4.1.4 In the event that backup sampling vans/FMT members are provided from other stations, the FMC should ensure that at least one FMT member from the affected station is on each FMT.

4.2 Locating and Tracking the Plume:

NOTE: If **NOT** dose prohibitive, the FMC may direct the FMTs to traverse the plume.

4.2.1 Unless otherwise directed by the FMC, the FMTs will generally be dispatched as follows:

- Alpha, Bravo, Charlie, Delta - performance of beta/gamma radiation surveys on the edges of the suspected area to determine plume.
- Sample Vans 1, 2, etc - performance of air sample surveys and beta/gamma radiation surveys and mobile analyses at or beyond the site boundary fence, utilizing an emergency van.
- Sample Boats 1, etc. - performance of beta/gamma radiation surveys on adjacent lake areas, utilizing an emergency boat.

4.2.2 The FMC will direct FMTs to systematically survey the suspected areas in a continuous mode and to obtain air samples and beta/gamma measurements as conditions warrant; utilizing quadrants, major roads, predetermined sampling locations and/or Global Positioning System information:

4.2.2.1 Each quadrant consists of a four square mile area (two miles on each side). This area is then sub-divided into four sub-quadrants of one square mile each:

NOTE: The letter "I" has been omitted to eliminate possible confusion with the number one (1).

A. A quadrant on the EPZ Map will be identified by:

1. the letter depicting the column and
2. the number depicting the row, e.g. B-6, D-7, H-12, etc.

B. A sub-quadrant will be described as the upper left (UL), upper right (UR), lower left (LL), or lower right (LR).

4.2.2.2 Major roadways delineate major territories surrounding the plant. Either all or a portion of these sections would be expected to be affected, to some degree, by the radioactivity released from the plant. Major roadways are therefore utilized to provide access to suspected regions (outer edges, leading edges(s), centerline) of the plume, as necessary:

A. Numerical designations and responsibility level (federal, state, county or city) designations identify major roadways on the EPZ map.

B. A specific name, rather than a numerical responsibility designation identify selected roadways on the EPZ map.

4.2.2.3 Each predetermined sampling location is denoted by a (colored) dot on the map. The sampling point designator indicates the protective action zone the point is in and the mileage from the plant:

A. The FMC should use the points as landmarks when directing the teams.

B. The point locations can be read directly from the map or from the directions in Enclosure 5.2.

4.2.2.4 Use GPS Unit in accordance with Enclosure 5.7 and a Site Map.

4.2.2.5 While enroute and at sampling locations, survey teams shall report the maximum radiation level to the FMC.

4.2.2.6 Sample van teams shall report the maximum radiation level of the instantaneous cloud, the average radiation level while inside the plume, and air sample data to the FMC.

4.2.3 The FMC may use Enclosure 5.3 as a log to document instructions to the radio operator regarding FMT movement and utilization.

4.2.4 The radio operator may use Enclosure 5.4 or site area maps to record FMT movement and field data such as beta/gamma surveys, air samples, and/or special samples.

4.2.5 The FMC should periodically provide information to the FMTs on the emergency classification, wind speed, wind direction, zones affected and other pertinent information, using Enclosure 5.5. Typically, information provided by the Emergency Coordinator or the EOF Director during public address announcements could be used to update FMTs.

4.2.6 The FMC should periodically check and track FMT members' radiation dose, using Enclosure 5.6.

4.3 Special Sampling, as directed:

NOTE:	FMTs may also be requested to retrieve and replace environmental air samplers and/or TLDs.

4.3.1 Collect additional special samples including but **NOT** limited to: smears of surrounding areas, integrated dose over a period of time with TLDs, vegetation, sediment, water, and milk, as requested by the FMC.

4.3.2 Label and save each for analysis:

4.3.2.1 To collect vegetation samples, use the shears to cut enough broad leaf vegetation to fill a 12"x12" poly bag.

4.3.2.2 To collect a soil sample, estimate one 12"x12" square of soil and dig out one inch deep.

4.3.2.3 To collect a water sample, use the limnological sampler to fill a one-gallon cubitainer.

4.3.2.4 Smears should be taken on stationary, horizontal surfaces, e.g. mailboxes, gas pumps, etc. **NOT** on Automobiles!

