DUKE POWER COMPANY

OCONEE NUCLEAR STATION

EMERGENCY PLAN IMPLEMENTING PROCEDURES

APPROVED:

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VOLUME B

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VOLUME B

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Form 34731 (3-84)

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DUKE POWER COMPANY
PROCEDURE PROCESS RECORD

(1) ID No. CP/1/A/2002/04C
Change(s) ____ - ____ to
4 Incorporated

PREPARATION

(2) STATION Oconee Nuclear Station

(3) PROCEDURE TITLE Operating Procedure for the Post-Accident Liquid Sampling (PALS) System

(4) PREPARED BY [signature] DATE 7/28/86

(5) REVIEWED BY Pat Hall DATE 7/28/86

Cross-Disciplinary Review By J. Carter N/R ____

(6) TEMPORARY APPROVAL (If Necessary)

By ____ (SRO) Date ____

By ____ Date ____

(7) APPROVED BY J S Barr DATE 7/29/86

(8) MISCELLANEOUS

Reviewed/Approved By ____ Date ____

Reviewed/Approved By ____ Date ____

COMPLETION

(9) DATE(S) PERFORMED ____

(10) PROCEDURE COMPLETION VERIFICATION

☐ Yes ☐ N/A Check lists and/or blanks properly initialed, signed, dated or filled in N/A or N/R, as appropriate?

☐ Yes ☐ N/A Listed enclosures attached?

☐ Yes ☐ N/A Data sheets attached, completed, dated and signed?

☐ Yes ☐ N/A Charts, graphs, etc. attached and properly dated, identified and marked?

☐ Yes ☐ N/A Acceptance criteria met?

VERIFIED BY ____ DATE ____

(11) PROCEDURE COMPLETION APPROVED ____ DATE ____

(12) REMARKS

Checked Control Copy_____

Date_____

DUKE POWER COMPANY

OCONEE NUCLEAR STATION

OPERATING PROCEDURE FOR THE

POST ACCIDENT LIQUID SAMPLING (PALS) SYSTEM

1.0 Purpose

The Post Accident Liquid Sampling System (PALS) provides the capability to promptly obtain a reactor coolant system sample under a nuclear reactor accident condition. Sample acquisition during accident conditions will provide information to evaluate the extent of core damage which has occurred or is occurring through knowledge of reactor coolant chemistry and radiochemistry.

2.0 Limits and Precautions

2.1 The PALS will be used to sample the reactor coolant system under the following conditions:

2.1.1 Post Accident.

2.1.2 Inaccessibility of Primary Sampling Area due to radiation levels.

2.1.3 Request from the Station Chemist or his designee.

2.2 UNDER ACCIDENT CONDITIONS, VALVE ALIGNMENTS SHALL NOT BE MADE AND SAMPLES SHALL NOT BE TAKEN WITHOUT PRIOR AUTHORIZATION FROM THE TECHNICAL SUPPORT CENTER (TSC)! (Containment Isolation valves may be closed upon ES Actuation).

2.3 UNDER ACCIDENT CONDITIONS, DO NOT ATTEMPT ANY PHASE OF SAMPLING OR ANALYSIS WITHOUT HEALTH PHYSICS APPROVAL AND COVERAGE!

2.4 Portable shielding, remote handling equipment, video equipment, etc., shall be used where practical during sampling, sample preparation, and sample analysis.

2.5 Chemistry personnel shall operate only those valves followed by (C) in this procedure. If ES signal requires containment isolation during use of this procedure, Operations and Chemistry Personnel should be aware of any pressure remaining in sample lines or sampling panel.

2.6 Working copy must be compared to control copy before use and sign off steps (Initials/Time) completed as procedure progresses.

3.0 Apparatus

3.1 Lockable glass syringes

3.2 Sample carrier

3.3 Stop watch

3.4 Plastic bags (8" x 12" minimum)

3.5 ~ 15 cc glass vial (stoppered with septum)

3.6 60 ml poly bottles

4.0 Procedure

4.1 Preparation for Sampling

4.1.1 Valve Alignments

4.1.1.1 Notify Shift Supervisor that operation of the PALS is being initiated by Chemistry. Chemistry will select either Enclosure 6.5 for a RCS sample or Enclosure 6.6 for a RBNS sample, check it against the control copy, and take it to the responsible individual in Operations (designated by the Shift Supervisor) for completion. Request Operations to complete Step 3.1 of the selected enclosure.

4.1.1.2 The following valves are electrically controlled by the PALS Control Panel:

RCS Sample: 1RC-179 (C)

Reactor Building Normal Sump Sample: 1LWD-1026 (C)
1LWD-1028 (C)

Return Line to Reactor Building Emergency Sump (either sample): 1LP-121 (C)

Demin. Water: 1DW-278 (C) (RCS Sample Line Flush)
1DW-280 (C) (RBNS Sample Line Flush)

4.1.1.3 The following valves are operated manually at the Sampling Panel by Chemistry personnel. They must be verified open prior to use of the panel.

	Initials/Time
OPEN Instrument Air Supply Isolation 1IA-2423	_____/____
OPEN Panel Instrument Air Isolation (Lower right on panel)	_____/____
OPEN Valve on Nitrogen Supply Bottle (>200 psi tank pressure required; ~45 psi delivery pressure).	_____/____
OPEN Panel Nitrogen Isolation (Lower right on panel)	_____/____
OPEN Cooling Water Supply Isolation 1DW-282	_____/____
OPEN Demin Water Supply Isolation 1DW-281	_____/____
OPEN Panel Demin Water Isolation (Lower right on panel)	_____/

4.1.1.4 The following should be verified as noted (Job supervisor may N/A as appropriate):

1LWD-1029 Low Point Drain (LPI Room) closed and capped	_____
1RC-177 High Point Vent (next to Sampling Panel) closed and capped	_____
1LP-110 Emergency Sump Line Drain (LPI Room) closed	_____
1LP-111 Emergency Sump Line Drain Tell-tale (LPI Room) Closed and capped	_____
1DW-278 Remote Starter (LPI Room) "ON"	_____
1LWD-1028 Remote Starter (LPI Room) "ON"	_____
1DW-91 Reactor Building Normal Sump Line Flush (LPI Room) Closed	_____
1LP-122 High Point Vent (Next to Sampling Panel) Closed and Capped	_____

1N-262 Nitrogen Supply Isolation:
Closed _____

4.1.2 Health Physics Notification

Contact Health Physics and ask for surveillance person prior to going to Control Panel. _____

4.1.3 Additional Requirements

Pick up glass syringes and sample carrier from Primary Lab and take stop watch and panel keys to Control Panel. _____

4.1.4 Power supplies for each electrical component are listed on Enclosure 6.2.

4.2 Panel Preparation

NOTE: If any item on panel is not clearly identified, refer to Enclosures 6.3 and 6.4 (Control Panel Diagrams).

4.2.1 Turn the main selector knob on the control panel to "Reset". Place key in System Power Switch and turn clockwise. (Panel lights should come on.) Press "Reset" button.

4.2.2 Place the toggle switch for the radiation monitor to "ON" and turn the scale select to "R/HR". If the radiation monitor is not functional, HP coverage is sufficient to operate the panel.

4.2.3 Place the toggle switches for the dilution water meter and dilution gas meter to "ON" position.

4.2.4 Push in the pH meter standardize knob.

4.2.5 Select the system to be sampled - Reactor Coolant System or Reactor Building Normal Sump - with the system selector.

4.2.6 Open sample regulator valve at cooler outlet. _____

4.3 Panel Operation (Position 8) Flush - Preliminary

4.3.1 Request Operations complete Step 3.3 of the enclosure selected in 4.1.1.1.

4.3.2 Turn the Operation Selector switch to the FLUSH position.

4.3.3 Press the SELECTION POWER ACTIVATE button.

4.3.4 Press the FLUSH ACTIVATE button and wait 4-5 minutes. (Observe that first flush light and the SAMPLE OUTLET indicating lights are both lit.)

4.3.5 Press the FLUSH ACTIVATE button and wait 4-5 minutes. Observe the second flush light is lit.

4.3.6 Press the FLUSH ACTIVATE button and wait 10 minutes. Observe the third flush light is lit.

4.3.7 Press the FLUSH ACTIVATE button and observe the COMPLETE Light is lit.

4.4 Panel Operation (Position 9) Drain - Preliminary

4.4.1 Turn the Operation Selector switch to the DRAIN position.

4.4.2 Press the SELECTION POWER ACTIVATE button.

4.4.3 Press DRAIN ACTIVATE and wait about 2 minutes or until no water is observed draining. Observe the first drain light is lit.

4.4.4 Press the DRAIN ACTIVATE a second time and wait about 2 minutes or until no water is observed draining. Observe the second drain light is lit.

4.4.5 Press the DRAIN ACTIVATE a third time and wait 6-7 minutes or until no water is observed draining. Observe the third drain light is lit.

4.4.6 Press the DRAIN ACTIVATE button a fourth time and observe the COMPLETE Light is lit.

4.5 Panel Operation (Position 1) Panel Prep

4.5.1 Turn the Operation Selector switch to the PANEL PREP. position. Press the reset button.

4.5.2 Momentarily depress the SELECTION POWER ACTIVATE pushbutton.

4.5.3 Depress the PURGE pushbutton for about 1 minute 10 seconds.

4.5.4 Depress the DRAIN pushbutton for about 1 minute 10 seconds.

4.5.5 Repeat 4.5.3 and 4.5.4 until no water is observed draining in either step.

4.5.6 Depress the CALIBRATE pushbutton and hold until the pH meter reading stabilizes.

4.5.7 Adjust the pH meter to the known pH of the buffer. _____

4.5.8 Depress the PURGE pushbutton for about 30 seconds.

4.5.9 Depress the FLUSH pushbutton until the pH meter reading stabilizes.

4.5.10 Depress the PURGE pushbutton for about 30 seconds.

4.5.11 Depress the DRAIN pushbutton for about 60 seconds.

4.5.12 Repeat Steps 4.5.9, 4.5.10, 4.5.11 and then continue to Section 4.6.

4.6 Panel Operation (Position 3) Sample

4.6.1 Request Operations complete Step 3.2 of the enclosure selected in 4.1.1.1.

4.6.2 Turn the thermocouple selector to TC-2. (TC-1 may be used as a backup.)

4.6.3 Establish by-pass line RCS flush by completing the following steps.

4.6.3.1 Place temperature measurement device on sample bypass line (after cooler) or place TC-5 in service if available.

4.6.3.2 Close sample regulating valve (#212). _____

4.6.3.3 Ensure sample flow regulator bypass toggle switch is "OFF". _____

4.6.3.4 OPEN bypass line block valve 1/4 turn. _____

4.6.3.5 CLOSE filter block valve. _____

4.6.3.6 Momentarily press SELECTION POWER ACTIVATE pushbutton. Record time RCS flush starts. _____

4.6.3.7 Adjust bypass line block valve to ensure TC-2 does not exceed 190°F. _____

4.6.3.8 Continue flush for 15 min. then move selector knob off position 3.

4.6.4 Establish flow through normal sample line by completing the following steps.

4.6.4.1 OPEN sample regulating valve (#212). _____

4.6.4.2 CLOSE bypass line block valve. _____

4.6.4.3 OPEN filter block valve to sample cylinder. _____

4.6.5 Momentarily depress the SELECTION POWER ACTIVATE pushbutton.

4.6.6 Observe that the SAMPLE INLET and SAMPLE OUTLET indicating lights are lit. Record the starting time.

4.6.7 Watch TC-2 closely. If it approaches 190°F, shut off sample flow by moving selector knob off position 3. If cooling water flow has been verified, then partially close sample regulator valve and reactivate position 3. Record the temperature when TC-2 has stabilized _____.

4.6.8 After verification of cooler function, sample flow regulator bypass may be used.

4.6.9 Record the PALS radiation reading _____. Subtract the initial background reading from sample radiation reading and record _____.

4.6.10 Press the 1) TC-2 STABILIZE ACTIVATE button; when pressure reading stabilizes, record _____. This pressure should match current system pressure.

4.6.11 Press the 2) Pressure STABILIZE ACTIVATE button and record time sample flow stops _____.

4.6.12 Close sample regulator bypass if opened in Step 4.6.8.

4.6.13 Request Operations to complete Step 3.4 of the enclosure selected in 4.1.1.1 if no more samples are to be taken.

4.7 Panel Operation (Position 4) Depressurization

4.7.1 Turn the Operation Selector switch to the DEPRESSURIZATION position.

4.7.2 Verify the pressure gauge on the instrument panel indicates about -25 inches of Mercury.

4.7.3 Momentarily depress the SELECTION POWER ACTIVATE pushbutton.

4.7.4 Observe that the system pressure is now zero. Wait about 60 seconds.

4.7.5 Flip the Nitrogen toggle switch to "ON" and observe the PRESS/VAC gauge. When the gauge needle just begins to move, flip the toggle switch to "OFF".

4.7.6 Continue to make small N_2 adds, by repeating 4.7.5 until the PRESS/VAC gauge reads about 6-10 inches.

4.8 Panel Operation (Position 5) Liquid Sample/Gas Sample

4.8.1 Turn the Operation Selector switch to the LIQUID SAMPLE/GAS SAMPLE position. Verify tank pressurization switch in the "ON" position.

4.8.2 Momentarily depress the SELECTION POWER ACTIVATE pushbutton.

4.8.3 Press SAMPLE GRAB and release. This will allow sample to be trapped in the sample loop.

4.8.4 Set dilution water totalizer to the desired ml. Wait 20 seconds and press "start" button on the totalizer. Record ml _____.

4.8.5 Place tank pressurization switch in the "OFF" position. Press ACTIVATE MIX button for ~ 10 seconds and release.

4.8.6 Press the ACTIVATE pH button and release. Record pH _____ when meter stabilizes.

4.8.7 Wait 5 seconds and press diluted GAS SAMPLE GRAB button and release.

4.9 Panel Operation (Position 7) Liquid Sample

4.9.1 Turn the Operation Selector switch to the Liquid Sample position.

4.9.2 Press the SELECTION POWER ACTIVATE button.

4.9.3 Press ACTIVATE button. Wait 5 seconds (for levels in dilution cylinder and grab sampler to equalize).

4.9.4 Immediately depress the DILUTED SAMPLE GRAB pushbutton to trap the sample.

4.9.5 Flip tank pressurization switch to "on".

4.10 Panel Operation (Position 8) Flush

4.10.1 Turn the Operation Selector switch to the FLUSH position.

4.10.2 Press the SELECTION POWER ACTIVATE button.

4.10.3 Press the FLUSH ACTIVATE button and wait 4-5 minutes. (Observe that the first FLUSH light and the SAMPLE OUTLET indicating light are both lit.)

4.10.4 Press the FLUSH ACTIVATE button and wait approximately 4-5 minutes. Observe second flush light is lit.

4.10.5 Press the FLUSH ACTIVATE pushbutton and wait 10 minutes. (Observe the third FLUSH light is lit.)

4.10.6 Press the FLUSH ACTIVATE pushbutton and observe the COMPLETE light is lit.

4.11 Panel Operation (Position 9) Drain

NOTE: Sump pump toggle switch may be activated at this point.

4.11.1 Turn the Operation Selector switch to the DRAIN position.

4.11.2 Momentarily depress the SELECTION POWER ACTIVATE pushbutton. Press ACTIVATE and observe that the first DRAIN light is lit.

4.11.3 Wait for about 2 minutes or until no water is observed draining and again depress the ACTIVATE pushbutton and observe the second DRAIN light is lit.

4.11.4 Wait for about 2 minutes or until no water is observed draining and again depress the ACTIVATE pushbutton and observe the third DRAIN light is lit.

4.11.5 Wait for about 6 minutes or until no more drainage is observed and again momentarily depress the ACTIVATE pushbutton and observe the DRAIN COMPLETE light is lit.

4.12 Panel Shutdown and Decontamination

4.12.1 Turn the Sample Selector switch to the OFF position.

4.12.2 Turn the Operation Selector switch to the RESET position.

4.12.3 Momentarily depress the RESET pushbutton.

4.12.4 Determine the method of pumping the sump to be used (The Sump Pump may be used to accomplish this).

NOTE: Ensure that sample has been obtained prior to pumping the sump.

4.12.5 Turn the System Power keylock to the SAMPLE position and record the PALS or HP Radiation Monitor meter reading_____.

4.12.5.1 If the radiation monitor indicates less than 3 R/Hr over background, turn the System Power keylock to the OFF position and remove the PALS System key.

4.12.5.2 If the radiation monitor indicates greater than 3 R/Hr over background, repeat 4.10 thru 4.12.5, if radiation levels at control panel will allow, (confer with HP).

4.12.6 If radiation level remains greater than 3 R/Hr over background after one repeat of Section 4.10 through 4.12.5, contact Station Chemist or his designee (personnel should move to a lower background area during this time, if one is available) for permission to return to Section 4.1 and take another sample using larger dilution volume. Permission given by_____.

4.12.7 Request HP to survey the Post Accident Sampling Panel and the area around the PASP prior to sample removal to ensure the 3 R/Hr over background is not exceeded.

4.12.8 The job supervisor may give permission to postpone the following steps by indicating a date for them to be performed.

CLOSE 1DW-281 Demin Water Supply Isolation. _____

CLOSE 1DW-282 Cooling Water Supply Isolation. _____

CLOSE Panel Demin Water Isolation. _____

CLOSE Valve on Nitrogen Supply Bottle. _____

CLOSE Panel Nitrogen Isolation. _____

CLOSE 1IA-2423 Instrument Air Isolation. _____

CLOSE Panel Instrument Air Isolation. _____

4.13 Sampling

4.13.1 Collect 3-1.0 ml stripped gas samples at the gas grab sampler in lockable glass syringes. Place in plastic bag.

4.13.2 Collect liquid sample in the liquid grab sampler. Place in plastic bag.

4.13.3 Request Operations to complete Steps 3.5 and 3.6 of the enclosure selected in 4.1.1.1.

4.13.4 Place plastic bags in sample carrier and transport to Hot Lab. Place sample carrier in operating fume hood behind a lead brick shield to await analysis.

4.14 Sample Analysis

4.14.1 Gas

4.14.1.1 Analyze one syringe of stripped gas by Chemistry Procedure CP/0/B/2004/14D, the determination of hydrogen in gas samples using the carle chromatograph and the spectra physics integrator. Calculate the results by the following method:

$$\%\ H_2 \times \frac{215\ cc}{0.095\ Kg} \times \frac{1}{100} = cc/Kg\ H_2$$

Where: $\%\ H_2$ is determined from CP/0/B/2004/14A

215 cc = stripped gas bomb volume

0.095 Kg = collected sample size

$\frac{1}{100}$ = conversion of percent to decimal

Report result_____cc/kg H_2

4.14.1.2 Withdraw 1 cc of air from septum stoppered glass vial and load 1 cc of stripped gas into it from second syringe. Analyze by GeLi Spectral Analysis (HP/0/B/1001/14, Procedure for Nuclear Data 6600 System Operation). Activities will be reported by HP for 1 cc of diluted gas sample. Calculate activity of dissolved gas in 1 ml of reactor coolant as follows:

μCi in 1 cc $\times \frac{215}{95}$ = Total activity from dissolved gas in 1 ml RC.

GeLi Spectra Attached _____.

4.14.1.3 Reserve third stripped gas syringe for use as a backup, if needed.

4.14.1.4 Additional gas sample dilution may be necessary to bring amount of hydrogen or activity within range of analyses. If so, withdraw 1 cc of air from a septum stoppered glass vial and load 1 cc of the sample to be diluted into it. Be sure to record the additional dilution information so that isotope activities may be adjusted accordingly.

4.14.2 Liquid

4.14.2.1 Job supervisor should select number of mls of diluted sample to be used _____. To obtain a gamma spectra that will correlate directly with the normal RCS, the dilution factor must be calculated and only the number of mls of actual reactor coolant in the sample turned in to HP for analysis.

Calculate mls actual RCS by:

$$mls_{RCS} = \frac{\text{number of ml of sample loop}}{\text{Total dilution volume + no. of ml of sample loop}} \times \text{number ml diluted sample}$$

Where, 6.3 = no. of ml of sample loop

THEN, 50 ml_{RCS} = ml H_2O

Report ml_{RCS}/ml H_2O (total will be 50 ml)

GeLi Spectra Attached _____

4.14.2.2 Job supervisor should select number of mls of diluted sample to be used _____. To obtain a boron concentration that will correlate directly with the normal RCS, the dilution factor must be calculated and multiplied by the analyzed sample concentration.

$$\text{ppm B} = \text{measured ppm B} \times \frac{\text{Total dilution volume + no. of ml of sample loop}}{\text{No. of ml of sample loop}}$$

Where, 6.3 = no. of ml of sample loop

Boron concentration $_{PALS}$ = _____ ppm

Boron concentration $_{RCS}$ = _____ ppm

$$\frac{\text{ppm } B_{RCS} - \text{ppm } B_{PALS}}{\text{ppm } B_{RCS}} \times 100 = \% \text{ difference}$$

4.14.2.3 Job supervisor should select number of mls of diluted sample to be used _____. To obtain chloride concentration that will correlate directly with the normal RCS, the dilution factor must be calculated and multiplied by the analyzed sample concentration.

Chloride concentration_____ppm

4.14.2.4 Report all results of liquid sample analyses in Primary Chemistry Chemplot and transmit results to the OSC.

4.14.2.5 Reserve third liquid syringe for use as a backup, if needed.

4.14.2.6 Additional liquid sample dilution may be necessary to bring amount of activity within range. If so, withdraw 1 ml of sample from 60 ml poly bottle (from Section 4.14.2.1) and dilute to 50 ml with Reagent Grade Water for analysis. Be sure to record the additional dilution information so that isotope activities may be adjusted accordingly.

4.14.2.7 Route completed procedure to Operational Support Center.

Accepted By:_____

4.15 Waste Disposal

4.15.1 Determine by detailed planning meeting the exact course of action to be taken. Under no condition will liquid or solid wastes be disposed of without prior specific HP directions.

4.15.2 Designate a sealable carboy as the "Post Accident Lab Waste" container. This container must be shielded and used as an interim liquid waste disposal container for all liquid analytical waste.

4.15.3 In the event an area is grossly contaminated and cannot be decontaminated, evaluate the need for shielding or protective covering to prevent the spread of airborne activity.

5.0 References

5.1 NUREG-0737, Section II.B.3

5.2 DPC System Health Physics Manual

5.3 Radiological Health Handbook, U.S. Dept. of HEW (1970).

5.4 Radiation Safety Technician Training Course, H.J. Moe, ANL-7291 Rev. 1 (1972).

5.5 Post Accident Liquid Sampling System Manual, Steam Production Department, OM-267A-28 (1981)

5.6 MNS Operating Procedure OP/0/A/6200/48

5.7 DPC Alara Manual (1980)

5.8 ONS Emergency Plan

5.9 ONS Chemistry Manual Section 5.1

6.0 Enclosures

6.1 Post Accident Authorization for Operation of PALS

6.2 U1 PALS Power Supplies

6.3 PALS Control Panel Diagram - Left

6.4 PALS Control Panel Diagram - Right

6.5 Operations Checklist for Reactor Coolant System Valve Lineups to Post Accident Liquid Sampling System

6.6 Operations Checklist for Reactor Building Normal Sump Valve Lineups to Post Accident Liquid Sampling System.

ENCLOSURE 6.1

POST ACCIDENT AUTHORIZATION FOR OPERATION OF PALS

Technician/Time

1. Verbal/written direction for sampling the Reactor Coolant System (RCS) has been received from the Technical Support Center (TSC). _____/____
   Person Authorizing Sampling _____

2. The specific post-accident analysis requested by TSC: _____/____

   Sample to be taken: RCS ☐ RBNS ☐ _____/____

   _____Boron

   _____Chloride

   _____Isotopic Analysis for _____Iodines

   _____Cesiums

   _____Noble Gases

   _____Non-Volatile Fission Products

   _____Other (Specify) _____

3. Determine by detailed planning meeting the exact course of action and data required. _____/____

4. Evaluate the use of portable shielding, remote handling equipment, video equipment, etc., to minimize the exposure to personnel while sampling. _____/____

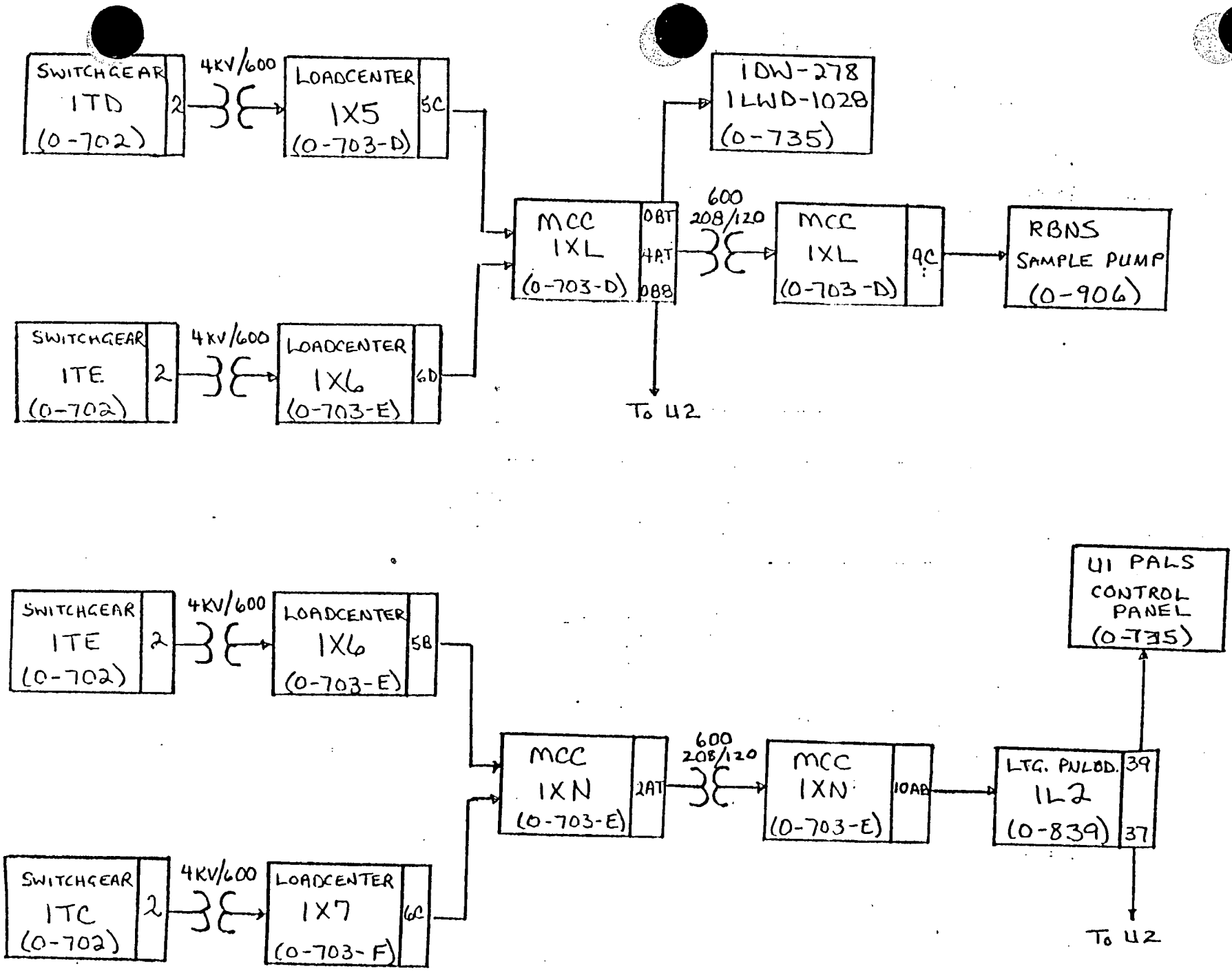
5. Have HP determine the required respiratory equipment and protective clothing to prevent or minimize internal exposure in any Planned Emergency situation. Use high range and/or extremity dosimetry if required. _____/____

6. Request HP to designate a route from PALS to the lab. _____/____

   Sample route designated: _____

   _____

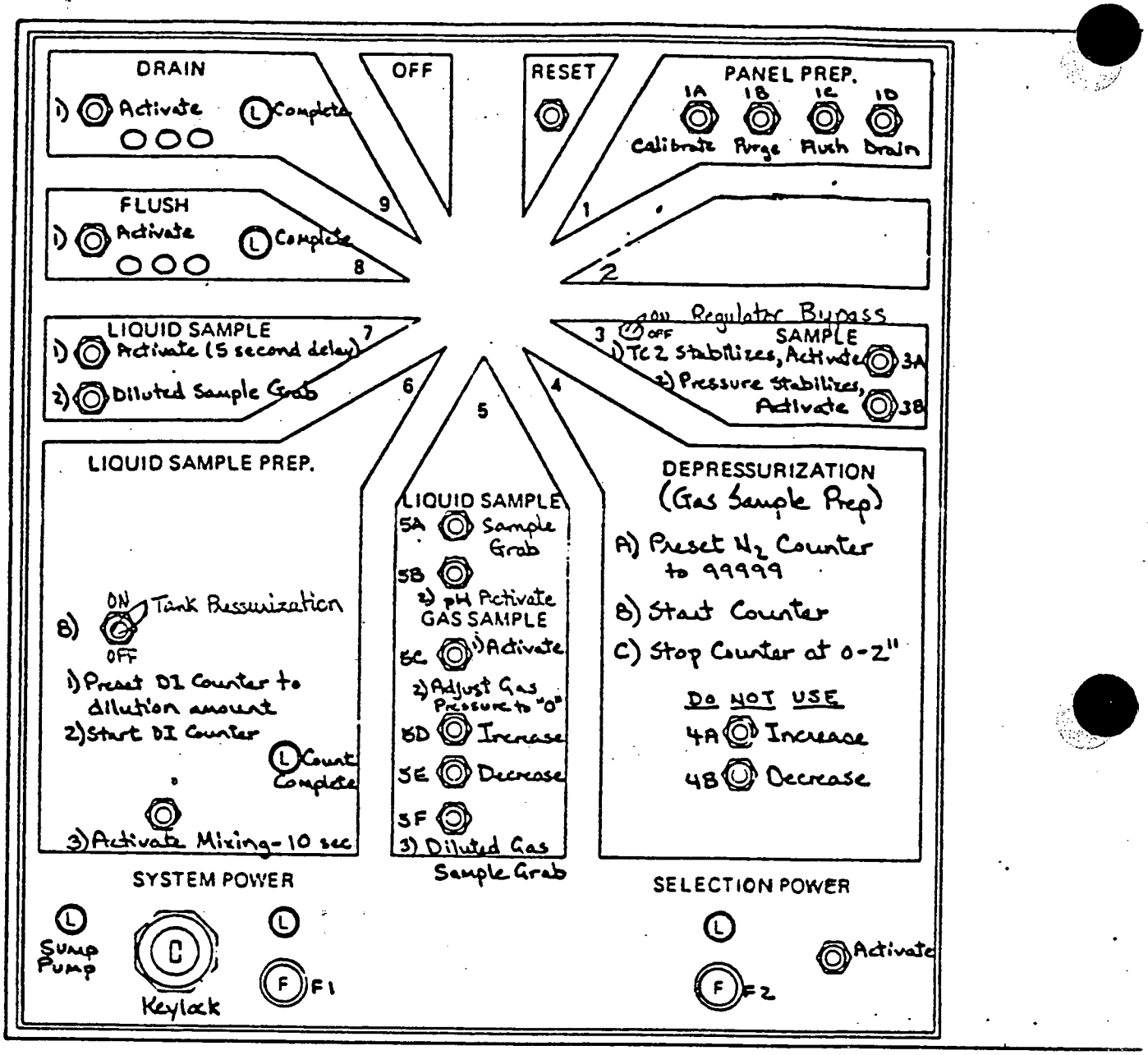
7. Evaluate the use of portable shielding, remote handling equipment, video equipment, etc., to minimize the exposure to personnel in the lab for the required analyses. _____/____



ENCLOSURE 6.2

Unit 1 PALS Power Supplies

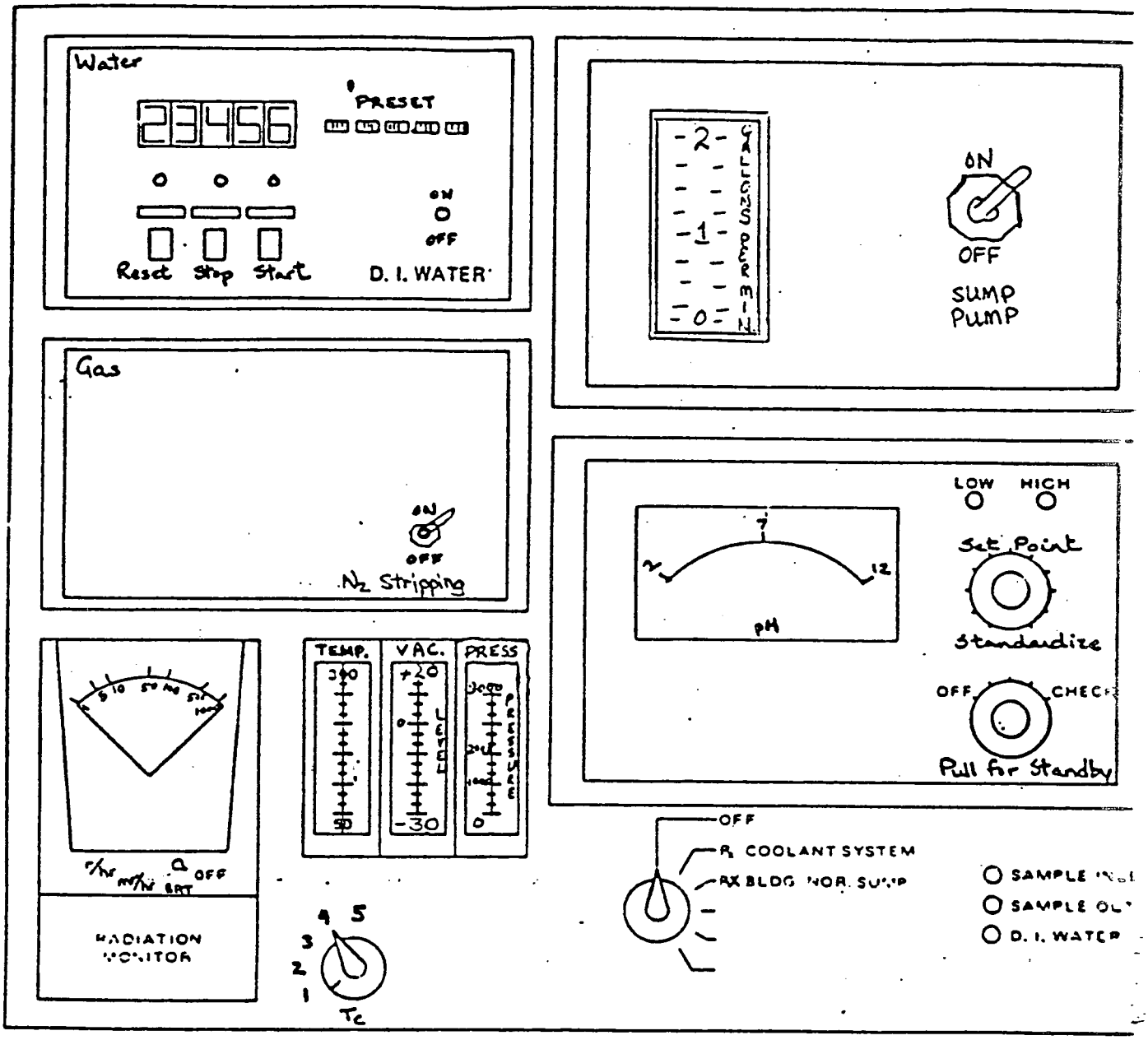
PALS Control Panel Diagram - Left



SEE DRAWING NO. L040180D FOR PANEL DETAIL

ENCLOSURE 6.4

PALS Control Panel Diagram-Right



Checked Control Copy_____

Date_____

ENCLOSURE 6.5

OPERATIONS CHECKLIST FOR REACTOR COOLANT SYSTEM VALVE LINEUPS TO POST ACCIDENT LIQUID SAMPLING SYSTEM

1.0 Purpose

This enclosure gives the valve lineups needed for Chemistry Personnel to sample the Reactor Coolant System (RCS). Locations of valves are given to facilitate lineups.

2.0 Limits and Precautions

2.1 RIA-54 should be in service and monitored during the course of operation of the PALS.

2.2 Demineralized water header must be in service and have at least 60 psi pressure (per Station Directive 3.1.15).

3.0 Procedure

		Date Init./Time
3.1	Ensure the following breakers are closed:	
3.1.1	1L2 Bkr. #39 Sampling/Control Panels Power Supply (located next to U2 sampling panel)	_____
3.1.2	MCC1XL Bkr. for 1DW-278 (RCS sample line flush) and 1LWD-1028 (RBNS Sample Line)	_____
3.1.3	Remove white tag from breaker #14 on 1KVIB (placed per OP/1/A/1102/01 Enc. 4.1, Section 2.8), and close breaker.	_____
	NOTE: Both 1RC-162 and 1RC-164 are powered from this breaker.	

ENCLOSURE 6.5

			Date Init./Time	Verification Date Init./Time
3.1.4		Remove white tag from breaker #4 on 1KVIA (placed per OP/1/A/1102/01 Enc. 4.1, Section 2.8) for 1RC-165, and close breaker.	_____	
3.2		To obtain a reactor coolant sample, the valves listed in this section should be aligned as follows:		
3.2.1	1RC-84	Inside reactor building - refer to Fill and Vent Procedure (OP/1/A/1103/02) to verify OPEN status.	_____	
3.2.2		1RC-174/1RC-176 (Test Connections) and 1RC-175 (High Point Vent) inside reactor building - refer to Fill and Vent Procedure (OP/1/A/1103/02) to verify CLOSED Status.	_____	
3.2.3	Open 1RC-162	inside reactor building-operated from control room.	_____	_____
3.2.4	Open 1RC-163	inside reactor building-operated from control room.	_____	_____
	NOTE:	The following initial conditions must be observed.		

ENCLOSURE 6.5

		Date Init./Time	Verification Date Init./Time
3.2.5	If containment integrity is required, then steps 3.2.6 and 3.2.7 must be completed.	_____	
3.2.6	Designate a responsible person in the Control Room to immediately close the isolation valves (1RC-164 and 1RC-165) if an ES actuation occurs.	_____	
3.2.7	Record that containment isolation valves 1RC-164 and 1RC-165 are open in OP/0/A/1102/20 (Shift Turnover).	_____	
3.2.8	Open 1RC-164 in Unit 1 LPI Room-operated from Control Room.	_____	_____
3.2.9	Open 1RC-165 in Unit 1 LPI Room-operated from Control Room.	_____	_____

CAUTION: If ES actuation occurs, immediately close isolation valves for containment isolation.

3.3 To allow recirculation of sample, align 1LP-65, return line valve to the RB Emergency Sump:

NOTE: The following initial conditions must be observed.

3.3.1	If containment integrity is required, then steps 3.3.2 and 3.3.3 must be completed.	_____	
3.3.2	Station a responsible person in the vicinity of 1LP-65 to immediately close 1LP-65 if ES Actuation occurs. This person must be in constant communication with the Control Room the entire time 1LP-65 is open.		
3.3.3	Record that the valve is open in OP/0/A/1102/20 (Shift Turnover).	_____	

ENCLOSURE 6.5

			Date Init./Time	Verification Date Init./Time
3.3.4	Open 1LP-65	manual valve (located in Unit 1 LPI Room) to be operated by reach rod from LPI/HPI Hatch Room 118, 119 (behind breaker panels ~ 15' south of 1LP-21).	_____	_____

3.4 Chemistry will inform Operations when they have obtained the RCS sample in the panel and the following valves should then be realigned as follows:

3.4.1	CLOSE 1RC-165	in Unit 1 LPI Room-operated from Control Room.	_____	_____
3.4.2	CLOSE 1RC-164	in Unit 1 LPI Room-operated from Control Room.	_____	_____
	NOTE:	Remove the containment isolation valves (1RC-164 and 1RC-165) from OP/0/A/1102/20 (Shift Turnover).		
3.4.3	CLOSE 1RC-163	inside Reactor Building-operated from Control Room.	_____	_____
3.4.4	CLOSE 1RC-162	inside Reactor Building-operated from Control Room.	_____	_____

3.5 Chemistry will inform Operations when entire sampling sequence has been completed.

3.5.1	CLOSE 1LP-65	Manual valve (located in LPI Room) operated by reach rod from LPI/HPI Hatch Room 118, 119 (behind breaker panels ~ 15' south of 1LP-21).	_____	_____

ENCLOSURE 6.5

		Date Init./Time	Verification Date Init./Time
	NOTE: This will regain containment integrity. Remove the containment isolation valve per OP/0/A/1102/20 (Shift Turnover).		
3.5.2	Ensure the following breakers are open:		
3.5.2.1	White tag open breaker #14 on 1KVIB.	_____	_____
	NOTE: Both 1RC-162 and 1RC-164 are powered from this breaker.		
3.5.2.2	White tag open breaker #4 on 1KVIA for 1RC-165.	_____	_____
3.6	Return completed enclosure to Chemistry personnel operating PALS.	_____	

Checked Control Copy_____

Date_____

ENCLOSURE 6.6

OPERATIONS CHECKLIST FOR REACTOR BUILDING

NORMAL SUMP VALVE LINEUPS TO POST ACCIDENT

SAMPLING SYSTEM

1.0 Purpose

This enclosure gives the valve lineups needed for Chemistry Personnel to sample the Reactor Building Normal Sump (RBNS). Locations of valves are given to facilitate lineups.