4.4 FMT Turnover:

4.4.1 FMTs shall be relieved as directed by the FMC.

4.4.2 The FMTs shall provide turnover to the relief FMTs, consisting of the following:

4.4.2.1 Dose rates and other sample data from areas previously surveyed.

4.4.2.2 Sampling van emergency supplies or emergency kit inventory consumed.

4.4.2.3 Equipment operating status.

4.4.2.4 Any sampling problems.

4.4.2.5 Emergency classification.

4.4.2.6 Wind speed and direction.

4.4.2.7 Zones affected.

4.4.3 FMTs shall turn in all data sheets to the FMC or designee, as directed.

4.4.4 Following turnover, relieved FMT members shall report to a counting facility designated by the FMC for a post-job BBA

5. Enclosures

5.1 Field Monitoring Team Checklist for Initial Response

5.2 Predetermined Sampling Locations By Sector and Distance from ONS

5.3 FMC Instruction Log

5.4 Field Monitoring Survey Data Sheet

5.5 Periodic Status Update for Field Monitoring Teams

5.6 Field Monitoring Team Radiation Dose Record

5.7 Lowrance GlobalNav Operating Instructions

5.8 Field Monitoring Coordinator Duties At The EOF

1. Field Monitoring Initial Response Verification

1.1 Verify the following:

_____ 1.1.1 Assemble at BBA Room.

_____ 1.1.2 Simultaneously Perform:

_____ 1.1.2.1 Survey of BBA Area

_____ 1.1.2.2 Confirm Accountability

_____ 1.1.2.3 Get Emergency Vehicle Keys

_____ 1.1.3 Assign and dispatch 1st Sample Van Team:

- Team member names: _____&_____

1.1.3.1 1st Sample Van Team Initial Responsibilities:

_____ A. Leave BBA Room and survey pathway to Sample Van parking area.

_____ B. Survey the route to the motor pool.

_____ C. Report conditions to FMC.

_____ D. **IF** path is clear, 2nd Sample Van will monitor transmissions and transport personnel to vehicles.

_____ E. Continue from vehicle parking area and complete Fence Survey.

_____ 1.1.4 Assign and dispatch 2nd Sample Van Team:

- Team member names: _____&_____

1.1.4.1 2nd Sample Van Team Initial Responsibilities:

_____ A. Leave BBA Room and survey pathway to Sample Van parking area.

_____ B. Park the Sample Van in front of the Admin Building.

_____ C. Monitor the radio for any information concerning the emergency.

_____ D. Verify conditions with 1st Sample Van.

_____ E. **IF** the route is clear, transport necessary personnel to their survey vehicles.

_____ F. Report to Emergency Count Room and if no other team has arrived, survey the Emergency Count Room area.

_____ G. Load and source check one Portable Iodine Analysis System in the van.

_____ H. Report availability to FMC.

_____ 1.1.5 Assign remaining personnel into Survey Teams:

- Alpha Team: _____&_____
- Bravo Team: _____&_____
- Charlie Team: _____&_____
- Delta Team: _____&_____
- Echo Team: _____&_____
- Foxtrot Team: _____&_____

_____ 1.1.6 Assemble in front of the Admin Building to be transported to Survey Vehicles.

_____ 1.1.7 **WHEN** Survey Vehicles are secured, assemble at the Emergency Count Room.

_____ 1.1.8 **IF** it has **NOT** been performed, perform an area survey.

1.1.9 Have each Survey Team source check instruments, load equipment and radios and report availability status to FMC:

_____ • Alpha Team
_____ • Bravo Team
_____ • Charlie Team
_____ • Delta Team
_____ • Echo Team
_____ • Foxtrot Team

_____ 1.1.10 Dispatch one survey to complete the fence surveys and allow the 1st Sample Van to report to the Emergency Count Room to obtain the remaining Portable Iodine Analysis System.

_____ 1.1.11 1st Sample Van installs Portable Iodine Analysis System, performs the source check and report availability to the FMC.