2.0 Limits and Precautions

2.1 RIA-54 should be in service and monitored during the course of operation of the PALS.

2.2 Demineralized water header must be in service and have at least 60 psi pressure (per Station Directive 3.1.15).

3.0 Procedure

		Date Init./Time
3.1	Ensure the following breakers are closed:	
3.1.1	1L2 Bkr. #39 Sampling/Control Panels Power Supply (located next to U2 sampling panel)	_____
3.1.2	MCC1XL Bkr. #9C RB Normal Sump Sample Pump Power Supply.	_____
3.1.3	MCC1XL Bkr. for 1DW-278 (RCS Sample line flush) and 1LWD-1028 (RBNS Sample Line).	_____
3.2	To obtain a reactor building normal sump sample, the following valves should be aligned as indicated:	

ENCLOSURE 6.6

			Date Init./Time	Verification Date Init./Time
3.2.1	White tag open breaker on RB Normal Sump Pump 1A. White Tag No._____ (Located on MCC1XL).		_____	
3.2.2	White tag open breaker on RB Normal Sump Pump 1B. White Tag No._____ (Located on MCC-1XL)		_____	
3.2.3	CLOSE 1LWD-30	RB Normal Sump Pump 1A Suction. Operated by reach rod on north wall in LPI/HPI Hatch Room 118, 119.	_____	
3.2.4	CLOSE 1LWD-33	RB Normal Sump Pump 1B Suction. Operated by reach rod on north wall in LPI/HPI Hatch Room 118, 119.	_____	
3.2.5	OPEN 1LWD-1	Reactor building normal sump line. This is an ES valve operated from the Control Room.	_____	_____
3.2.6	OPEN 1LWD-2	Reactor building normal sump line. This is an ES valve operated from the Control Room.	_____	_____

3.3 To allow recirculation of sample, align LP-65, return line valve to the RB Emergency Sump:

NOTE: The following initial conditions must be observed:

3.3.1 If containment integrity is required, then steps 3.3.2 and 3.3.3 must be completed. _____

ENCLOSURE 6.6

			Date Init./Time	Verification Date Init./Time
3.3.2	Station a responsible person in the vicinity of 1LP-65 to immediately close 1LP-65 if ES Actuation occurs. This person must be in constant communication with the Control Room the entire time 1LP-65 is open.		_____	
3.3.3	Record that the valve is open in OP/0/A/1102/20 (Shift Turnover).		_____	
3.3.4	OPEN 1LP-65	Manual valve (located in Unit 1 LPI Room) to be operated by reach rod from LPI/HPI Hatch Room 118, 119 (behind breaker panels ~ 15' south of 1LP-21).	_____	_____

3.4 Chemistry will inform Operations when they have obtained the reactor building normal sump sample in the panel, and the following valves should then be realigned as follows:

3.4.1	CLOSE 1LWD-2	Reactor building normal sump line. This is an ES valve operated from the Control Room.	_____	_____
3.4.2	CLOSE 1LWD-1	Reactor building normal sump line. This is an ES valve operated from the Control Room.	_____	_____
3.4.3	OPEN 1LWD-33	RB Normal Sump Pump (1WD-2B) Suction. Operated by reach rod on north wall in LPI/HPI Hatch Room 118, 119.	_____	

ENCLOSURE 6.6

			Date Init./Time	Verification Date Init./Time
3.4.4	OPEN 1LWD-30	RB Normal Sump Pump (1WD-2A) Suction. Operated by reach rod on north wall in LPI/HPI Hatch Room 118, 119.	_____	
3.4.5	Remove white tag from breaker on RB Normal Sump Pump 1B. White Tag No. _____		_____	
3.4.6	Remove tag from breaker on RB Normal Sump Pump 1A. White Tag No. _____		_____	

3.5 Chemistry will inform Operations when entire sampling sequence has been completed.

3.5.1	CLOSE 1LP-65	Manual valve (located in LPI Room) operated by reach rod from LPI/HPI Hatch Room 118, 119 (behind breaker panels ~ 15' south of 1LP-21).	_____	_____

NOTE: This will regain containment integrity. Remove the containment isolation valve from OP/0/A/1102/20 (Shift Turnover).

3.6 Return completed enclosure to Chemistry Personnel operating PALS. _____

Form 34731 (3-84)

CONTROL COPY

DUKE POWER COMPANY
PROCEDURE PROCESS RECORD

(1) ID No. CP/2/A/2002/04C
Change(s) - to
4 Incorporated

PREPARATION

INFORMATION ONLY

(2) STATION Oconee Nuclear Station

(3) PROCEDURE TITLE Operating Procedure for the Post-Accident Liquid Sampling (PALS) System

(4) PREPARED BY S K Green DATE 7/28/86

(5) REVIEWED BY Pat Hull DATE 7/28/86

Cross-Disciplinary Review By W L Pollard N/R 7/28/86

(6) TEMPORARY APPROVAL (If Necessary)

By _____ (SRO) Date _____

By _____ Date _____

(7) APPROVED BY J S Barr DATE 7/29/86

(8) MISCELLANEOUS

Reviewed/Approved By _____ Date _____

Reviewed/Approved By _____ Date _____

COMPLETION

(9) DATE(S) PERFORMED _____

(10) PROCEDURE COMPLETION VERIFICATION

☐ Yes ☐ N/A Check lists and/or blanks properly initialed, signed, dated or filled in N/A or N/R, as appropriate?

☐ Yes ☐ N/A Listed enclosures attached?

☐ Yes ☐ N/A Data sheets attached, completed, dated and signed?

☐ Yes ☐ N/A Charts, graphs, etc. attached and properly dated, identified and marked?

☐ Yes ☐ N/A Acceptance criteria met?

VERIFIED BY _____ DATE _____

(11) PROCEDURE COMPLETION APPROVED _____ DATE _____

(12) REMARKS

Checked Control Copy_____

Date_____

DUKE POWER COMPANY

OCONEE NUCLEAR STATION

OPERATING PROCEDURE FOR THE

POST ACCIDENT LIQUID SAMPLING (PALS) SYSTEM

1.0 Purpose

The Post Accident Liquid Sampling System (PALS) provides the capability to promptly obtain a reactor coolant system sample under a nuclear reactor accident condition. Sample acquisition during accident conditions will provide information to evaluate the extent of core damage which has occurred or is occurring through knowledge of reactor coolant chemistry and radiochemistry.

2.0 Limits and Precautions

2.1 The PALS will be used to sample the reactor coolant system under the following conditions:

2.1.1 Post Accident.

2.1.2 Inaccessibility of Primary Sampling Area due to radiation levels.

2.1.3 Request from the Station Chemist or his designee.

2.2 UNDER ACCIDENT CONDITIONS, VALVE ALIGNMENTS SHALL NOT BE MADE AND SAMPLES SHALL NOT BE TAKEN WITHOUT PRIOR AUTHORIZATION FROM THE TECHNICAL SUPPORT CENTER (TSC)! (Containment Isolation valves may be closed upon ES Actuation).

2.3 UNDER ACCIDENT CONDITIONS, DO NOT ATTEMPT ANY PHASE OF SAMPLING OR ANALYIS WITHOUT HEALTH PHYSICS APPROVAL AND COVERAGE!

2.4 Portable shielding, remote handling equipment, video equipment, etc., shall be used where practical during sampling, sample preparation, and sample analysis.

2.5 Chemistry personnel shall operate only those valves followed by (C) in this procedure. If ES signal requires containment isolation during use of this procedure, Operations and Chemistry Personnel should be aware of any pressure remaining in sample lines or sampling panel.

2.6 Working copy must be compared to control copy before use and sign off steps (Initials/Time) completed as procedure progresses.

3.0 Apparatus

3.1 Lockable gas syringes

3.2 Sample carrier

3.3 Stop watch

3.4 Plastic bags (8" x 12" minimum)

3.5 ~ 15 cc glass vial (stoppered with septum)

3.6 60 ml poly bottles

4.0 Procedure

4.1 Preparation for Sampling

4.1.1 Valve Alignments

4.1.1.1 Notify Shift Supervisor that operation of the PALS is being initiated by Chemistry. Chemistry will select either Enclosure 6.5 for a RCS sample or Enclosure 6.6 for a RBNS sample, check it against the control copy, and take it to the responsible individual in Operations (designated by the Shift Supervisor) for completion. Request Operations to complete Step 3.1 of the selected enclosure.

4.1.1.2 The following valves are electrically controlled by the PALS Control Panel:

RCS Sample: 2RC-179 (C)

Reactor Building Normal Sump Sample: 2LWD-1026 (C)
2LWD-1028 (C)

Return Line to Reactor Building Emergency Sump (either sample): 2LP-121 (C)

Demin. Water: 2DW-278 (C) (RCS Sample Line Flush)
2DW-280 (C) (RBNS Sample Line Flush)

4.1.1.3 The following valves are operated manually at the Sampling Panel by Chemistry personnel. They must be verified open prior to use of the panel.

	Initials/Time
OPEN Instrument Air Supply Isolation 2IA-2423	_____/____
OPEN Panel Instrument Air Isolation (Lower right on panel)	_____/____
OPEN Valve on Nitrogen Supply Bottle (>200 psi tank pressure required; ~45 psi delivery pressure).	_____/____
OPEN Panel Nitrogen Isolation (Lower right on panel)	_____/____
OPEN Cooling Water Supply Isolation 2DW-282	_____/____
OPEN Demin Water Supply Isolation 2DW-281	_____/____
OPEN Panel Demin Water Isolation (Lower right on panel)	_____/____

4.1.1.4 The following should be verified as noted (job supervisor may N/A as appropriate).

2LWD-1029 Low Point Drain (LPI Room) closed and capped	_____
2RC-177 High Point Vent (next to Sampling Panel) closed and capped	_____
2LP-110 Emergency Sump Line Drain (LPI Room) Closed	_____
2LP-111 Emergency Sump Line Drain Tell-tale (LPI Room) closed and capped	_____
2DW-278 Remote Starter (HPI Room) "ON"	_____
2LWD-1028 Remote Starter (LPI Room) "ON"	_____
2DW-91 Reactor Building Normal Sump Line Flush (HPI Room) Closed	_____
2RC-178 Low Point Drain (LPI Room) closed and capped	_____

2DW-283 Low Point Drain (HPI Room) closed and capped _____

2LP-122 High Point Vent (next to Sampling Panel) closed and capped _____

2DW-324 Isolation Valve between U1 & U2 on header (~30 ft. upstream of 2DW-281) Open _____

2N-262 Nitrogen Isolation: Closed _____

4.1.2 Health Physics Notification

Contact Health Physics and ask for surveillance person prior to going to Control Panel. _____

4.1.3 Additional Requirements

Pick up glass syringes and sample carrier from Primary Lab, and take stop watch and panel keys to Control Panel. _____

4.1.4 Power supplies for each electrical component are listed on Enclosure 6.2.

4.2 Panel Preparation

NOTE: If any item on panel is not clearly identified, refer to Enclosures 6.3 and 6.4 (Control Panel Diagrams).

4.2.1 Turn the main selector knob on the control panel to "Reset". Place key in System Power Switch and turn clockwise. (Panel lights should come on.) Press "Reset" button.

4.2.2 Place the toggle switch for the radiation monitor to "ON" and turn the scale select to "R/HR". If the radiation monitor is not functional, HP coverage is sufficient to operate the panel.

4.2.3 Place the toggle switches for the dilution water meter and dilution gas meter to "ON" position.

4.2.4 Push in the pH meter standardize knob.

4.2.5 Select the system to be sampled - Reactor Coolant System or Reactor Building Normal Sump - with the system selector.

4.2.6 Open sample regulator valve at cooler outlet. _____

4.3 Panel Operation (Position 8) Flush - Preliminary

4.3.1 Request Operations complete Step 3.3 of the enclosure selected in 4.1.1.1.

4.3.2 Turn the Operation Selector switch to the FLUSH position.

4.3.3 Press the SELECTION POWER ACTIVATE button.

4.3.4 Press the FLUSH ACTIVATE button and wait 4-5 minutes. (Observe that first flush light and the SAMPLE OUTLET indicating lights are both lit.)

4.3.5 Press the FLUSH ACTIVATE button and wait 4-5 minutes. Observe the second flush light is lit.

4.3.6 Press the FLUSH ACTIVATE button and wait 10 minutes. Observe the third flush light is lit.

4.3.7 Press the FLUSH ACTIVATE button and observe the COMPLETE light is lit.

4.4 Panel Operation (Position 9) Drain - Preliminary

4.4.1 Turn the Operation Selector switch to the DRAIN position.

4.4.2 Press the SELECTION POWER ACTIVATE button.

4.4.3 Press DRAIN ACTIVATE and wait about 2 minutes or until no water is observed draining. Observe the first drain light is lit.

4.4.4 Press the DRAIN ACTIVATE a second time and wait about 2 minutes or until no water is observed draining. Observe the second drain light is lit.

4.4.5 Press the DRAIN ACTIVATE a third time and wait 6-7 minutes or until no water is observed draining. Observe the third drain light is lit.

4.4.6 Press the DRAIN ACTIVATE button a fourth time and observe the COMPLETE light is lit.

4.5 Panel Operation (Position 1) Panel Prep

4.5.1 Turn the Operation Selector switch to the PANEL PREP. position. Press the reset button.

4.5.2 Momentarily depress the SELECTION POWER ACTIVATE pushbutton.

4.5.3 Depress the PURGE pushbutton for about 1 minute 10 seconds.

4.5.4 Depress the DRAIN pushbutton for about 1 minute 10 seconds.

4.5.5 Repeat 4.5.2 and 4.5.4 until no water is observed draining in either step.

4.5.6 Depress the CALIBRATE pushbutton and hold until the pH meter reading stabilizes

4.5.7 Adjust the pH meter to the known pH of the buffer. _____

4.5.8 Depress the PURGE pushbutton for about 30 seconds.

4.5.9 Depress the FLUSH pushbutton until the pH meter reading stabilizes.

4.5.10 Depress the PURGE pushbutton for about 30 seconds.

4.5.11 Depress the DRAIN pushbutton for about 60 seconds.

4.5.12 Repeat Steps 4.5.9, 4.5.10, 4.5.11 and then continue to Section 4.6.

4.6 Panel Operation (Position 3) Sample

4.6.1 Request Operations complete Step 3.2 of the enclosure selected in 4.1.1.1.

4.6.2 Establish bypass line RCS flush as needed by completing the following steps:

4.6.2.1 Place temperature measurement device on sample bypass line (after cooler) or place TC-5 in service if available. _____

4.6.2.2 Close sample regulating valve 212. _____

4.6.2.3 Ensure sample flow regulator bypass toggle switch is "OFF". _____

4.6.2.4 OPEN bypass line block valve ~1/4 turn. _____

4.6.2.5 CLOSE filter block valve. _____

4.6.2.6 Momentarily depress SELECTION POWER ACTIVATE pushbutton. Record time RCS flush starts. _____

4.6.2.7 Adjust bypass line block valve as needed to ensure temperature does not exceed 190°. _____

4.6.2.8 Continue flush for 10-15 minutes, then move selector knob off Position 3. Record end time of flush. _____

4.6.3 Establish flow through normal sample line as needed by completing the following steps:

4.6.3.1 Turn thermocouple selector to TC-2 (or TC-1 may be used as backup). _____

4.6.3.2 OPEN sample regulating valve #212 approximately four turns (to maintain flow at _____

4.6.3.3 CLOSE bypass line block valve. _____

4.6.3.4 OPEN filter block valve to sample cylinder. _____

4.6.4 Return to Position 3 and momentarily depress the SELECTION POWER ACTIVATE pushbutton.

4.6.5 Observe that the SAMPLE INLET and SAMPLE OUTLET indicating lights are lit. Record the starting time _____.

4.6.6 Watch TC-2 closely. If it approaches 190°F, check cooling water flow. If it goes above 190°F, shut off sample flow by moving selector knob off position 3. If cooling water flow has been verified, then partially close sample regulator valve and reactivate position 3. Record the temperature when TC-2 has stabilized _____.

4.6.7 After verification of cooler function, sample flow regulator bypass may be used for low pressure sampling.

4.6.8 Record the PALS radiation reading _____. Subtract the initial background reading from sample radiation reading and record _____.

4.6.9 Press the 1) TC-2 Stabilize Activate button; when pressure reading stabilizes, record _____. This pressure should match current system pressure.

4.6.10 Press the 2) Pressure Stabilize Activate button and record time sample flow stops _____.

4.6.11 Close sample regulator bypass if opened in Step 4.6.7.

4.6.12 Request Operations to complete Step 3.4 of the enclosure selected in 4.1.1.1.

4.7 Panel Operation (Position 4) Depressurization

4.7.1 Turn the Operation Selector switch to the DEPRESSURIZATION position.

4.7.2 Verify the pressure gauge on the instrument panel indicates between -20 and -30 inches of Mercury.

4.7.3 Momentarily depress the SELECTION POWER ACTIVATE pushbutton.

4.7.4 Observe that system pressure is now zero. Wait about 10 minutes.

4.7.5 Flip the Nitrogen toggle switch to "ON" and observe the PRESS/VAC gauge. When the gauge needle just begins to move, flip the toggle switch to "OFF".

4.7.6 Continue to make small N_2 adds, by repeating 4.7.5 until the PRESS/VAC gauge reads about 10.5 inches.

4.8 Panel Operation (Position 5) Liquid Sample/Gas Sample

4.8.1 Turn the Operation Selector switch to the LIQUID SAMPLE/GAS SAMPLE position. Verify tank pressurization switch is in the "ON" position.

4.8.2 Momentarily depress the SELECTION POWER ACTIVATE pushbutton.

4.8.3 Press SAMPLE GRAB and release. This will allow sample to be trapped in the sample loop.

4.8.4 Set dilution water totalizer to the desired ml. Count off 10 seconds and press 'start' button on the totalizer. Record ml _____.

4.8.5 Place tank pressurization switch in the "OFF" position.

4.8.6 Press ACTIVATE MIX button for ~ 10 seconds and release.

4.8.7 Press the ACTIVATE pH button and release. Record pH_____ when meter stabilizes.

4.8.8 Press the GAS SAMPLE ACTIVATE button and release. (Vacuum level gauge should drop to ~ 0 inches of mercury).

4.8.9 Wait 5 seconds and press diluted GAS SAMPLE GRAB button and release.

4.9 Panel Operation (Position 7) Liquid Sample

4.9.1 Turn the Operation Selector switch to the Liquid Sample position.

4.9.2 Press the SELECTION POWER ACTIVATE button.

4.9.3 Press Activate button. Wait 5 seconds (for levels in dilution cylinder and grab sampler to equalize).

4.9.4 Immediately depress the DILUTED SAMPLE GRAB pushbutton to trap the sample.

4.9.5 Flip the tank pressurization switch to "ON".

4.10 Panel Operation (Position 8) Flush

4.10.1 Turn the Operation Selector switch to the FLUSH position.

4.10.2 Press the SELECTION POWER ACTIVATE button.

4.10.3 Press the FLUSH ACTIVATE button and wait 4-5 minutes. (Observe that the first FLUSH light and the SAMPLE OUTLET indicating light are both lit.)

4.10.4 Press the FLUSH ACTIVATE button and wait approximately 4-5 minutes. Observe second flush light is lit.

4.10.5 Press the FLUSH ACTIVATE pushbutton and wait 10 minutes. Observe the third FLUSH light is lit.

4.10.6 Press the FLUSH ACTIVATE pushbutton and observe the COMPLETE light is lit.

4.11 Panel Operation (Position 9) Drain

NOTE: Sump pump toggle switch may be turned "ON" at this point.

4.11.1 Turn the Operation Selector switch to the DRAIN position.

4.11.2 Momentarily depress the SELECTION POWER ACTIVATE pushbutton. Press ACTIVATE and observe that the first DRAIN light is lit.

4.11.3 Wait for about 2 minutes or until no water is observed draining and again depress the ACTIVATE pushbutton and observe the second DRAIN light is lit.

4.11.4 Wait for about 2 minutes or until no water is observed draining and again depress the ACTIVATE pushbutton and observe the third DRAIN light is lit.