1.1.12 All teams verify copies of procedure(s) to control copy.

Enclosure 5.2
Predetermined Sampling Locations By Sector And Distance From ONS

Sampling Sector	Sampling Location	Responsible Team	Radius From ONS (Miles)	Description of Sampling Locations
N	A-1	E	1	Lake Keowee – Mid-lake due west of Warpath Access Area
N	A-2	B or E	3	Gap Hill Landing
N	A-3	E	3	West Shoreline of Lake Keowee from Gap Hill Landing
N	A-4	E	5	East Shoreline of Lake Keowee – Due East from Crow Creek Island
N	A-5	E	5	Mid-lake at Crow Creek Island
N	A-6	C or E	5	Old Town Landing
N	A-7	D	10	Keowee Toxaway State Park
N	A-8	D or E	9	Hwy 11 Bridge over Lake Keowee
NNE	B-1	A or E	1	Warpath Access Area
NNE	B-2	B	3	Junction of Hwy 157 (Gap Hill Rd) and 500 KV Transmission Line
NNE	B-3	B	3	Lake Hill Acres Campground – Hwy 157 (Gap Hill Rd)
NNE	B-4	C	5	Junction of Hwy 133 & 327
NNE	B-5	C	5	Hwy 327, Keowee Church
NNE	B-6	D	9	Junction of Hwy 133 & 49 (Shady Grove Church)
NE	C-1	A	1	Hwy 183, 1 mile North of Lake Hartwell at Steel Gate (West Side of road)
NE	C-2	B	3	Junction of Hwy 183&157 (Gap Hill Rd)
NE	C-3	C	4	Love & Care Nursing Home (Love & Care Rd)
NE	C-4	C	5	Junction of Hwy 133 and Hunting Hollow Rd
NE	C-5	D	10	Martin Grove Church, Junction of Hwy 172 & 32
NE	C-6	D	10	Junction of Hwy 32 & 33

Enclosure 5.2
Predetermined Sampling Locations By Sector And Distance From ONS

Sampling Sector	Sampling Location	Responsible Team	Radius From ONS (Miles)	Description of Sampling Locations
ENE	D-1	A	1	Hwy 183 N of Keowee Hydro Station Trailrace Bridge @ Keowee Cabins
ENE	D-2	B	3	Junction of 157 (Gin Shoals Rd) and Shadydale Circle
ENE	D-3	C	5	Junction of Hwy 137 and Belle Shoals Rd
ENE	D-4	C	5	Hwy 137, 1.5 miles east of Hwy 183 at first road junction
ENE	D-5	D	10	Junction of Hwy 267 & 12 Mile Creek
ENE	D-6	D	10	Junction of Hwy 273 & 12 Mile Creek
ENE	D-7	D	10	Junction of Hwy 183 & 287
E	E-1	A	1	Old Pickens Grocery, Junction of Hwy 182 & 160
E	E-2	B	3	Bridge @ Junction of Hwy 291 (Old Seneca Hwy) & Six Mile Creek
E	E-3	B	3	Entrance to Foxfire Estates off Hwy 291 1 mile N of Hwy 160
E	E-4	C	5	Junction of SC 133 & County 137 @ Old Six Mile Post Office
E	E-5	C	5	Junction of Hwy 133 & 337 (Maw Bridge Rd)
E	E-6	C	5	Junction of Hwy 337 & Camp Creek Rd
E	E-7	D	10	Holly Springs Church on Hwy 222
E	E-8	D	10	Junction of Hwy 158 & 137
E	E-9	D	10	Junction of Hwy 93 & 171