NOTE: This step will open 2DW-278 if in the RCS position in 4.2.4. A decrease in activity will verify operability of 2DW-278.

4.11.5 Wait for about 6 minutes or until no more drainage is observed and again momentarily depress the ACTIVATE pushbutton and observe the DRAIN COMPLETE light is lit.

4.12 Panel Shutdown and Decontamination

4.12.1 Turn the Sample Selector switch to the OFF position.

4.12.2 Turn the Operation Selector switch to the RESET position.

4.12.3 Momentarily depress the RESET pushbutton.

4.12.4 Determine the method of pumping the sump to be used (the sump pump may be used to accomplish this).

NOTE: Ensure that the sample has been obtained prior to pumping the sump.

4.12.5 Turn the System Power keylock to the SAMPLE position and record the PALS or HP Radiation Monitor meter reading_____.

4.12.5.1 If the radiation monitor indicates less than 3 R/Hr over background, turn the System Power keylock to the OFF position and remove the PALS System key.

4.12.5.2 If the radiation monitor indicates greater than 3R/Hr over background, repeat 4.10 thru 4.12.5, if radiation levels at control panel will allow. (Confer with HP).

4.12.6 If radiation level remains greater than 3 R/hr over background after one repeat of Section 4.10 through 4.12.5, contact Station Chemist or his designee (personnel should move to a lower background area during this time, if one is available) for permission to return to Section 4.1 and take another sample using larger dilution volume. Permission given by_____.

4.12.7 Request HP to survey the Post Accident Sampling Panel and the area around the PASP prior to sample removal to ensure the 3 R/Hr over background is not exceeded.

4.12.8 The job supervisor may give permission to postpone the following steps by indicating a date for them to be performed.

CLOSE 2DW-281 Demin Water Supply Isolation. _____

CLOSE 2DW-282 Cooling Water Supply Isolation. _____

CLOSE Panel Demin Water Supply Isolation. _____

CLOSE Valve on Nitrogen Supply Cylinder. _____

CLOSE Panel Nitrogen Supply Isolation. _____

CLOSE 2IA-2423 Instrument Air Isolation. _____

CLOSE Panel Instrument Air Isolation. _____

4.13 Sampling

4.13.1 Collect 3-1.0 ml stripped gas samples at the gas grab sampler in lockable glass syringes. Place in plastic bag.

4.13.2 Collect liquid sample in the liquid grab sampler. Place in plastic bag.

4.13.3 Request Operations to complete Steps 3.5 and 3.6 of the enclosure selected in 4.1.1.1.

4.13.4 Place plastic bags in sample carrier and transport to Hot Lab. Place sample carrier in operating fume hood behind a lead brick shield to await analysis.

4.14 Sample Analysis

4.14.1 Gas

4.14.1.1 Analyze one syringe of stripped gas by Chemistry Procedure CP/0/B/2004/14D, the determination of hydrogen in gas samples using the carle gas chromatograph and the spectra physics integrator.

Calculate the results by the following method:

$$\%\ H_2 \times \frac{215\ cc}{0.095\ Kg} \times \frac{1}{100} = cc/Kg\ H_2$$

Where: % H_2 is determined from CP/0/B/2004/14D

215 cc = stripped gas bomb volume

0.095 Kg = collected sample size

$\frac{1}{100}$ = conversion of percent to decimal

Report result_____cc/kg H_2

4.14.1.2 Withdraw 1 cc of air from septum stoppered glass vial and load 1 cc of stripped gas into it from second syringe. Analyze by GeLi Spectral Analysis (HP/0/B/1001/14, Procedure for Nuclear Data 6600 System Operation). Activities will be reported by HP for 1 cc of diluted gas sample. Calculate activity of dissolved gas in 1 ml of reactor coolant as follows:

μCi in 1 cc x $\frac{215}{95}$ = Total activity from dissolved gas in 1 ml RC.

GeLi Spectra Attached _____.

4.14.1.3 Reserve third stripped gas syringe for use as a backup, if needed.

4.14.1.4 Additional gas sample dilution may be necessary to bring amount of hydrogen or activity within range of analyses. If so, withdraw 1 cc of air from a septum stoppered glass vial and load 1 cc of the sample to be diluted into it. Be sure to record the additional dilution information so that isotope activities may be adjusted accordingly.

4.14.2 Liquid

4.14.2.1 Job supervisor should select number of mls of diluted sample to be used _____. To obtain a gamma spectra that will correlate directly with the normal RCS, the dilution factor must be calculated and only the number of mls of actual reactor coolant in the sample turned in to HP for analysis.

Calculate mls actual RCS by:

$$mls_{RCS} = \frac{\text{number of ml of sample loop}}{\text{Total dilution volume + no. of ml of sample loop}} \times \text{number ml diluted sample}$$

THEN, $50 - ml_{RCS} = ml\ H_2O$

Report ml_{RCS}/ml H_2O (total will be 50 ml)

GeLi Spectra Attached _____

4.14.2.2 Job supervisor should select number of mls of diluted sample to be used _____. To obtain a boron concentration that will correlate directly with the normal RCS, the dilution factor must be calculated, and multiplied by the analyzed sample concentration.

$$\text{ppm B} = \text{measured ppm B} \times \frac{\text{Total dilution volume + no. of ml of sample loop}}{\text{no. of ml of sample loop}}$$

Boron concentration $_{PALS}$ = _____ ppm

Boron concentration $_{RCS}$ = _____ ppm

$$\frac{\text{ppm } B_{RCS} - \text{ppm } B_{PALS}}{\text{ppm } B_{RCS}} \times 100 = \%\ \text{difference}$$

4.14.2.3 Job supervisor should select number of mls of diluted sample to be used _____. To obtain concentration that will correlate directly with the normal RCS, the dilution factor must be calculated, and multiplied by the analyzed sample concentration.

Chloride concentration _____ ppm.

4.14.2.4 Report all results of liquid sample analyses in Primary Chemistry Chemplot and transmit results to the OSC.

4.14.2.5 Reserve third liquid syringe for use as a backup, if needed.

4.14.2.6 Additional liquid sample dilution may be necessary to bring amount of activity within range. If so, withdraw 1 ml of sample from 60 ml poly bottle (from Section 4.14.2.1) and dilute to 50 ml with Reagent Grade Water for analysis. Be sure to record the additional dilution information so that isotope activities may be adjusted accordingly.

4.14.2.7 Route completed procedure to Operational Support Center.

Accepted By: _____

4.15 Waste Disposal

4.15.1 Determine by detailed planning meeting the exact course of action to be taken. Under no condition will liquid or solid wastes be disposed of without prior specific HP directions.

4.15.2 Designate a sealable carboy as the "Post Accident Lab Waste" container. This container must be shielded and used as an interim liquid waste disposal container for all liquid analytical waste.

4.15.3 In the event an area is grossly contaminated and cannot be decontaminated, evaluate the need for shielding or protective covering to prevent the spread of airborne activity.

5.0 References

5.1 NUREG-0737, Section II.B.3

5.2 DPC System Health Physics Manual

5.3 Radiological Health Handbook, U.S. Dept. of HEW (1970).

5.4 Radiation Safety Technician Training Course, H.J. Moe, ANL-7291 Rev. 1 (1972).

5.5 Post Accident Liquid Sampling System Manual, Steam Production Department, OM-267A-28 (1981)

5.6 MNS Operating Procedure OP/0/A/6200/48

5.7 DPC Alara Manual (1980)

5.8 ONS Emergency Plan

5.9 ONS Chemistry Manual Section 5.1

6.0 Enclosures

6.1 Post Accident Authorization for Operation of PALS

6.2 U2 PALS Power Supplies

6.3 PALS Control Panel Diagram - Left

6.4 PALS Control Panel Diagram - Right

6.5 Operations Checklist for Reactor Coolant System Valve Lineups to Post Accident Liquid Sampling System

6.6 Operations Checklist for Reactor Building Normal Sump Valve Lineups to Post Accident Liquid Sampling System.

Checked Control Copy_____

Date_____

ENCLOSURE 6.1

POST ACCIDENT AUTHORIZATION FOR OPERATION OF PALS

Technician/Time

1. Verbal/written direction for sampling the Reactor Coolant System (RCS) has been received from the Technical Support Center (TSC). _____/____
   Person Authorizing Sampling _____

2. The specific post-accident analysis requested by TSC: _____/____

   Sample to be taken: RCS ☐ RBNS ☐ _____/____

   _____Boron

   _____Chloride

   _____Isotopic Analysis for _____Iodines

   _____Cesiums

   _____Noble Gases

   _____Non-Volatile Fission Products

   _____Other (Specify) _____

3. Determine by detailed planning meeting the exact course of action and data required. _____/____

4. Evaluate the use of portable shielding, remote handling equipment, video equipment, etc., to minimize the exposure to personnel while sampling. _____/____

5. Have HP determine the required respiratory equipment and protective clothing to prevent or minimize internal exposure in any Planned Emergency situation. Use high range and/or extremity dosimetry if required. _____/____

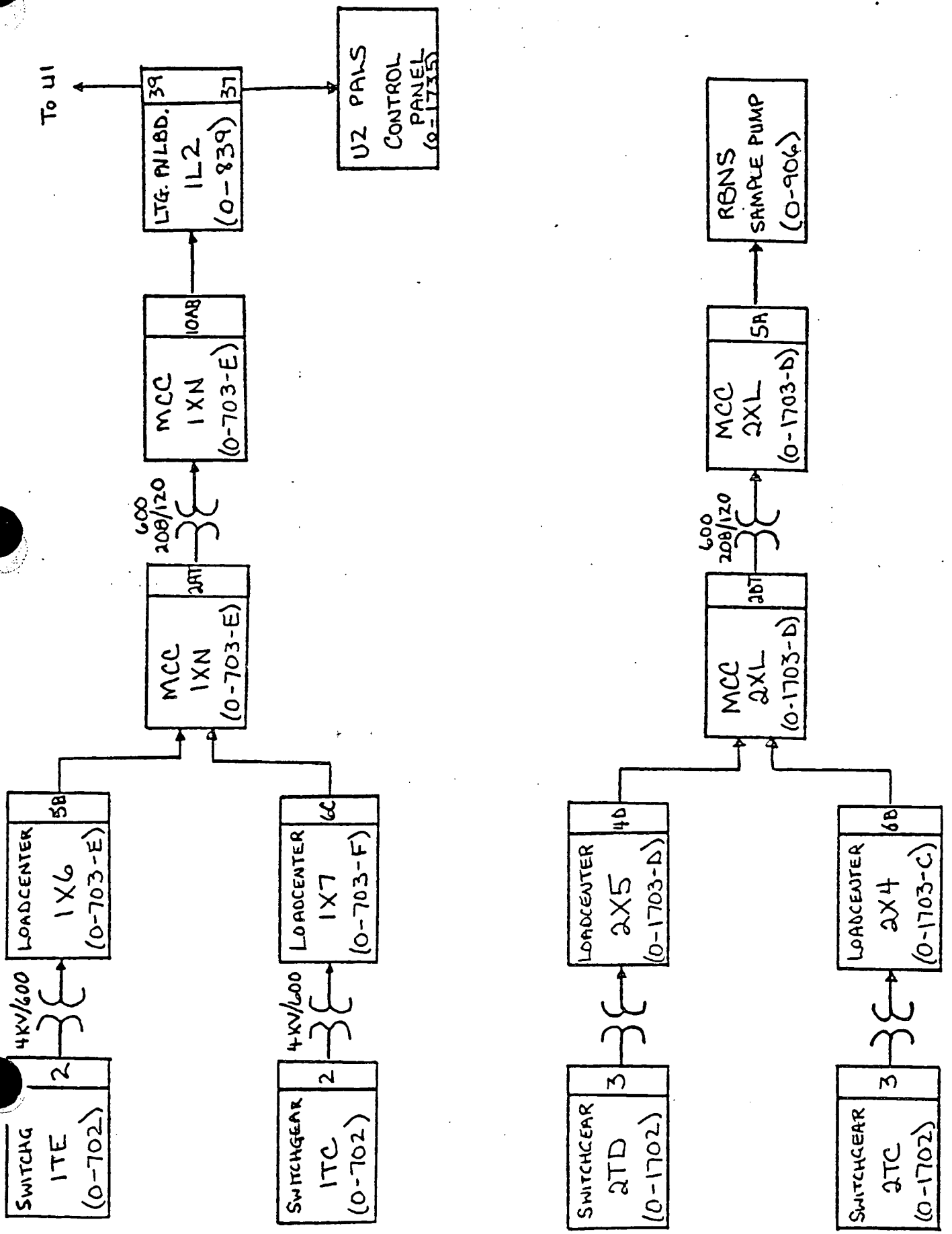
6. Request HP to designate a route from PALS to the lab. _____/____

   Sample route designated: _____

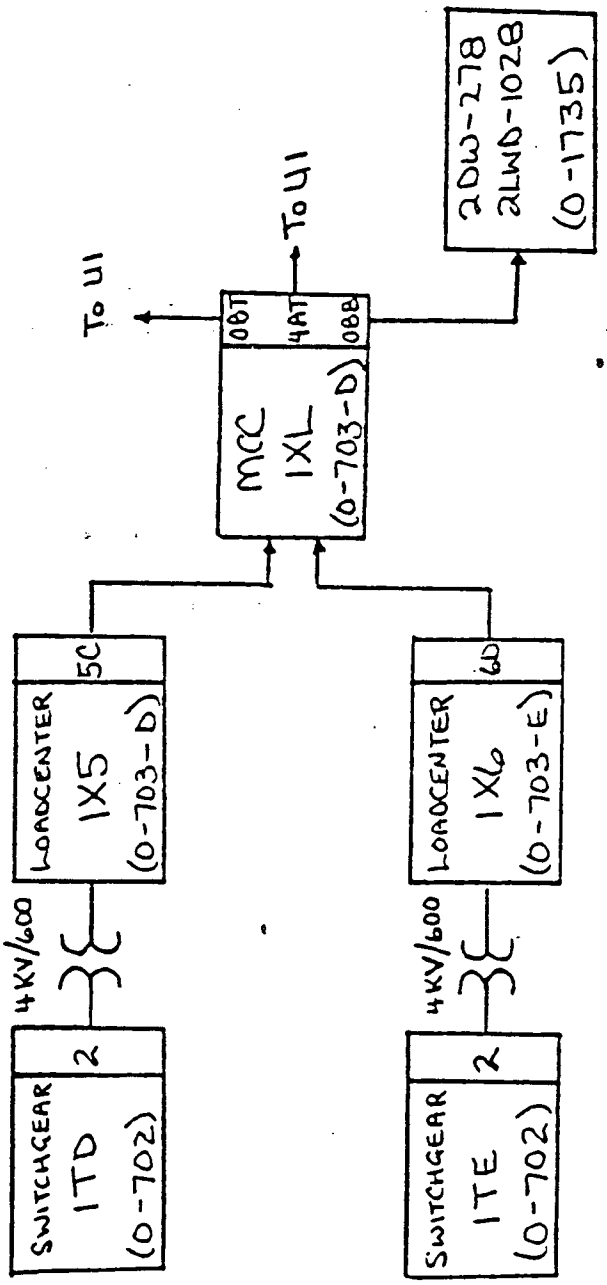
   _____

7. Evaluate the use of portable shielding, remote handling equipment, video equipment, etc., to minimize the exposure to personnel in the lab for the required analyses. _____/____

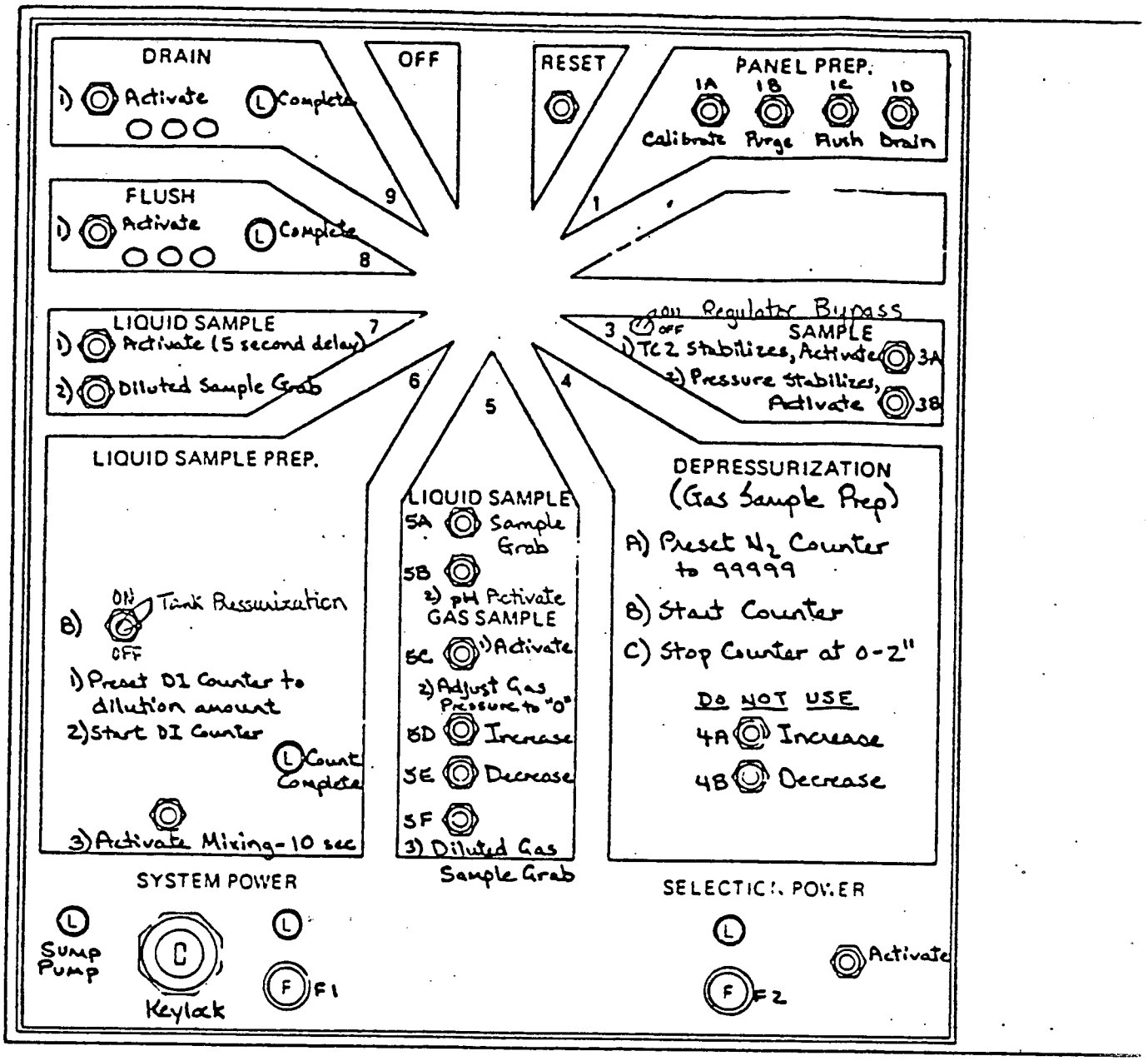
Unit 2 PALS Power Supplies



Unit 2 PALS Power Supplies



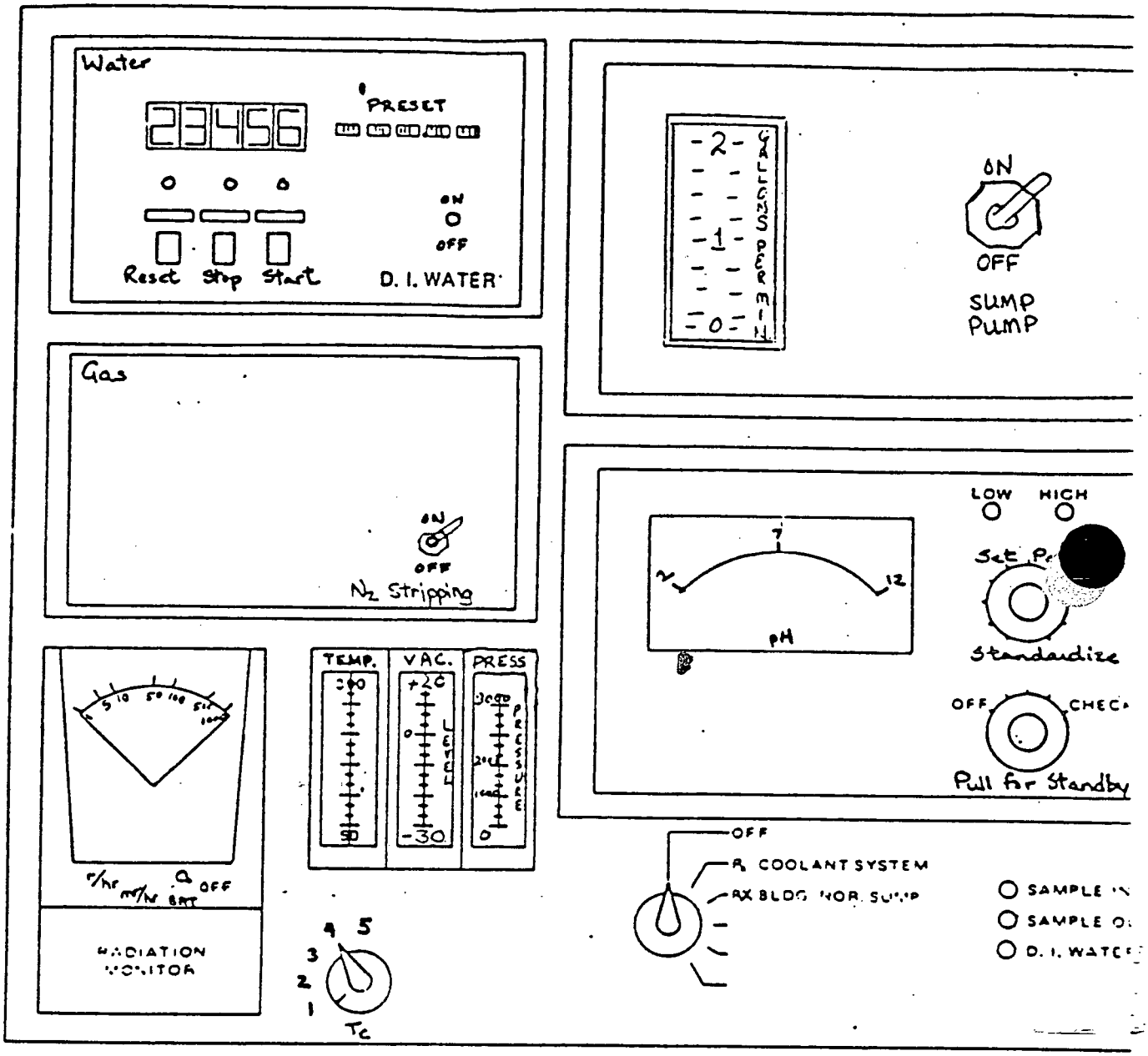
PALS Control Panel Diagram - Left



SEE DRAWING NO. L040180D FOR PANEL DETAIL

ENCLOSURE 6.4

PALS Control Panel Diagram-Right



Checked Control Copy_____

Date_____

ENCLOSURE 6.5

OPERATIONS CHECKLIST FOR REACTOR COOLANT SYSTEM VALVE LINEUPS TO POST ACCIDENT LIQUID SAMPLING SYSTEM

1.0 Purpose

This enclosure gives the valve lineups needed for Chemistry Personnel to sample the Reactor Coolant System (RCS). Locations of valves are given to facilitate lineups.