Enclosure 5.2
Predetermined Sampling Locations By Sector And Distance From ONS

Sampling Sector	Sampling Location	Responsible Team	Radius From ONS (Miles)	Description of Sampling Locations
ESE	F-1	A	1	Hwy 183 Bridge across Lake Hartwell
ESE	F-2	B	3	Junction of Hwy 160 & Furman L. Smith Rd
ESE	F-3	B	3	Junction of Furman L. Smith Rd & Hwy 101 (Knoll View Rd)
ESE	F-4	C	5	Junction of Hwy 277 & 337 (Maw Bridge Rd)
ESE	F-5	D	10	Junction of Hwy 165 & 44 (Central, SC)
ESE	F-6	D	10	Midway Church, Junction of Hwy 395 & 91
ESE	F-7	D	10	Junction of Hwy 93 & 51 (Norris, SC)
SE	G-1	A	1	Hwy 183 @ Old Pickens Church
SE	G-2	B	3	Hwy 291 @ entrance to Toby Hills Subdivision
SE	G-3	C	5	Pleasant Hill Church @ Junction of Hwy 160 & 133
SE	G-4	C	5	Daniel High School @ Junction of Hwy 133 & 15
SE	G-5	D	7	Junction of Hwy 15 & 102 (Central, SC)
SE	G-6	D	10	Junction of Hwy 123 & 18
SE	G-7	D	10	Junction of Hwy 123 & 30
SSE	H-1	A	1	Junction Hwy 183 & 6
SSE	H-2	B	3	Hwy 291 two miles South of Hwy 160
SSE	H-3	B	5	Hwy 291 & 27 @ Issaqueena Park entrance
SSE	H-4	B	5	Hwy 27, Lawrence-Ramsey Bridge Access Area
SSE	H-5	C	9	Junction of Hwy 123 & 133 (Clemson, SC)
SSE	H-6	C	9	Junction of Hwy 123 & 93 (Clemson, SC)
SSE	H-7	C	9	Junction of Hwy 93 & 320 @ Littlejohn Coliseum
SSE	H-8	C	10	Bridge across Lake Hartwell 1 mile East of Hwy 149 & 115 Junction

Enclosure 5.2
Predetermined Sampling Locations By Sector And Distance From ONS

Sampling Sector	Sampling Location	Responsible Team	Radius From ONS (Miles)	Description of Sampling Locations
S	I-1	A	1	0.5 miles SW of Junction 130 & 6 @ Beaver Pond Marker
S	I-2	A	3	Hwy 130 @ Holder's Landing
S	I-3	B	5	Junction of Hwy 27 & North Bayshore Dr.
S	I-4	B	5	Junction of Hwy 27 & 359 (Hanover Hills)
S	I-5	B	5	Corinth Baptist Church, Hwy 1 (Old Clemson Hwy)
S	I-6	C	10	Junction of Hwy 37 & 210
S	I-7	C	10	Clemson, Oconee Airport, Hwy 37
SSW	J-1	A	1	Junction of Hwy 183 & 130
SSW	J-2	A	3	Junction of Hwy 130 & 38
SSW	J-3	E	3	Lake Keowee, East Shoreline
SSW	J-4	B	5	Hwy 130 @ South end of Newry Dam
SSW	J-5	E	5	Lake Keowee, Midlake West of Newry Dam
SSW	J-6	B	8	Junction of Hwy 130 & 123
SSW	J-7	C	9	Utica Elementary School, Seneca, SC
SSW	J-8	C	8	Seneca Water Plant
SW	K-1	A	1	Old Hwy 183, 1/4 mile West of Hwy 130
SW	K-2	E	3	Lake Keowee, Midlake beneath Norcross, GA 500 KV Transmission Line
SW	K-3	B	5	Fairview Church, Hwy 340
SW	K-4	B	5	Crooked Creek Bridge across Lake Keowee on Hwy 188
SW	K-5	C	9	Oconee Memorial Hospital @ Hwy 123 & 28
SW	K-6	C	9	Head-Lee Nursery, Hwy 28

Enclosure 5.2
Predetermined Sampling Locations By Sector And Distance From ONS

Sampling Sector	Sampling Location	Responsible Team	Radius From ONS (Miles)	Description of Sampling Locations
WSW	L-1	E	1	Lake Keowee, Cove immediately North of Simmer Wall
WSW	L-2	E or A	3	End of Hwy 605 @ Lake Keowee
WSW	L-3	B	5	Junction of Hwy 46 & 175
WSW	L-4	B	5	2 miles South of Hwy 46 & 175 Junction
WSW	L-5	C	10	Junction of Hwy 35 & 28 (West Union)
WSW	L-6	C	10	Junction of Hwy 11 & 28 (West Union)
W	M-1	E	1	Due West of ONS on Lake Keowee
W	M-2	A	3	Junction of Hwy 12 & 576
W	M-3	B	5	Junction of Hwy 223 & Crooked Creek
W	M-4	B	6	Junction of Hwy 183 & 40 (D&D Grocery)
W	M-5	C	8	Junction of Hwy 11 & 131
W	M-6	C	8	Junction of Hwy 11 & 183
WNW	N-1	E	1	Midlake, due west of Connecting Canal Bridge in Lake Keowee
WNW	N-2	A	3	Junction of Hwy 183 & 201
WNW	N-3	A	3	Junction of Hwy 201 & 92
WNW	N-4	B	5	Junction of Hwy 40 & 46
WNW	N-5	B	5	Little River Bridge on Hwy 132
WNW	N-6	C	9	Pickett Post @ Hwy 11
WNW	N-7	C	9	Junction of Hwy 11 & 94
NW	O-1	A	1	Junction of Hwy 130 & 183 at Keowee Key Sign
NW	O-2	A or E	3	Stamp Creek Landing on Hwy 92
NW	O-3	B	5	Junction of Hwy 132 & unmarked Rd
NW	O-4	B	5	Junction of Hwy 130 & 200
NW	O-5	C	10	Tamassee DAR School off Hwy 11
NW	O-6	C	10	Junction of Hwy 11 & 57