2.0 Limits and Precautions

2.1 RIA-54 should be in service and monitored during the course of operation of the PALS.

2.2 Demineralized water header must be in service and have at least 60 psi pressure (per Station Directive 3.1.15).

3.0 Procedure

		Date Init./Time
3.1	Ensure the following breakers are closed:	
3.1.1	1L2 Bkr. #37 Sampling/Control Panels Power Supply (located next to U2 sampling panel)	_____
3.1.2	MCC1XL Bkr. for 2DW-278 (RCS sample line flush) and 2LWD-1028 (RBNS Sample Line)	_____
3.1.3	Remove white tag from breaker #9 on 2KVIB (placed per OP/2/A/1102/01 Enclosure 4.1, Section 2.8), and close breaker.	_____
	NOTE: Both 2RC-162 and 2RC-164 are powered from this breaker.	
3.1.4	Remove white tag from breaker #4 on 2KVIA (placed per OP/2/A/1102/01 Enclosure 4.1, Section 2.8) for 2RC-165, and close breaker.	_____

ENCLOSURE 6.5

			Date Init./Time	Verification Date Init./Time
3.2	To obtain a reactor coolant sample, the valves listed in this section should be aligned as follows:			
3.2.1	2RC-84	Inside reactor building - refer to Fill and Vent Procedure (OP/2/A/1103/02) to verify OPEN status.	_____	
3.2.2	2RC-174/2RC-176 (Test Connections) and 2RC-175 (High Point Vent)	inside reactor building - refer to Fill and Vent Procedure (OP/2/A/1103/02) to verify CLOSED Status.	_____	
3.2.3	Open 2RC-162	inside reactor building-operated from control room.	_____	_____
3.2.4	Open 2RC-163	inside reactor building-operated from control room.	_____	_____
	NOTE:	The following initial conditions must be observed.		
3.2.5	If containment integrity is required, then Steps 3.2.6 and 3.2.7 must be completed.		_____	
3.2.6	Designate a responsible person in the Control Room to immediately close the isolation valves (2RC-164 and 2RC-165) if an ES actuation occurs.		_____	
3.2.7	Record that containment isolation valves 2RC-164 and 2RC-165 are open in OP/0/A/1102/20 (Shift Turnover).		_____	

ENCLOSURE 6.5

			Date Init./Time	Verification Date Init./Time
3.2.8	Open 2RC-164	in Unit 2 LPI Room-operated from Control Room.	_____	_____
3.2.9	Open 2RC-165	in Unit 2 LPI Room-operated from Control Room.	_____	_____

CAUTION: If ES actuation occurs, immediately close isolation valves for containment isolation.

3.3 To allow recirculation of sample, align 2LP-65, return line valve to the RB Emergency Sump:

NOTE: The following initial conditions must be observed.

3.3.1	If Containment integrity is required, then Steps 3.3.2 and 3.3.3 must be completed.	_____	
3.3.2	Station a responsible person in the vicinity of 2LP-65 to immediately close 2LP-65 if ES Actuation occurs. This person must be in constant communication with the Control Room the entire time 2LP-65 is open.	_____	
3.3.3	Record that the valve is open in OP/0/A/1102/20 (Shift Turnover).	_____	
3.3.4	Open 2LP-65 manual valve (located in Unit 2 LPI Room) to be operated by reach rod from LPI/HPI Hatch Room 118, 119 (on west wall directly behind 2LP-22).	_____	_____

ENCLOSURE 6.5

			Date Init./Time	Verification Date Init./Time
3.2.8	Open 2RC-164	in Unit 2 LPI Room-operated from Control Room.	_____	_____
3.2.9	Open 2RC-165	in Unit 2 LPI Room-operated from Control Room.	_____	_____

CAUTION: If ES actuation occurs, immediately close isolation valves for containment isolation.

3.3 To allow recirculation of sample, align 2LP-65, return line valve to the RB Emergency Sump:

NOTE: The following initial conditions must be observed.

3.3.1	If Containment integrity is required, then Steps 3.3.2 and 3.3.3 must be completed.	_____	
3.3.2	Station a responsible person in the vicinity of 2LP-65 to immediately close 2LP-65 if ES Actuation occurs. This person must be in constant communication with the Control Room the entire time 2LP-65 is open.	_____	
3.3.3	Record that the valve is open in OP/0/A/1102/20 (Shift Turnover).	_____	
3.3.4	Open 2LP-65 manual valve (located in Unit 2 LPI Room) to be operated by reach rod from LPI/HPI Hatch Room 118, 119 (on west wall directly behind 2LP-22).	_____	_____

ENCLOSURE 6.5

			Date Init./Time	Verification Date Init./Time
3.4	Chemistry will inform Operations when they have obtained the RCS sample in the panel and the following valves should then be realigned as follows:			
3.4.1	CLOSE 2RC-165	in Unit 2 LPI Room-operated from Control Room.	_____	_____
3.4.2	CLOSE 2RC-164	in Unit 2 LPI Room-operated from Control Room.	_____	_____
	NOTE:	Remove the containment isolation valves (2RC-164 and 2RC-165) from OP/0/A/1102/20 (Shift Turnover).		
3.4.3	CLOSE 2RC-163	inside Reactor Building-operated from Control Room.	_____	_____
3.4.4	CLOSE 2RC-162	inside Reactor Building-operated from Control Room.	_____	_____
3.5	Chemistry will inform Operations when entire sampling sequence has been completed.			
3.5.1	CLOSE 2LP-65	Manual valve (located in LPI Room) operated by reach rod from LPI/HPI Hatch Room 118, 119 (on west wall directly behind 2LP-22).	_____	_____
	NOTE:	This will regain containment integrity. Remove the containment isolation valve per OP/0/A/1102/20 (Shift Turnover).		

ENCLOSURE 6.5

		Date Init./Time	Verification Date Init./Time
3.5.2	Ensure the following breakers are open:		
3.5.2.1	White tag open breaker #9 on 2KVIB.	_____	_____
	NOTE: Both 2RC-162 and 2RC-164 are powered from this breaker.		
3.5.2.2	White tag open breaker #4 on 2KVIA for 2RC-165.	_____	_____
3.6	Return completed enclosure to Chemistry personnel operating PALS.	_____	

Checked Control Copy_____

Date_____

ENCLOSURE 6.6

OPERATIONS CHECKLIST FOR REACTOR BUILDING

NORMAL SUMP VALVE LINEUPS TO POST ACCIDENT

SAMPLING SYSTEM

1.0 Purpose

This enclosure gives the valve lineups needed for Chemistry Personnel to sample the Reactor Building Normal Sump (RBNS). Locations of valves are given to facilitate lineups.

2.0 Limits and Precautions

2.1 RIA-54 should be in service and monitored during the course of operation of the PALS.

2.2 Demineralized water header must be in service and have at least 60 psi pressure (per Station Directive 3.1.15).

3.0 Procedure

		Date Init./Time
3.1	Ensure the following breakers are closed:	
3.1.1	1L2 Bkr. #37 Sampling/Control Panels Power Supply (located next to U2 sampling panel)	_____
3.1.2	MCC2XL Bkr. #5A RB Normal Sump Sample Pump Power Supply.	_____
3.1.3	MCC1XL Bkr. for 2DW-278 (RCS Sample line flush) and 2LWD-1028 (RBNS Sample Line).	_____
3.2	To obtain a reactor building normal sump sample, the following valves should be aligned as indicated:	
3.2.1	White tag open breaker on RB Normal Sump Pump 2A. White Tag No._____ (Located on MCC2XL).	_____

ENCLOSURE 6.6

			Date Init./Time	Verification Date Init./Time
3.2.2	White tag open breaker on RB Normal Sump Pump 2B. White Tag No._____ (Located on MCC-2XN)		_____	
3.2.3	CLOSE 2LWD-30	RB Normal Sump Pump 2A Suction. Operated by reach rod on east wall of valve gallery room in LPI/HPI Hatch Room 118, 119.	_____	
3.2.4	CLOSE 2LWD-33	RB Normal Sump Pump 2B Suction. Operated by reach rod on east wall of valve gallery room in LPI/HPI Hatch Room 118, 119.	_____	
3.2.5	OPEN 2LWD-1	Reactor building normal sump line. This is an ES valve operated from the Control Room.	_____	_____
3.2.6	OPEN 2LWD-2	Reactor building normal sump line. This is an ES valve operated from the Control Room.	_____	_____

3.3 To allow recirculation of sample, align 2LP-65, return line valve to the RB Emergency Sump:

NOTE: The following initial conditions must be observed:

3.3.1	If containment Integrity is required, then Steps 3.3.2 and 3.3.3 must be completed		_____	_____
3.3.2	Station a responsible person in the vicinity of 2LP-65 to immediately close 2LP-65 if ES Actuation occurs. This person must be in constant communication with the Control Room the entire time 2LP-65 is open.		_____	

ENCLOSURE 6.6

			Date Init./Time	Verification Date Init./Time
3.3.3	Record that the valve is open in OP/0/A/1102/20 (Shift Turnover).		_____	
3.3.4	OPEN 2LP-65	Manual valve (located in Unit 2 LPI Room) to be operated by reach rod from LPI/HPI Hatch Room 118, 119 (on west wall directly behind 2LP-22).	_____	_____

3.4 Chemistry will inform Operations when they have obtained the reactor building normal sump sample in the panel, and the following valves should then be realigned as follows:

3.4.1	CLOSE 2LWD-2	Reactor building normal sump line. This is an ES valve operated from the Control Room.	_____	_____
3.4.2	CLOSE 2LWD-1	Reactor building normal sump line. This is an ES valve operated from the Control Room.	_____	_____
3.4.3	OPEN 2LWD-33	RB Normal Sump Pump (2WD-2B) Suction. Operated by reach rod on east wall of valve gallery room in LPI/HPI Hatch Room 118, 119.	_____	
3.4.4	OPEN 2LWD-30	RB Normal Sump Pump (2WD-2A) Suction. Operated by reach rod on east wall of valve gallery room in LPI/HPI Hatch Room 118, 119.	_____	

ENCLOSURE 6.6

		Date Init./Time	Verification Date Init./Time
3.4.5	Remove white tag from breaker on RB Normal Sump Pump 2B. White Tag No. _____	_____	
3.4.6	Remove tag from breaker on RB Normal Sump Pump 2A. White Tag No. _____	_____	

3.5 Chemistry will inform Operations when entire sampling sequence has been completed.

3.5.1	CLOSE 2LP-65	Manual valve (located in LPI Room) operated by reach rod from LPI/HPI Hatch Room 118, 119 (on west wall directly behind 2LP-22).	_____	_____

NOTE: This will regain containment integrity. Remove the containment isolation valve from OP/0/A/1102/20 (Shift Turnover).

3.6 Return completed enclosure to Chemistry Personnel operating PALS. _____

Form 34731 (3-84)

CONTROL COPY

DUKE POWER COMPANY
PROCEDURE PROCESS RECORD

(1) ID No. CP/3/A/2002/04C
Change(s) - to
3 Incorporated

INFORMATION ONLY

PREPARATION

(2) STATION Oconee Nuclear Station

(3) PROCEDURE TITLE Operating Procedure for the Post-Accident Liquid Sampling (PALS) System

(4) PREPARED BY A H Dean DATE 7/28/86

(5) REVIEWED BY Pat Hull DATE 7/28/86

Cross-Disciplinary Review By Wayne Morgan N/R

(6) TEMPORARY APPROVAL (If Necessary)

By _____ (SRO) Date _____

By _____ Date _____

(7) APPROVED BY J S Barr DATE 7/29/86

(8) MISCELLANEOUS

Reviewed/Approved By _____ Date _____

Reviewed/Approved By _____ Date _____

COMPLETION

(9) DATE(S) PERFORMED _____

(10) PROCEDURE COMPLETION VERIFICATION

☐ Yes ☐ N/A Check lists and/or blanks properly initialed, signed, dated or filled in N/A or N/R, as appropriate?

☐ Yes ☐ N/A Listed enclosures attached?

☐ Yes ☐ N/A Data sheets attached, completed, dated and signed?

☐ Yes ☐ N/A Charts, graphs, etc. attached and properly dated, identified and marked?

☐ Yes ☐ N/A Acceptance criteria met?

VERIFIED BY _____ DATE _____

(11) PROCEDURE COMPLETION APPROVED _____ DATE _____

(12) REMARKS

DUKE POWER COMPANY

OCONEE NUCLEAR STATION

OPERATING PROCEDURE FOR THE

POST ACCIDENT LIQUID SAMPLING (PALS) SYSTEM

1.0 Purpose

The Post Accident Liquid Sampling System (PALS) provides the capability to promptly obtain a reactor coolant system sample under a nuclear reactor accident condition. Sample acquisition during accident conditions will provide information to evaluate the extent of core damage which has occurred or is occurring through knowledge of reactor coolant chemistry and radiochemistry.

2.0 Limits and Precautions

2.1 The PALS will be used to sample the reactor coolant system under the following conditions:

2.1.1 Post Accident.

2.1.2 Inaccessibility of Primary Sampling Area due to radiation levels.

2.1.3 Request from the Station Chemist or his designee.

2.2 UNDER ACCIDENT CONDITIONS, VALVE ALIGNMENTS SHALL NOT BE MADE AND SAMPLES SHALL NOT BE TAKEN WITHOUT PRIOR AUTHORIZATION FROM THE TECHNICAL SUPPORT CENTER (TSC)! (Containment Isolation valves may be closed upon ES Actuation).

2.3 UNDER ACCIDENT CONDITIONS, DO NOT ATTEMPT ANY PHASE OF SAMPLING OR ANALYSIS WITHOUT HEALTH PHYSICS APPROVAL AND COVERAGE!

2.4 Portable shielding, remote handling equipment, video equipment, etc., shall be used where practical during sampling, sample preparation, and sample analysis.

2.5 Chemistry personnel shall operate only those valves followed by (C) in this procedure. If ES signal requires containment isolation during use of this procedure, Operations and Chemistry personnel should be aware of any pressure remaining in sample lines or sampling panel.

2.6 Working copy must be compared to control copy before use and sign off steps (Initials/Time) completed as procedure progresses.

3.0 Apparatus

3.1 Lockable gas syringes

3.2 Sample carrier

3.3 Stop watch

3.4 Plastic bags (8" x 12" minimum)

3.5 ~ 15 cc glass vial (stoppered with septum)

3.6 60 ml poly bottles

4.0 Procedure

4.1 Preparation for Sampling

4.1.1 Valve Alignments

4.1.1.1 Notify Shift Supervisor that operation of the PALS is being initiated by Chemistry. Chemistry will select either Enclosure 6.5 for a RCS sample or Enclosure 6.6 for a RBNS sample, check it against the Control Copy, and take it to the responsible individual in Operations (designated by the Shift Supervisor) for completion. Request Operations to complete Step 3.1 of the selected enclosure.

4.1.1.2 The following valves are electrically controlled by the PALS Control Panel:

RCS Sample: 3RC-179 (C)

Reactor Building Normal Sump Sample: 3LWD-1026 (C)
3LWD-1028 (C)

Return Line to Reactor Building Emergency Sump (either sample): 3LP-121 (C)

Demin. Water: 3DW-278 (C) (RCS Sample Line Flush)
3DW-280 (C) (RBNS Sample Line Flush)

4.1.1.3 The following valves are operated manually at the Sampling Panel by Chemistry personnel. They must be verified open prior to use of the panel.

	Initials/Time
OPEN Instrument Air Supply Isolation 3IA-2423	_____/____
OPEN Panel Instrument Air Isolation (Lower right on panel)	_____/____
OPEN Valve on Nitrogen Supply Bottle (> 200 psi tank pressure required, ~ 45 psi delivery pressure)	_____/____
OPEN Panel Nitrogen Isolation (Lower right on panel)	_____/____
OPEN Cooling Water Supply Isolation 3DW-282	_____/____
OPEN Demin Water Supply Isolation 3DW-281	_____/____
OPEN Panel Demin Water Isolation (Lower right on panel)	_____/____

4.1.1.4 The following should be verified as noted prior to periodic testing (Job Supervisor may N/A as appropriate):

3DW-283 Low Point Drain (HPI Room) Closed and Capped	_____
3LWD-1029 Low Point Drain (LPI Room) Closed and Capped	_____
3RC-177 High Point Vent (next to Sampling Panel) Closed and Capped	_____
3LP-122 High Point Vent (next to Sampling Panel) Closed and Capped	_____
3LP-110 Emergency Sump Line B Drain (LPI Room) Closed	_____
3LP-111 Emergency Sump Line B Drain Tell-Tale (LPI Room) Closed and Capped	_____
3DW-91 Reactor Building Flush Line (HPI Room) Closed	_____

3DW-278 Remote Starter (HPI Room) "ON" _____

3LWD-1028 Remote Starter (LPI Room) "ON" _____

3N-262 Nitrogen Isolation: Closed _____

4.1.2 Health Physics Notification

Contact Health Physics and ask for surveillance person prior to going to Control Panel. _____

4.1.3 Additional Requirements

Pick up glass syringes and sample carrier from Primary Lab, and take stop watch and panel keys to Control Panel. _____

4.1.4 Power supplies for each electrical component are listed on Enclosure 6.2.

4.2 Panel Preparation

NOTE: If any item on panel is not clearly identified, refer to Enclosures 6.3 and 6.4 (Control Panel Diagrams).

4.2.1 Turn the main selector knob on the control panel to "Reset". Place key in System Power Switch and turn clockwise. (Panel lights should come on.) Press "Reset" button.

4.2.2 Place the toggle switch for the radiation monitor to "ON" and turn the scale select to "R/HR". If the radiation monitor is not functional, HP coverage is sufficient to operate the panel.

4.2.3 Place the toggle switches for the dilution water meter and dilution gas meter to "ON" position.

4.2.4 Push in the pH meter standardize knob.

4.2.5 Select the system to be sampled - Reactor Coolant System or Reactor Building Normal Sump - with the system selector.

4.2.6 Open sample regulator valve at cooler outlet. _____

4.3 Panel Operation (Position 8) Flush - Preliminary

4.3.1 Request Operations complete Step 3.3 of the Enclosure selected in 4.1.1.1.

4.3.2 Turn the Operation Selector switch to the FLUSH position.

4.3.3 Press the SELECTION POWER ACTIVATE button.

4.3.4 Press the FLUSH ACTIVATE button and wait 4-5 minutes. (Observe that first flush light and the SAMPLE OUTLET indicating lights are both lit.)

4.3.5 Press the FLUSH ACTIVATE button and wait 4-5 minutes. Observe the second flush light is lit.

4.3.6 Press the FLUSH ACTIVATE button and wait 10 minutes. Observe the third flush light is lit.

4.3.7 Press the FLUSH ACTIVATE button and observe the COMPLETE light is lit.

4.4 Panel Operation (Position 9) Drain - Preliminary

4.4.1 Turn the Operation Selector switch to the DRAIN position.

4.4.2 Press the SELECTION POWER ACTIVATE button.

4.4.3 Press DRAIN ACTIVATE and wait about 2 minutes or until no water is observed draining. Observe the first drain light is lit.

4.4.4 Press the DRAIN ACTIVATE a second time and wait about 2 minutes or until no water is observed draining. Observe the second drain light is lit.

4.4.5 Press the DRAIN ACTIVATE a third time and wait 6-7 minutes or until no water is observed draining. Observe the third drain light is lit.

4.4.6 Press the DRAIN ACTIVATE button a fourth time and observe the COMPLETE light is lit.

4.5 Panel Operation (Position 1) Panel Prep

4.5.1 Turn the Operation Selector switch to the PANEL PREP. position. Press the RESET button.

4.5.2 Momentarily depress the SELECTION POWER ACTIVATE pushbutton.

4.5.3 Depress the PURGE pushbutton for about 1 minute 10 seconds.

4.5.4 Depress the DRAIN pushbutton for about 1 minute 10 seconds.

4.5.5 Repeat 4.5.3 and 4.5.4 until no water is observed draining.

4.5.6 Depress the CALIBRATE pushbutton and hold until the pH meter reading stabilizes.

4.5.7 Adjust the pH meter to the known pH of the buffer._____

4.5.8 Depress the PURGE pushbutton for about 30 seconds.

4.5.9 Depress the FLUSH pushbutton until the pH meter reading stabilizes.

4.5.10 Depress the PURGE pushbutton for about 30 seconds.

4.5.11 Depress the DRAIN pushbutton for about 60 seconds.

4.5.12 Repeat Steps 4.5.9, 4.5.10, 4.5.11 and then continue to Section 4.6.

4.6 Panel Operation (Position 3) Sample

4.6.1 Request Operations complete Step 3.2 of the enclosure selected in 4.1.1.1.

4.6.2 Establish bypass line RCS flush as needed by completing the following steps:

4.6.2.1 Place temperature measurement device on sample bypass line (after cooler) or place TC-5 in service if available. _____

4.6.2.2 Close sample regulating valve 212. _____

4.6.2.3 Ensure sample flow regulator bypass toggle switch is "OFF". _____

4.6.2.4 OPEN bypass line block valve ~1/4 turn. _____

4.6.2.5 CLOSE filter block valve. _____

4.6.2.6 Momentarily depress SELECTION POWER ACTIVATE pushbutton. Record time RCS flush starts. _____

4.6.2.7 Adjust bypass line block valve as needed to ensure temperature does not exceed 190°F. _____

4.6.2.8 Continue flush for 10-15 minutes, then move selector knob off Position 3. Record end time of flush. _____

4.6.3 Establish flow through normal sample line as needed by completing the following steps:

4.6.3.1 Turn thermocouple selector to TC-2 (or TC-1 may be used as backup). _____

4.6.3.2 OPEN sample regulating valve #212 approximately four turns (to maintain flow at less than 2 gpm). _____

4.6.3.3 CLOSE bypass line block valve. _____

4.6.3.4 OPEN filter block valve to sample cylinder. _____

4.6.4 Return to Position 3 and momentarily depress the SELECTION POWER ACTIVATE pushbutton.

4.6.5 Observe that the SAMPLE INLET and SAMPLE OUTLET indicating lights are lit. Record the starting time _____.

4.6.6 Watch TC-2 closely. If it approaches 190°F, check cooling water flow. If it goes above 190°F, shut off sample flow by moving selector knob off position 3. If cooling water flow has been verified, then partially close sample regulator valve and reactivate position 3. Record the temperature when TC-2 has stabilized _____.

4.6.7 After verification of cooler function, sample flow regulator bypass may be used for low pressure sampling.

4.6.8 Record the PALS radiation reading _____. Subtract the initial background reading from sample radiation reading and record _____.

4.6.9 Press the 1) TC-2 Stabilize Activate button; when pressure reading stabilizes, record _____. This pressure should match current system pressure.

4.6.10 Press the 2) Pressure Stabilize Activate button and record time sample flow stops _____.

4.6.11 Close sample regulator bypass if opened in Step 4.6.7.

4.6.12 Request Operations to complete Step 3.4 of the enclosure selected in 4.1.1.1.

4.7 Panel Operation (Position 4) Depressurization

4.7.1 Turn the Operation Selector switch to the DEPRESSURIZATION position.

4.7.2 Verify the pressure gauge on the instrument panel indicates about -25 inches of Mercury.

4.7.3 Momentarily depress the SELECTION POWER ACTIVATE pushbutton.

4.7.4 Observe that the system pressure is now zero. Wait about 10 minutes.

4.7.5 Flip the Nitrogen toggle switch to "ON" and observe the PRESS/VAC gauge. When the gauge needle just begins to move flip the toggle switch to "OFF".

4.7.6 Continue to make small N_2 adds, by repeating 4.7.5 until the PRESS./VAC gauge reads about 10.5 inches.

4.8 Panel Operation (Position 5) Liquid Sample/Gas Sample

4.8.1 Turn the Operation Selector switch to the LIQUID SAMPLE/GAS SAMPLE position.

4.8.1 Verify tank pressurization toggle switch is in the "ON" position.

4.8.3 Momentarily depress the SELECTION POWER ACTIVATE pushbutton.

4.8.4 Press SAMPLE GRAB and release. This will allow sample to be trapped in the sample loop.

4.8.5 Set dilution water totalizer to the desired ml. Count off 10 seconds and press 'start' button on the totalizer. Record ml _____.

4.8.6 Place tank pressurization toggle switch in the "OFF" position.

4.8.7 Press ACTIVATE MIX button for ~ 10 seconds and release.

4.8.8 Press the ACTIVATE pH button and release. Record pH _____ when meter stabilizes.

4.8.9 Press the GAS SAMPLE ACTIVATE button and release. (Vacuum level gauge should drop to ~ 0 inches of mercury.)

4.8.10 Wait 5 seconds and press DILUTED GAS SAMPLE GRAB button and release.

4.9 Panel Operation (Position 7) Liquid Sample

4.9.1 Turn the Operation Selector switch to the Liquid Sample position.

4.9.2 Press the SELECTION POWER ACTIVATE button.

4.9.3 Press Activate button. Wait 5 seconds (for levels in dilution cylinder and grab sampler to equalize).

4.9.4 Immediately depress the DILUTED SAMPLE GRAB pushbutton to trap the sample.

4.9.5 Flip the tank pressurization toggle switch to "ON".

4.10 Panel Operation (Position 8) Flush

4.10.1 Turn the Operation Selector switch to the FLUSH position.

4.10.2 Press the SELECTION POWER ACTIVATE button.

4.10.3 Press the FLUSH ACTIVATE button and wait 4-5 minutes. (Observe that the first FLUSH light and the SAMPLE OUTLET indicating light are both lit.)

4.10.4 Press the FLUSH ACTIVATE button and wait approximately 4-5 minutes. Observe second flush light is lit.

4.10.5 Press the FLUSH ACTIVATE pushbutton and wait 10 minutes. (Observe the third FLUSH light is lit.)

4.10.6 Press the FLUSH ACTIVATE pushbutton and observe the COMPLETE light is lit.

4.11 Panel Operation (Position 9) Drain

NOTE: Sump pump toggle switch may be turned "ON" at this point.

4.11.1 Turn the Operation Selector switch to the DRAIN position.

4.11.2 Momentarily depress the SELECTION POWER ACTIVATE pushbutton. Press ACTIVATE and observe that the first DRAIN light is lit.

4.11.3 Wait for about 2 minutes or until no water is observed draining and again depress the ACTIVATE pushbutton and observe the second DRAIN light is lit.

4.11.4 Wait for about 2 minutes or until no water is observed draining and again depress the ACTIVATE pushbutton and observe the third DRAIN light is lit.

NOTE: This step will open 3DW-278 if in the RCS position in 4.2.4. A decrease in activity will verify operability of 3DW-278.

4.11.5 Wait for about 6 minutes or until no more drainage is observed and again momentarily depress the ACTIVATE pushbutton and observe the DRAIN COMPLETE light is lit.

4.12 Panel Shutdown and Decontamination

4.12.1 Turn the Sample Selector switch to the OFF position.

4.12.2 Turn the Operation Selector switch to the RESET position.

4.12.3 Momentarily depress the RESET pushbutton.

4.12.4 Determine the method of pumping the sump to be used (the Sump Pump may be used to accomplish this).

NOTE: Ensure that sample has been taken prior to pumping the sump.

4.12.5 Turn the System Power keylock to the SAMPLE position and record the PALS or HP Radiation Monitor meter reading _____.

4.12.5.1 If the radiation monitor indicates less than 3 R/Hr over background, turn the System Power keylock to the OFF position and remove the PALS System key.

4.12.5.2 If the radiation monitor indicates greater than 3 R/Hr over background, repeat 4.10 thru 4.12.5, if radiation levels at the control panel will allow. (Confer with HP).

4.12.6 If radiation level remains greater than 3 R/hr over background after one repeat of Section 4.10 through 4.12.5, contact Station Chemist or his designee (personnel should move to a lower background area during this time, if one is available) for permission to return to Section 4.1 and take another sample using larger dilution volume. Permission given by _____.

4.12.7 Request HP to survey the Post Accident Sampling Panel and the area around the PASP prior to sample removal to ensure the 3 R/Hr over background is not exceeded.

4.12.8 The job supervisor may give permission to postpone the following steps by indicating a date for them to be performed.

CLOSE 3DW-281 Demin Water Supply Isolation. _____

CLOSE 3DW-282 Cooling Water Supply Isolation. _____

CLOSE Panel Demin Water Supply Isolation. _____

CLOSE Valve on Nitrogen Supply Cylinder. _____

CLOSE Panel Nitrogen Supply Isolation. _____

CLOSE 3IA-2423 Instrument Air Isolation. _____

CLOSE Panel Instrument Air Isolation. _____

4.13 Sampling

4.13.1 Collect 3-1.0 ml stripped gas samples at the gas grab sampler in lockable glass syringes. Place in plastic bag.

4.13.2 Collect liquid sample in the liquid grab sampler. Place in plastic bag.

4.13.3 Request Operations to complete Steps 3.5 and 3.6 of the enclosure selected in 4.1.1.1.

4.13.4 Place plastic bags in sample carrier and transport to Hot Lab. Place sample carrier in operating fume hood behind a lead brick shield to await analysis.

4.14 Sample Analysis

4.14.1 Gas

4.14.1.1 Analyze one syringe of stripped gas by Chemistry Procedure CP/0/B/2004/14D, the determination of hydrogen in gas samples using the carle gas chromatograph and the spectra physics integrator.

Calculate the results by the following method:

$$\%\ H_2 \times \frac{215\ cc}{0.095\ Kg} \times \frac{1}{100} = cc/Kg\ H_2$$

Where: % H_2 is determined from CP/0/B/2004/14D

215 cc = stripped gas bomb volume

0.095 Kg = collected sample size

$\frac{1}{100}$ = conversion of percent to decimal

Report result _____ cc/Kg H_2

4.14.1.2 Withdraw 1 cc of air from septum stoppered glass vial and load 1 cc of stripped gas into it from second syringe. Analyze by GeLi Spectral Analysis (HP/0/B/1001/14, Procedure for Nuclear Data 6600 System Operation). Activities will be reported by HP for 1 cc of diluted gas sample. Calculate activity of dissolved gas in 1 ml of reactor coolant as follows:

μCi in 1 cc x $\frac{215}{95}$ = Total activity from dissolved gas in 1 ml RC.

Ge Li Spectra Attached _____.

4.14.1.3 Reserve third stripped gas syringe for use as a backup, if needed.

4.14.1.4 Additional gas sample dilution may be necessary to bring amount of hydrogen or activity within range of analyses. If so, withdraw 1 cc of air from a septum stoppered glass vial and load 1 cc of the sample to be diluted into it. Be sure to record the additional dilution information so that isotope activities may be adjusted accordingly.

4.14.2 Liquid

4.14.2.1 Job supervisor should select number of mls of diluted sample to be used _____. To obtain a gamma spectra that will correlate directly with the normal RCS, the dilution factor must be calculated and only the number of mls of actual reactor coolant in the sample turned in to HP for analysis.

Calculate mls actual RCS by:

$$mls_{RCS} = \frac{\text{number of ml of sample loop}}{\text{Total dilution volume + no. of ml of sample loop}} \times \text{number ml diluted sample}$$

THEN, $50 - ml_{RCS} = ml\ H_2O$

Report ml_{RCS}/ml H_2O (total will be 50 ml)

GeLi Spectra Attached _____

4.14.2.2 Job supervisor should select number of mls of diluted sample to be used _____. To obtain a boron concentration that will correlate directly with the normal RCS, the dilution factor must be calculated, and multiplied by the analyzed sample concentration.

$$\text{ppm B} = \text{measured ppm B} \times \frac{\text{Total dilution volume + no. of ml of sample loop}}{\text{no. of ml of sample loop}}$$

Boron concentration $_{PALS}$ = _____ ppm

Boron concentration $_{RCS}$ = _____ ppm

$$\frac{\text{ppm } B_{RCS} - \text{ppm } B_{PALS}}{\text{ppm } B_{RCS}} \times 100 = \%\ \text{difference}$$

4.14.2.3 Job supervisor should select number of mls of dilute sample to be used _____. To obtain concentration that will correlate directly with the normal RCS, the dilution factor must be calculated, and multiplied by the analyzed sample concentration.

Chloride concentration _____ ppm.

4.14.2.4 Report all results of liquid sample analyses in Primary Chemistry Chemplot and transmit results to the OSC.

4.14.2.5 Reserve third liquid syringe for use as a backup, if needed.

4.14.2.6 Additional liquid sample dilution may be necessary to bring amount of activity within range. If so, withdraw 1 ml of sample from 60 ml poly bottle (from Section 4.14.2.1) and dilute to 50 ml with Reagent Grade Water for analysis. Be sure to record the additional dilution information so that isotope activities may be adjusted accordingly.

4.14.2.7 Route completed procedure to Operational Support Center. Accepted by: _____

4.15 Waste Disposal

4.15.1 Determine by detailed planning meeting the exact course of action to be taken. Under no condition will liquid or solid wastes be disposed of without prior specific HP directions.

4.15.2 Designate a sealable carboy as the "Post Accident Lab Waste" container. This container must be shielded and used as an interim liquid waste disposal container for all liquid analytical waste.

4.15.3 In the event an area is grossly contaminated and cannot be decontaminated, evaluate the need for shielding or protective covering to prevent the spread of airborne activity.

5.0 References

5.1 NUREG-0737, Section II.B.3

5.2 DPC System Health Physics Manual

5.3 Radiological Health Handbook, U.S. Dept. of HEW (1970).

5.4 Radiation Safety Technician Training Course, H.J. Moe, ANL-7291 Rev. 1 (1972).

5.5 Post Accident Liquid Sampling System Manual, Steam Production Department, OM-267A-28 (1981)

5.6 MNS Operating Procedure OP/0/A/6200/48

5.7 DPC Alara Manual (1980)

5.8 ONS Emergency Plan

5.9 ONS Chemistry Manual Section 5.1

6.0 Enclosures

6.1 Post Accident Authorization for Operation of PALS

6.2 U3 PALS Power Supplies

6.3 PALS Control Panel Diagram - Left

6.4 PALS Control Panel Diagram - Right

6.5 Operations Checklist for Reactor Coolant System Valve Lineups to Post Accident Liquid Sampling System

6.6 Operations Checklist for Reactor Building Normal Sump Valve Lineups to Post Accident Liquid Sampling System

ENCLOSURE 6.1

POST ACCIDENT AUTHORIZATION FOR OPERATION OF PALS

Technician/Time

1. Verbal/written direction for sampling the Reactor Coolant System (RCS) has been received from the Technical Support Center (TSC). _____/____
   Person Authorizing Sampling _____

2. The specific post-accident analysis requested by TSC: _____/____

   Sample to be taken: RCS ☐ RBNS ☐ _____/____

   _____Boron

   _____Chloride

   _____Isotopic Analysis for _____Iodines

   _____Cesiums

   _____Noble Gases

   _____Non-Volatile Fission Products

   _____Other (Specify) _____

3. Determine by detailed planning meeting the exact course of action and data required. _____/____

4. Evaluate the use of portable shielding, remote handling equipment, video equipment, etc., to minimize the exposure to personnel while sampling. _____/____

5. Have HP determine the required respiratory equipment and protective clothing to prevent or minimize internal exposure in any Planned Emergency situation. Use high range and/or extremity dosimetry if required. _____/____