Enclosure 5.2
Predetermined Sampling Locations By Sector And Distance From ONS

Sampling Sector	Sampling Location	Responsible Team	Radius From ONS (Miles)	Description of Sampling Locations
NNW	P-1	E	1	West shoreline of cove immediately north of connection canal on Lake Keowee
NNW	P-2	A	3	Stamp Creek Church @ Junction of Hwy 128 & 130
NNW	P-3	B	5	Junction of Hwy 200 & Stamp Creek Bridge
NNW	P-4	B	5	Church of God @ Junction of Hwy 200 & 128
NNW	P-5	C	10	Junction of Hwy 11 & 171
NNW	P-6	C	10	Junction of Hwy 11 & 127

TLD LOCATIONS

SAMPLING LOCATION DESCRIPTION*

020	Site Boundary	(0.1 Miles N)	040	4-5 Mile Radius	(4.5 Miles E)
021	Site Boundary	(0.3 Miles NNE)	041	4-5 Mile Radius	(4.0 Miles ESE)
022	Site Boundary	(0.5 Miles NE)	042	4-5 Mile Radius	(5.0 Miles SE)
023	Site Boundary	(0.9 Miles ENE)	043	4-5 Mile Radius	(4.0 Miles SSE)
024	Site Boundary	(0.8 Miles E)	044	4-5 Mile Radius	(4.0 Miles S)
025	Site Boundary	(0.4 Miles ESE)	045	4-5 Mile Radius	(5.0 Miles SSW)
026	Site Boundary	(0.3 Miles SE)	046	4-5 Mile Radius	(4.5 Miles SW)
027	Site Boundary	(0.4 Miles SSE)	047	4-5 Mile Radius	(4.0 Miles WSW)
028	Site Boundary	(0.5 Miles S)	048	4-5 Mile Radius	(4.0 Miles W)
029	Site Boundary	(0.6 Miles SSW)	049	4-5 Mile Radius	(4.0 Miles WNW)
030	Site Boundary	(0.4 Miles SW)	050	4-5 Mile Radius	(4.0 Miles NW)
031	Site Boundary	(0.3 Miles WSW)	051	4-5 Mile Radius	(4.5 Miles NNW)
076	Site Boundary	(0.2 Miles W)	052	Special Interest	(12.0 Miles ENE)
032	Site Boundary	(0.2 Miles WNW)	053	Special Interest	(11.0 Miles E)
033	Site Boundary	(0.2 Miles WNW)	054	Special Interest	(9.5 Miles ESE)
034	Site Boundary	(0.2 Miles NW)	055	Special Interest	(9.5 Miles SSE)
035	Site Boundary	(0.2 Miles NNW)	056	Special Interest	(8.4 Miles SSW)
036	4-5 Mile Radius	(4.0 Miles N)	057	Special Interest	(9.0 Miles SW)
036	4-5 Mile Radius	(4.5 Miles NNE)	058	Special Interest	(9.4 Miles WSW)
081	Special Interest	(9.8 Miles SE)	059	Special Interest	(9.2 Miles NW)
038	4-5 Mile Radius	(4.0 Miles ENE)	081	Special Interest	(9.8 Miles SE)

*All sampling locations are collected quarterly.