6. Request HP to designate a route from PALS to the lab. _____/____

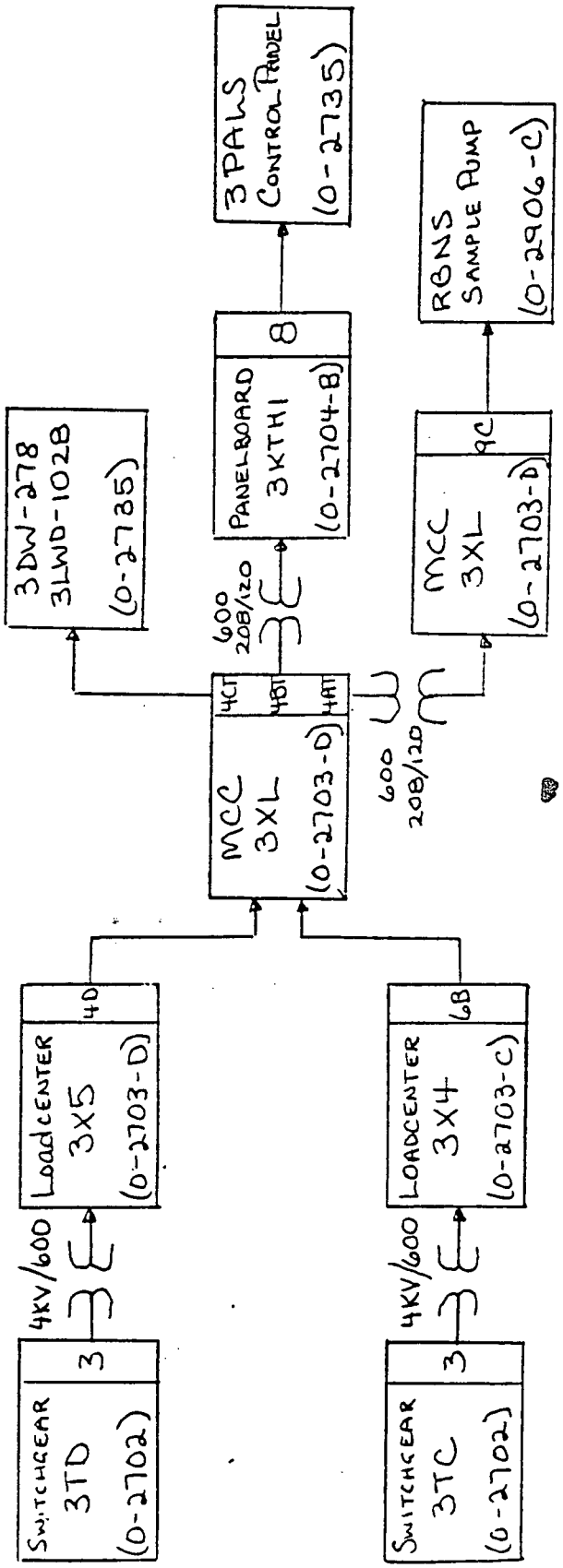
   Sample route designated: _____

   _____

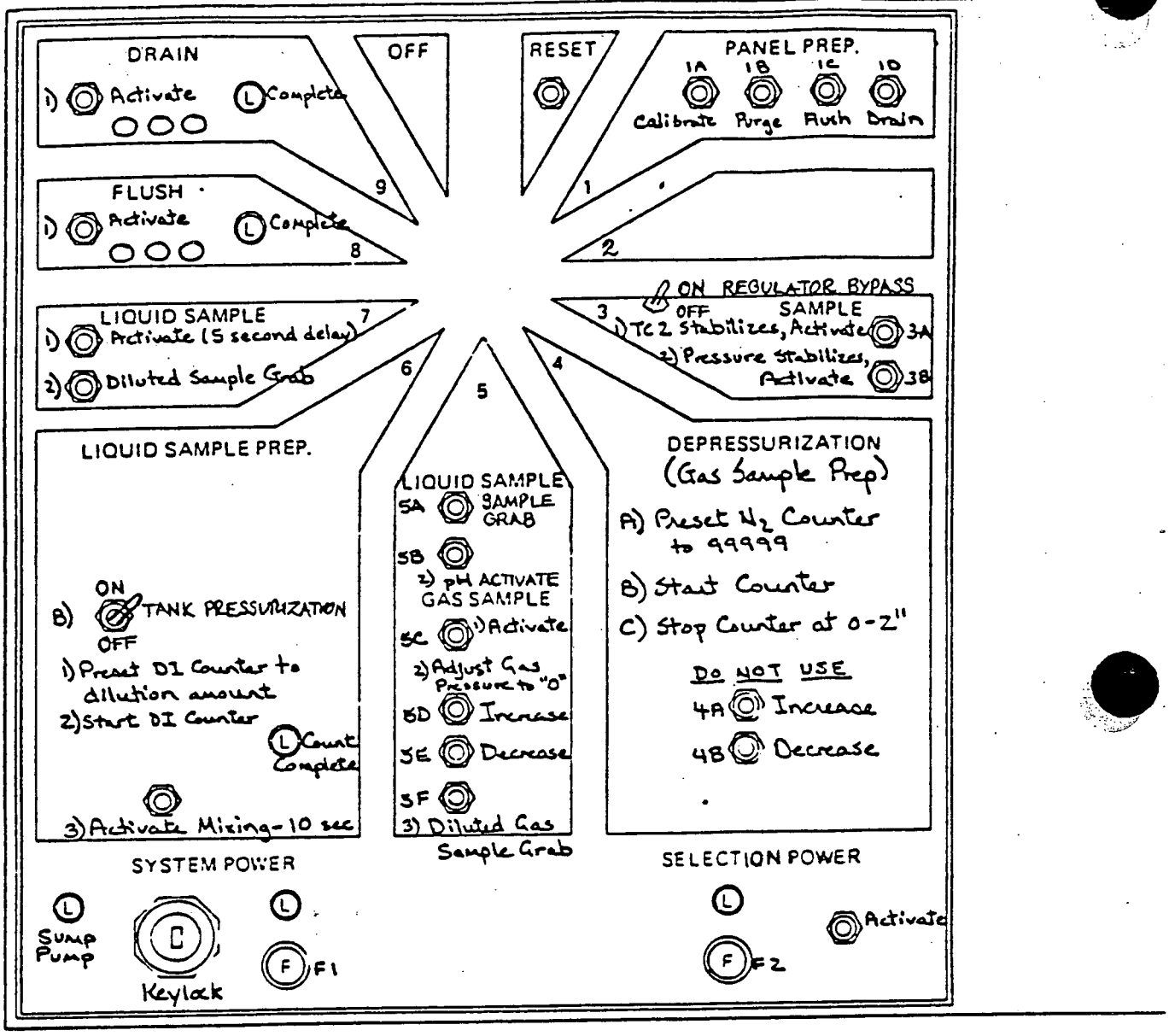
7. Evaluate the use of portable shielding, remote handling equipment, video equipment, etc., to minimize the exposure to personnel in the lab for the required analyses. _____/____

ENCLOSURE 6.2

Unit 3 PALS Power Supplies



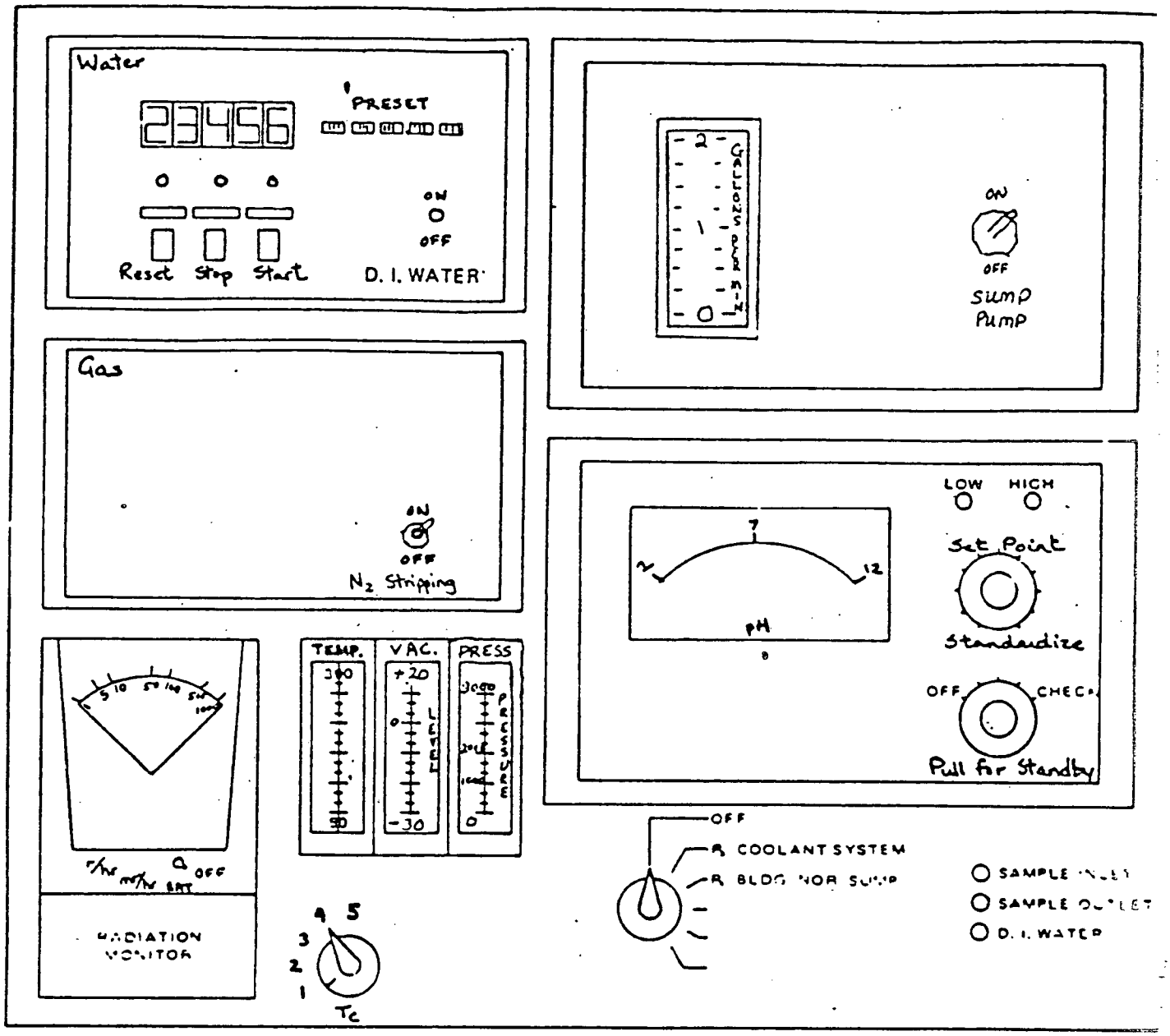
PALS Control Panel Diagram-Left



SEE DRAWING NO. L040180D FOR PANEL DETAIL

ENCLOSURE 6.4

PALS Control Panel Diagram-Right



Checked Control Copy_____

Date_____

ENCLOSURE 6.5

OPERATIONS CHECKLIST FOR REACTOR COOLANT SYSTEM VALVE LINEUPS

TO POST ACCIDENT LIQUID SAMPLING SYSTEM

1.0 Purpose

This enclosure gives the valve lineups needed for Chemistry personnel to sample the Reactor Coolant System (RCS). Location of valves are given to facilitate lineup.

2.0 Limits and Precautions

2.1 3RIA-54 should be in service and monitored during the course of operation of the PALS.

2.2 Demineralized water header must be in service and have at least 60 psi pressure (per Sta. Dir. 3.1.15).

3.0 Procedure

			Date Init./Time
3.1	Ensure the following breakers are closed:		
3.1.1	3KTH1 Bkr. #8 Sampling/Control Panels Power Supply (located next to U3 sampling panel)		_____
3.1.2	MCC3XL Bkr. for 3DW-278 (RCS sample line flush) and 3LWD-1028 (RBNS Sample Line)		_____
3.1.3	Ensure breakers located on KVIA, B, C are closed (Power supply to 3RC-162, 3RC-163).		_____
3.2	To obtain a reactor coolant sample, the valves listed in this section should be aligned as follows:		
3.2.1	3RC-84	Inside reactor building - refer to Fill and Vent Procedure (OP/3/A/1103/02) to verify OPEN status.	_____

ENCLOSURE 6.5

			Date Init./Time	Verification Date Init./Time
3.2.2	3RC-174/3RC-176(Test Connections) and 3RC-175 (High Point Vent) Inside reactor building - refer to Fill and Vent Procedure (OP/3/A/1103/02) to verify CLOSED status.		_____	
3.2.3	OPEN 3RC-162	Inside reactor building-operated from control room.	_____	_____
3.2.4	OPEN 3RC-163	Inside reactor building-operated from control room.	_____	_____

NOTE: The following initial conditions must be observed.

3.2.5	If containment integrity is required, then Steps 3.2.6 and 3.2.7 must be completed.		_____	_____
3.2.6	Station a responsible person in the vicinity of 3RC-164 and 3RC-165 to immediately close them if ES actuation occurs. This person must be in constant communication with the Control Room the entire time 3RC-164 and 3RC-165 are open.		_____	
3.2.7	Record that containment isolation valves 3RC-164 and 3RC-165 are open in OP/0/A/1102/20 (Shift Turnover).		_____	
3.2.8	OPEN 3RC-16	Manual Valve (located in U3 LPI Room) to be operated by reach rod from U3 LPI/HPI Hatch Room 158, 159 (on west wall next to spiral staircase).	_____	_____

ENCLOSURE 6.5

			Date Init./Time	Verification Date Init./Time
3.2.9	OPEN 3RC-165	Manual Valve (located in U3 LPI Room) to be operated by reach rod from U3 LPI/HPI Hatch Room 158, 159 (on west wall next to spiral staircase).	_____	_____

CAUTION: If ES actuation occurs, immediately close isolation valves for containment isolation.

3.3 To allow recirculation of sample, align 3LP-65, return line valve to the RB Emergency Sump:

NOTE: The following initial conditions must be observed.

3.3.1		If containment integrity is required, then Steps 3.3.2 and 3.3.3 must be completed.	_____	_____
3.3.2		Station a responsible person in the vicinity of 3LP-65 to immediately close 3LP-65 if ES Actuation occurs. This person must be in constant communication with the Control Room the entire time 3LP-65 is open.	_____	
3.3.3		Record that the valve is open in OP/0/A/1102/20 (Shift Turnover).	_____	
3.3.4	OPEN 3LP-65	Manual valve (located in Unit 3 LPI Room) to be operated by reach rod from LPI/HPI Hatch Room 158, 159 (on west wall directly behind 3LP-22).	_____	_____

3.4 Chemistry will inform Operations when they have obtained the RCS sample in the panel and the following valves should then be realigned as follows:

ENCLOSURE 6.5

			Date Init./Time	Verification Date Init./Time
3.4.1	CLOSE 3RC-165	Manual Valve (located in U3 LPI Room) to be operated by reach rod from LPI/HPI Hatch Room 158, 159 (on west wall next to spiral staircase).	_____	_____
3.4.2	CLOSE 3RC-164	Manual Valve (located in U3 LPI Room) to be operated by reach rod from LPI/HPI Hatch Room 158, 159 (on west wall next to spiral staircase).	_____	_____
		NOTE: Remove the containment isolation valves (3RC-164 and 3RC-165) from OP/0/A/1102/20 (Shift Turnover).		
3.4.3	CLOSE 3RC-163	Inside Reactor Building-operated from Control Room.	_____	_____
3.4.4	CLOSE 3RC-162	Inside Reactor Building-operated from Control Room.	_____	_____

3.5 Chemistry will inform Operations when entire sampling sequence has been completed.

3.5.1	CLOSE 3LP-65	Manual valve (located in LPI Room) operated by reach rod from LPI/HPI Hatch Room 158, 159 (on west wall directly behind 3LP-22).	_____	_____
3.5.2		This will regain containment integrity. Remove the containment isolation valve from OP/0/A/1102/20 (Shift Turnover).	_____	

3.6 Return completed enclosure to Chemistry personnel operating PALS. _____

Checked Control Copy_____

Date_____

ENCLOSURE 6.6

OPERATIONS CHECKLIST FOR REACTOR BUILDING NORMAL SUMP

VALVE LINEUPS TO POST ACCIDENT SAMPLING SYSTEM

1.0 Purpose

This enclosure gives the valve lineups needed for Chemistry personnel to sample the Reactor Building Normal Sump (RBNS). Locations of valves are given to facilitate lineups.

2.0 Limits and Precautions

2.1 3RIA-54 should be in service and monitored during the course of operation of the PALS.

2.2 Demineralized water header must be in service and have at least 60 psi pressure (per Sta. Dir. 3.1.15).

3.0 Procedure

		Date Init./Time
3.1	Ensure the following breakers are closed:	
3.1.1	3KTH1 Bkr. #8 Sampling/Control Panels Power Supply (located next to U3 Sampling Panel)	_____
*3.1.2	MCC3XL Bkr. #9C RB Normal Sump Sample Pump Power Supply.	_____
3.1.3	MCC3XL Bkr. for 3DW-278 (RCS Sample Line Flush) and 3LWD-1028 (RBNS Sample Line).	_____
3.2	To obtain a reactor building normal sump sample, the following valves should be aligned as indicated:	
3.2.1	White tag open breaker on RB Normal Sump Pump 3A White Tag No._____ (Located on MCC3XL).	_____

ENCLOSURE 6.6

			Date Init./Time	Verification Date Init./Time
3.2.2	White tag open breaker on RB Normal Sump Pump 3B White Tag No._____ (Located on MCC-3XN)		_____	
3.2.3	CLOSE 3LWD-30	RB Normal Sump Pump (3A) Suction. Operated by reach rod on east wall of valve gallery at bottom of spiral staircase.	_____	
3.2.4	CLOSE 3LWD-33	RB Normal Sump Pump (3B) Suction. Operated by reach rod on east wall of valve gallery directly at bottom of spiral staircase.	_____	
3.2.5	OPEN 3LWD-1	Reactor building normal sump line. This is an ES valve operated from the Control Room.	_____	_____
3.2.6	OPEN 3LWD-2	Reactor building normal sump line. This is an ES valve operated from the Control Room.	_____	_____

3.3 To allow recirculation of sample, align 3LP-65, return line valve to the RB Emergency Sump:

NOTE: The following initial conditions must be observed:

3.3.1	If containment Integrity is required, then Steps 3.3.2 and 3.3.3 must be completed.	_____	_____
3.3.2	Station a responsible person in the vicinity of 3LP-65 to immediately close 3LP-65 if ES Actuation occurs. This person must be in constant communication with the Control Room the entire time 3LP-65 is open.	_____	

ENCLOSURE 6.6

			Date Init./Time	Verification Date Init./Time
3.3.3	Record that the valve is open in OP/0/A/1102/20 (Shift Turnover).		_____	
3.3.4	OPEN 3LP-65	Manual valve (located in Unit 3 LPI Room) to be operated by reach rod from LPI/ HPI Hatch Room 158, 159 (on west wall directly behind 3LP-22).	_____	_____

3.4 Chemistry will inform Operations when they have obtained the reactor building normal sump sample in the panel, and the following valves should then be realigned as follows:

3.4.1	CLOSE 3LWD-2	Reactor building normal sump line. This is an ES valve operated from the Control Room.	_____	_____
3.4.2	CLOSE 3LWD-1	Reactor building normal sump line. This is an ES valve operated from the Control Room.	_____	_____
3.4.3	OPEN 3LWD-33	RB Normal Sump Pump (3B)Suction. Operated by reach rod on east wall of valve gallery directly at bottom of spiral staircase.	_____	
3.4.4	OPEN 3LWD-30	RB Normal Sump Pump (3A) Suction. Operated by reach rod on east wall of valve gallery directly at bottom of spiral staircase.	_____	
3.4.5	Remove white tag from breaker on RB Normal Sump Pump 3B. White Tag No. _____		_____	

ENCLOSURE 6.6

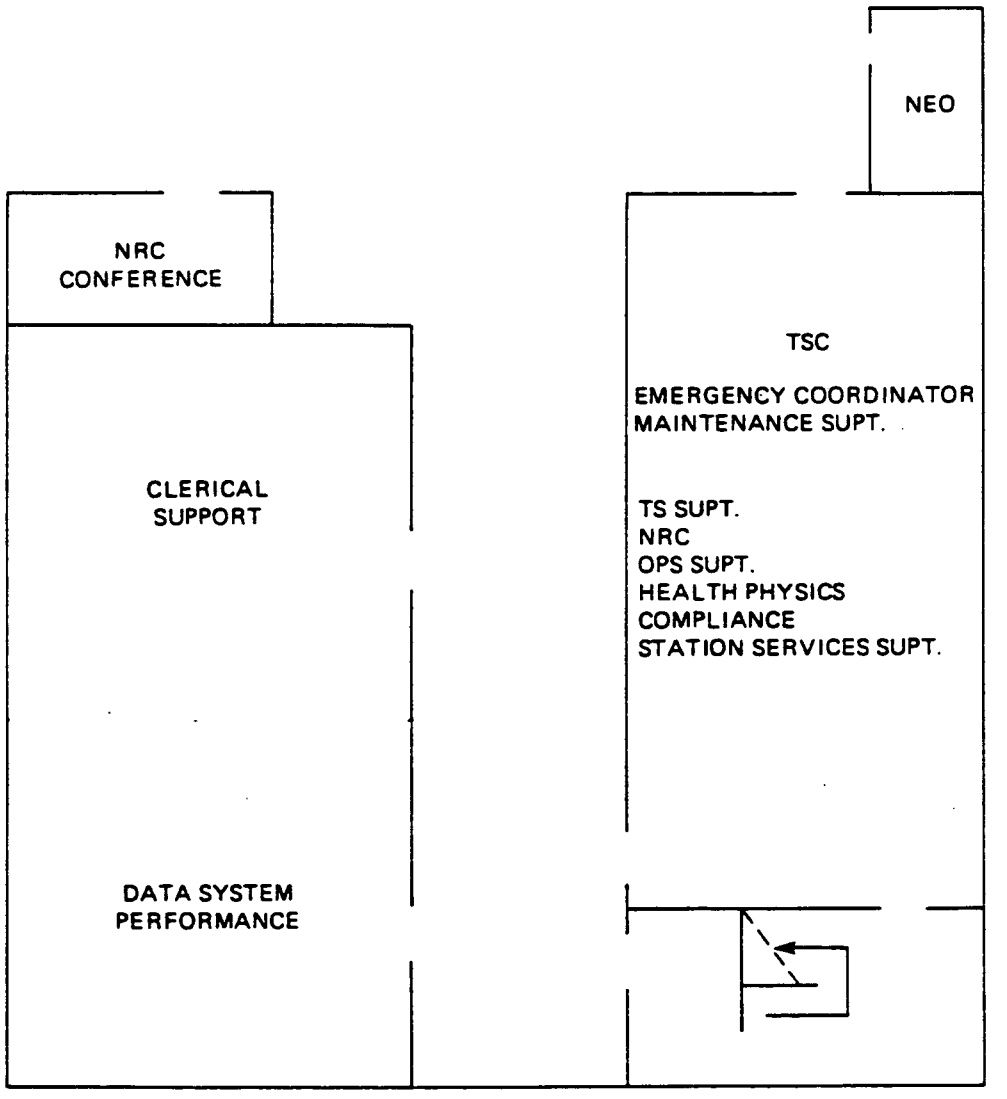
CP/3/A/2002/04C

			Date Init./Time	Verification Date Init./Time
3.4.6	Remove white tag from breaker on RB Normal Sump Pump 3A. White Tag No. _____		_____	
3.5	Chemistry will inform Operations when entire sampling sequence has been completed.			
3.5.1	CLOSE 3LP-65	Manual valve (located in LPI Room) operated by reach rod from LPI/ HPI Hatch Room 158, 159 (on west wall directly behind 3LP-22).	_____	_____
	NOTE:	This will regain containment integrity. Remove the containment isolation valve from OP/0/A/1102/20 (Shift Turnover).		
3.6	Return completed enclosure to Chemistry Personnel operating PALS.		_____	

FIGURE H-1

DUKE POWER COMPANY
OCONEE NUCLEAR STATION

TECHNICAL SUPPORT CENTER
UNIT 1 & 2 CONTROL ROOM



K-9

DUKE POWER COMPANY

OCONEE NUCLEAR STATION

_____ STATION

HEALTH PHYSICS RADIATION WORK PERMIT

Date _____ Time _____ RWP/SRWP Number _____

Supervisor to return original copy to Health Physics at completion of job.