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM LOCATIONS

Code:

W - Weekly
SM – Semi-Monthly
M - Monthly
SA - Semi-Annually

	Sampling Location Description	Air Sample	Surface Water	Drinking Water	Shoreline Sediment	Milk	Fish	Broadleaf Vegetation
060	New Greenville Water Intake Rd. (2.6 miles NNE)*	W		M			SA	M
062	Lake Kewoee/Hydro Intake (0.8 mile ENE) (CONTROL)		M					
063	Lake Hartwell – Hwy 183 Bridge (0.8 mile ESE)[000.7]		M		SA		SA	
064	Seneca (6.7 miles SW) [004.1] (CONTROL)			M				
066	Anderson (19.0 miles SSE) [012]			M				
067	Lawrence Ramsey Bridge, Hwy 27 (4.2 miles SSE) [005.2]				SA		SA	
068	High Falls County Park (2.0 miles W) (CONTROL)				SA			
069	Orr's Dairy (4.5 miles WNW) [002.1]					SM		
071	Clemson Dairy (10.3 miles SSE) [006.3]					SM		
074	Keowee Key Resort (2.3 miles NNW)	W						
077	Skimmer Wall (1.0 mile SW)	W						M
078	Recreation Site (0.6 mile WSW)	W						
079	Keowee Dam (0.5 mile NE)	W						M
080	Martin's Dairy (10.0 miles SSE) (CONTROL)					SM		
081	Clemson Operations Center (9.8 mile SE)	W						M

* Control for Fish Only
[ ] Location Numbers prior to 1984

Enclosure 5.2
Predetermined Sampling Locations By Sector And Distance From ONS

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM FREQUENCIES

		Analyses				
Sample Medium	Analysis Schedule	Gamma Isotopic	Tritium	Low Level I-131	Gross Beta	TLD
1. Air Radioiodine	Weekly	X				
2. Air Particulate	Weekly Quarterly Composite	X			X	
3. Direct Radiation	Quarterly					X
4. Surface Water	Monthly Quarterly Composite	X	X			
5. Drinking Water	Monthly Quarterly Composite	X	X	X	X	
6. Shoreline Sediment	Semi-Annually	X				
7. Milk	Semi-Monthly	X		X		
8. Fish	Semi-Annually	X				
9. Broadleaf Vegetation	Monthly	X				

Enclosure 5.3
FMC INSTRUCTION LOG

Team	Location		Sample Type		Special Instructions
	From	To	βγ	Air	

Enclosure 5.4
Field Monitoring Survey Data Sheet

Time	Team	Location	Results		Notes
			Rad Levels	Air Activity	

Enclosure 5.5
Periodic Status Update For Field Monitoring Teams

Date ______________

Time ______________ Classification ______________________________
Wind Speed ______________________________ Wind Direction ______________________________
Zones Affected ____
Other Information ____
____

Time ______________ Classification ______________________________
Wind Speed ______________________________ Wind Direction ______________________________
Zones Affected ____
Other Information ____
____

Time ______________ Classification ______________________________
Wind Speed ______________________________ Wind Direction ______________________________
Zones Affected ____
Other Information ____
____

Time ______________ Classification ______________________________
Wind Speed ______________________________ Wind Direction ______________________________
Zones Affected ____
Other Information ____
____

Time ______________ Classification ______________________________
Wind Speed ______________________________ Wind Direction ______________________________
Zones Affected ____
Other Information ____
____

Time ______________ Classification ______________________________
Wind Speed ______________________________ Wind Direction ______________________________
Zones Affected ____
Other Information ____
____

Time ______________ Classification ______________________________
Wind Speed ______________________________ Wind Direction ______________________________
Zones Affected ____
Other Information ____
____

Enclosure 5.6
Field Monitoring Team Radiation Dose Record

Start Date/Time ____________________ End Date/Time ____________________

	SV1		SV2		Alpha		Bravo		Charlie		Delta		Echo		Foxtrot	
Name																
TLD #																
Initial Dose																
Subsequent Dose																
Cumulative Total																
Subsequent Dose																
Cumulative Total																
Subsequent Dose																
Cumulative Total																
Subsequent Dose																
Cumulative Total																
Subsequent Dose																
Cumulative Total																
Subsequent Dose																
Cumulative Total																

SV1 ____________________

Bravo ____________________

Echo ____________________

SV2 ____________________

Charlie ____________________

Foxtrot ____________________

Alpha ____________________

Delta ____________________

WARNING:

- Vehicle operator should never use the GPS unit while operating a vehicle. They should pull over and stop to use unit. Passengers may use the unit at any time.
- Do **NOT** use lithium batteries to power GPS.
- Do **NOT** use "heavy duty" batteries; Lowrance recommendsDuracell AA alkaline.
- Do **NOT** mix different types of batteries (Example alkaline and ni-cad).

CAUTION: When using the auxiliary power cable, ensure all connections are tight.

1. Install 4 each AA alkaline batteries per the decal in the unit's battery compartment that shows the correct polarity (+,-) **AND/OR** connect auxiliary power cord to GPS and plug into cigarette lighter receptacle.
2. **IF** available and desirable, connect external antenna (accessory) to GPS.
3. Press PWR to turn GPS on.
4. Press EXIT to get rid of warning message.
5. Wait for GPS to acquire position.
6. Press WPT.
7. Use up and down arrows to select WPT#.
8. Use right and left arrows to select WPT# 1 (named "OCONEE"). If supporting McGuire or Catawba, select appropriate waypoint from Step 18 below.
9. Use down arrow to select GO TO WPT.
10. Press ENTER.
11. Press PAGES.
12. Use up and down arrows to select NAV.
13. Use right and left arrows to select NAV 2.
14. Press ENTER.

CAUTION: If display flashes at any time, position is invalid because satellites have been lost. Do **NOT** use position information until GPS re-acquires position (i.e., display does **NOT** flash).

15. The GPS now shows the distance and direction to Oconee.
16. Quickly pressing and releasing the PWR pushbutton turns the light on. Quickly pressing it again turns the light off. The light automatically turns off after 30 seconds unless the GPS is being operated off of the auxiliary power cable and the vehicle battery. Then it will stay on continuously until turned off.
17. When done, hold PWR pushbutton down for 3 seconds until GPS turns off.

NOTE: The following waypoints are already entered into the unit and require no changes by the user. The user will simply select the appropriate waypoint for the desired site.

18. Waypoint coordinates are:

WPT 1	Oconee	WPT2	McGuire	WPT3	Catawba
	N 34° 47.633'		N 35° 25.983'		N 35° 03.083'
	W 82° 53.917'		W 80° 56.917'		W 81° 04.167

Enclosure 5.8
Field Monitoring Coordinator Duties At The EOF

1. Fill out the accountability sheets at the entrance for you, the radio operator, and each field team member. Need to include controllers on this.

2. Get a Control Copy of RPSM 11.7 from procedure cart and verify the field teams have current copy in their kits.

3. Establish radio contact with team members as they become activated. Make sure everyone is fit for duty.

4. Record on Enclosure 5.6 of RPSM 11.7 each team's RP numbers and names.

5. Find out from the dose assessor's meteorological data or ask one of the field teams for wind direction using the flag at the WOE. Remember to caution the team members that the map used for the GPS unit is opposite (180 degrees) from their regular map.

6. Direct the teams and record that information on Enclosure 5.3 of RPSM 11.7.

7. As it becomes available, record plant information on Enclosure 5.5 of RPSM 11.7. Remember to give this information to the field teams as often as you can and keep their dose record updated every hour.

8. Record data on Enclosure 5.4 of RPSM 11.7 when pertinent data is received. Always keep the dose assessors informed of this data.

9. When you get a chance, contact the TSC on your radio. You may have to call them first to turn up the volume.

10. After the drill is over, you have to record on Enclosure 5.5 of RPSM 11.7 whether or **NOT** KI was distributed.

The basic team deployment that has worked is to get one team performing a fence survey as close to the protected area fence as possible. If you have 4-6 teams available, get some moving towards the downwind side of the plant and keep one sample van and survey team upwind in reserve. Keep them moving, unless sampling, along major roads perpendicular to the plant. Remember that the drill isn't over till we find the plume, sample the air, and sometimes pull vegetation/soil samples. Air samples shouldn't be over 3 minutes (generally 2 minutes) and the analysis 5 minutes. In the past, KI tablets are given to teams entering the plume to take samples as a precaution. We have bottled water for this.

$$\text{Air Sample Activity in uCi/cc} = \left[\frac{CCPM \times EFF.FACTOR}{SAMPLE\_TIME \times 2CFM \times 0.02832E6}\right] \times 0.4505E-6$$