Job Description _____

_____

Location: Building _____ Room _____ or Area _____

Protective Clothing and Equipment Required

TYPE (QUANTITY)	TYPE (QUANTITY)	TYPE (QUANTITY)
__ SURGEON'S CAP	__ GLOVES	__ FULL-FACE RESPIRATOR
Disposable ( )	*Cotton* ( )	__ AIR-LINE MASK
Cloth ( )	*Rubber* ( )	__ SELF-CONTAINED AIR PACK
__ HOOD	*Hvy Rubber* ( )	__ AIR-SUPPLIED SUIT
Disposable ( )	__ COVERALLS	__ TLD BADGE
Cloth ( )	*Disposable* ( )	*Whole-Body* ( )
Wet Suit ( )	*Cloth* ( )	*Extremity* ( )
__ SHOE COVERS	*Wet Suit* ( )	*Other* _____
Disposable ( )	__ LAB COAT	__ POCKET DOSIMETER
Cloth ( )	*Disposable* ( )	*Low-Range* ( )
Rubber ( )	*Cloth* ( )	*Extended-Range* ( )
__ TAPE REQD. ( )	__ NO OUTER CLOTHING ( )	__ OTHER REQUIREMENTS: _____

Radiation Monitoring Required

(1) When:
- __ at start of job
- __ intermittent
- __ continuous
- __ timekeeper required

(2) Type: α ( ) β ( ) β-γ ( ) n ( )
- __ radiation level
- __ air particulate/iodine __
- __ gaseous
- __ surface contamination

Special Instructions

- __ Set up RCZ/Stanchions/Rope/Signs/Laundry Bins/Radioactive Waste Containers
- __ Lay down paper or polyethylene on work surface
- __ Provide absorbent-material swipes to pick up water
- __ Set up contamination-enclosure tent
- __ Set up local exhaust system for proper ventilation
- __ Install portable shielding
- __ Enter time in RCZ on Daily Exposure Time Record Card
- __ Personnel/Tool/Equipment monitoring required when leaving RCZ /RCA
- __ Job-planning meeting required and/or cold mockup and dry run
- __ Contact Health Physics prior to changing/going to work locations
- __ RCZ has been cleared of tools and/or equipment _____ (Initial)

REMARKS: _____

_____

_____

SRWP APPROVAL _____ Manager Prepared by _____ Health Physics

Approved for job beginning:
Date _____ Time _____ Shift Supervisor _____

Completed: Date _____ Time _____ Signature _____

Copy 1: Supervisor/Worker Copy 2: Control Room Copy 3: Health Physics

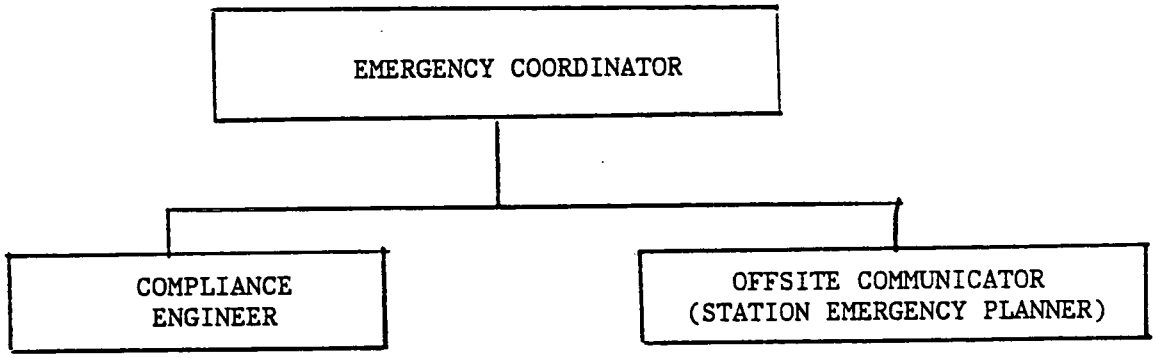
HP FORM #4

OCONEE NUCLEAR STATION

COMPLIANCE

EMERGENCY RESPONSE ORGANIZATION

1.0 Emergency Response Organization



NOTE: The above noted positions are located in the Technical Support Center (TSC).

2.0 Essential and non-Essential Personnel

2.1 Non-exempt personnel are considered non-essential and will be evacuated and/or requested to leave (not come to) the station as dictated by the emergency situation. These personnel may be recalled as necessary. Exempt personnel are considered essential with the below noted exception.

2.2 Certain exempt personnel may be designated by the Compliance Engineer or designee as non-essential. These personnel would be evacuated and/or requested to leave or not come to the station as dictated by the emergency situation. These personnel may be recalled and/or set up on a rotating shift as necessary.

2.3 Normally, two (2) Compliance personnel will fill the positions noted in the Emergency Response Organization (Item 1.0). These positions will be considered essential for any initial emergency situation requiring the activation of the Technical Support Center (TSC). This organization and staffing may be modified at the discretion of the Emergency Coordinator.

3.0 Designation of Alternates

3.1 The positions indicated in the Emergency Response Organization (Item 1.0) will normally be assumed by personnel permanently assigned to those positions.

3.2 In the absence of the Compliance Engineer, the Technical Specialist/ Licensing is the designated alternate.

3.3 In the absence of the Compliance Engineer and the Technical Specialist/ Licensing, the Associated Health Physicist is the designated alternate.

3.4 In the absence of the Station Emergency Planner, an alternate will be designated by the Compliance Engineer or designee.

4.0 Responsibilities of the Compliance Engineer (or Designee)

4.1 Oversee the activities of the Compliance Section and interface with Technical Support Center.

4.2 Provide initial notification to the Resident NRC Inspector if an emergency occurs.

4.3 Interface with the NRC Resident Inspector on questions involving the emergency.

4.4 Provide station interface relative to providing access for additional NRC personnel.

4.5 Interface between the Technical Support Center and the NRC to provide prompt and adequate information to the NRC while minimizing their impact on other station personnel involved in the emergency. Assume responsibility for ENS (Red Phone) from the Control Room.

4.6 Interface with General Office Licensing personnel relative to the review and application of licensing related information.

5.0 Responsibilities of the Station Emergency Planner (or Designee)

5.1 Serve as the Offsite Communicator for County/State agency update, assist the Station Manager in the Technical Support Center in assuring that the emergency response organization is established, and other activities as requested by the Emergency Coordinator.

5.2 Determine status boards are being updated.

5.3 Determine that data sheets are being sent to the Operational Support Center.

5.4 Determine that communication channels to all groups are being followed.

5.5 Determine the Director of Visitor's Center has been contacted to establish a liaison between the Technical Support Center and the Crisis News Group.

Oconee Nuclear Station
Maintenance Directive 8.1
Approved Tony B Cimer
Original Date 4-24-84
Revised Date 2/4/87

EMERGENCY PREPAREDNESS PLAN ACTIVATION

1.0 Purpose

The purpose of this directive is to provide instructions on how to activate the Maintenance Response Organization in case of a site emergency and provide guidelines for the Maintenance Duty Engineer during activation of the Spent Fuel Emergency Plan.

2.0 Responsibility

Responsibilities of Maintenance Group personnel are described in the body of this directive.

3.0 Implementation

This directive explains the duties of various Maintenance Group personnel whenever the Emergency Plan is activated.

3.1 Normal Working Hours

3.1.1 Upon site assembly alarm, all Maintenance Group personnel will:

a. Maintenance Shift Personnel (crews and supervisors) report immediately to the Operational Support Center (Unit 3 I&E Shop). Supervisors report accountability to their respective coordinators.

b. All other Maintenance Personnel report immediately to the work area listed on the back of their security badge for accountability. Personnel should remain in their work area or offices until notified to set up TSC/OSC or secure from site assembly.

1) Maintenance personnel on site and not physically close to their reporting work area will go to the nearest telephone and call their supervisor immediately for accountability and instructions. These people should either return to their reporting area or remain close to a phone, as desired by their supervision.

c. Maintenance Supervisors will account for their on site personnel, whether accounted for or missing, and give accountability report to their Maintenance Coordinators/ Support Engineers within five (5) minutes after the site assembly alarm.

d. Maintenance Coordinators/Support Engineers will give their accountability report to their respective Section Head Clerk eight (8) minutes after the site assembly alarm.

e. Section Head's Clerks will give accountability report to the Group Head Clerk within ten (10) minutes after the site assembly alarm.

f. The Group Head Clerk will give accountability report to the Superintendent of Maintenance within fifteen (15) minutes after the site assembly alarm.

g. Superintendent of Maintenance will give accountability report to the Security Shift Lieutenant within twenty (20) minutes after the site assembly alarm.

3.1.2 Activation of the Maintenance Emergency Response Organization

Upon announcement over the P.A. system to set up the Technical Support Center (TSC) and the Operational Support Center (OSC) the following Maintenance Personnel should respond as indicated below:

SUPERINTENDENT OF MAINTENANCE

a. Contact TSC Maintenance Communicator to report to the TSC. (See Attachment 1)

b. Report to the Technical Support Center (TSC) with a copy of the Quality Standards Manual for Structures, Systems, and Components.

c. Determine if the Operational Support Center (OSC) has been established and reports information to the Station Manager.

d. Determine additional manpower needs once the situation has been evaluated and contacts the appropriate personnel (See Attachment #2).

TSC COMMUNICATOR

a. Reports to TSC when contacted.

b. Sets up communication equipment (telephone, intercom, and PA system) and checks operability.

c. Maintains Logbook

1. Instructions for the OSC

2. Activities in the OSC

3. Any problems that may arise

d. Perform any duties assigned by Superintendent of Maintenance

I&E ENGINEER

a. Contact a Maintenance Administration Supervisor and have her report to the OSC.

b. Report to the OSC.

c. Keep the OSC Communicator and Superintendent of Maintenance up-to-date as to the activities of the I&E Section.

MECHANICAL MAINTENANCE ENGINEER

a. Report to the OSC.

b. Keep the OSC Communicator and Supt. of Maintenance up-to-date as activities of the Mech. Maint. Section.

TRANSMISSION DEPARTMENT OCONEE SUPPORT ENGINEER

a. Report to OSC.

b. Contact appropriate personnel in substation maintenance and have them report to OSC (See Attachment #4).

c. Keep the I&E Engineer up-to-date as to the activities of the Transmission Department.

MAINTENANCE SHIFT (12 hour) PERSONNEL

a. I&E Shift Crew Supervisor

1. Reports with crew to the OSC (Unit 3 I&E Shop) at Site Assembly Alarm.

2. I&E Shift Supervisor reports accountability to appropriate I&E Coordinator.

3. Sets up communication equipment (if announcement has been made to set up TSC/OSC).

4. I&E Supervisor contacts Operations Shift Supervisor to make him aware when the OSC is established. (I&E, MM, Chemistry, HP, present and accounted.)

5. Determines from the Operations Shift Supervisor the emergency situation and responds as directed by the Operations Shift Supervisor.

6. Serves as OSC Coordinator until relieved.

7. Responsible for maintaining a logbook of where his people are located.

b. Mechanical Maintenance Shift Crew Supervisor

1. Reports with crew to the OSC (Unit 3 I&E Shop) at the Site Assembly Alarm.

2. Mechanical Maintenance Supervisor reports accountability to appropriate MM Coordinator.

3. Sets up and maintains communication with Materials personnel.

4. Follows instructions for response from the Mechanical Maintenance Engineer.

5. Responsible for maintaining a logbook of where his people are located.

c. Materials Shift Personnel

1. Reports to Supply Issue Window at Site Assembly Alarm and calls Mechanical Maintenance Shift Supervisor at ext. 2113 for instructions.

2. Stands by Phone 2256 for further instructions.

3. Reports accountability to Materials Supervisor.

MAINTENANCE DUTY ENGINEER

a. Report to OSC as OSC Communicator

b. Check out communication equipment in the OSC to verify it is installed properly and operational.

c. Answer telephone, maintain "OSC Task Work Sheet" and keep OSC Coordinator updated.

d. Maintain Logbook (Record information required to account for all activities)

1. Instructions from TSC, OPS Shift Supervisor, etc.

2. Actions taken to follow Instructions

3. Any problems that may arise

e. Perform any duties assigned by OSC Coordinator.

MAINTENANCE ADMINISTRATION SUPERVISOR

a. Report to OSC to assist OSC Communicator.

b. Obtain a record of Maintenance personnel reporting to the OSC.

c. Issue task numbers and maintain the status boards.

3.2 Backshift, Holidays, Weekends

3.2.1 SUPERINTENDENT OF MAINTENANCE:

a. Receives information concerning emergency through contact with Station Manager (or Alternate, see Attachment 1).

b. Reports to the Technical Support Center with a copy of the Quality Standards Manual for Structures, Systems & Components.

c. Determines if the Operational Support Center has been established and reports information to Station Manager.

d. Determines additional manpower needs once the emergency situation has been evaluated.

3.2.2 Maintenance Group Duty Engineer will be contacted by Globe Security to activate the Maintenance Emergency Response Organization. The Duty Engineer will:

a. Contact the I&E Engineer and advise him to report to the OSC.

b. Contact the Mech. Maint. Engineer and advise him to report to the OSC.

c. Contact the TSC Maintenance Communicator and advise him/her to report to the TSC

d. Contact Maintenance Administration Supervisor and advise her to report to the OSC.

e. Contact Transmission Department Oconee Support Engineer and advise him to report to the OSC.

f. Report to the O.S.C. to serve as OSC Maintenance Communicator.

Attachment #1 shows the primary and alternates for the above (a through e) positions and their home phone numbers. If alternates are used for positions described in a thru d, the duty engineer will advise the person contacted which position he will be filling.

3.2.3 The OSC Communicator, TSC Communicator, I&E Engineer, Mech. Maint. Engineer, Maint. Admin. Supervisor, and Transmission Department Oconee Support Engineer's duties are the same as described in Section 3.1 for normal duty hours.

3.2.4 MAINTENANCE SHIFT PERSONNEL

a. I&E Shift Crew Supervisor

1. Reports with crew to the OSC (Unit 3 I&E Shop) at Site Assembly Alarm.

2. I&E Shift Supervisor reports accountability to Security Shift Lieutenant.

3. I&E Shift Supervisor contacts Operations Shift Supervisor to make him aware when the OSC is established (I&E, MM, Chemistry, HP).

4. Determine from the Operations Shift Supervisor the emergency situation and respond as directed by Operations Shift Supervisor.

5. Set up communication equipment when Activation of Emergency Response Organization (set up TSC/OSC) is announced over P.A. System. (See Attachment #3)

6. Serve as OSC Coordinator until relieved.

7. Responsible for maintaining a logbook of where his people are located.

b. MM Shift Crew Supervisor

1. Reports with crew to the OSC (Unit 3 I&E Shop) at Site Assembly Alarm.

2. Reports accountability (Maint. Technicians and Materials personnel) to Security Shift Lieutenant.

3. Follows instructions for response from the OSC Coordinator.

4. Responsible for maintaining a logbook of where his people are located.

c. Materials Shift Personnel

1. Reports to Supply Issue Window at Site Assembly Alarm.

2. Calls Mechanical Maintenance Shift Supervisor at Extension 2113 and reports accountability.

3. Stands by Phone 2256 for further instructions.

3.3 Evacuation of Maintenance Personnel

NOTE: Site Assembly will always precede a Station Evacuation.

3.3.1 Normal Working Hours

3.3.1.1 After the TSC and OSC are established, the Superintendent of Maintenance along with the I&E and Mechanical Maintenance Engineers will determine the essential Maintenance personnel to retain on site. Guidelines for this determination, which will vary according to specific situational requirements, are given in Attachment 5.

NOTE: All personnel designated as "essential" must appear on the "Blue Dot" List.

3.3.1.2 When the determination of essential personnel is complete it will be provided to the Evacuation Coordinator for each Maintenance Section. The Evacuation Coordinators are assigned as follows (reference Attachment 6):

a. I&E - Coordinator/Support Engineer as designated by I&E Engineer in OSC.

b. Mechanical Maintenance - Coordinator as designated by Mechanical Maintenance Engineer in OSC.

c. Maintenance Services/Materials - Maintenance Services Engineer/ designee.

d. Planning & Scheduling - Planning & Scheduling Engineer/designee.

3.3.1.3 The Evacuation Coordinator for each Section will ensure that assigned personnel are informed of their designation as either essential or non-essential. All personnel designated as essential will remain on site in the event of a Station Evacuation. All personnel designated as non-essential will be directed to follow all evacuation instructions if a Station Evacuation is announced.

3.3.1.4 After the decision is made to evacuate Station personnel, the Evacuation Coordinator for each Maintenance Section will be given the following information to disseminate to all Maintenance Personnel:

a. Reason(s) for Station Evacuation.

b. Current plant condition/status.

c. Anticipated plans/activities to mitigate and recover from the accident.

d. Any known medical injuries or fatalities related to the accident.

e. Detailed evacuation instructions including (at a minimum):

1. Route to follow for exiting the Protected Area.

2. Route to follow for exiting the plant.

3. Availability and use of mass transportation for evacuation.

4. H.P. requirements related to the evacuation.

5. Assembly location after evacuation (Keowee School, Daniel High School, etc.)

f. Specific work schedule instructions.

3.3.1.5 After receiving the information detailed in 3.3.1.4 all on-site non-essential Maintenance personnel will evacuate the site following the given evacuation instructions.

3.3.1.6 All on-site essential Maintenance personnel will be directed by the TSC/OSC in any further activities after receiving the information detailed in 3.3.1.4.

3.3.1.7 All off-site Maintenance personnel will be contacted by Maintenance Supervision with specific work schedule instructions.

3.3.2 Backshift, Holidays, Weekends

3.3.2.1 All on-site Maintenance personnel will be designated as essential or non-essential by the I&E Supervisor in the OSC (until relieved).

3.3.2.2 The I&E Supervisor in the OSC (until relieved) will notify all on-site Maintenance personnel of their designation as essential or non-essential as described in 3.3.1.3.

3.3.2.3 After the decision is made to evacuate Station personnel all on-site Maintenance personnel will have the information detailed in Section 3.3.1.4 provided to them by I&E Supervisor in the OSC (until relieved).

3.3.2.4 After receiving the evacuation notice all on-site non-essential Maintenance personnel will evacuate the site following the given evacuation instructions.

3.3.2.5 All on-site essential Maintenance personnel will be directed by the I&E Shift Supervisor in the OSC (until relieved) in any further activities after receiving the information detailed in 3.3.1.4.

3.3.2.6 All off-site Maintenance personnel will be contacted by Maintenance Supervisor with specific work schedule instructions.

3.4 SPENT FUEL TRANSPORT EMERGENCY PLAN

The Spent Fuel Transport Emergency Plan for the Station (Procedure RP/0/B/1000/14) will be placed into effect in the event of a transportation accident or other emergencies involving the shipment of radioactive material.

a. Contact a Mechanical Engineer knowledgeable of cask construction (Rod Emory or Basil Carney) and advise him of the event. (Major or Minor Event)

b. If there is a Major Event, the Mechanical Engineer will be required to report to the site of the Event with cask drawings (OM-1120-137, in Master File and Maintenance Services Satellite File) and advise the Station Response Coordinator of:

1. Extent of Cask Damage

2. Possible temporary repairs to cask

3. Recommended handling.

4.0 Attachments

Attachment #1 Maintenance TSC/OSC Contact List

Attachment #2 Technical Support Center Checklist

Attachment #3 OSC Coordinator Checklist

Attachment #4 Transmission Department and Substation Division Contact List

Attachment #5 Typical Maintenance Personnel to Retain After Station Evacuation.

Attachment #6 Maintenance Evacuation Coordinator List

ATTACHMENT 1
MAINTENANCE TSC/OSC CONTACT LIST

a. Superintendent of Maintenance

Primary - Tony Owen	882-1499	3rd Alt.	Don Havice	878-4940
1st Alt. - Dendy Clardy	882-6637	4th Alt.	Danny Thompson	261-8884
2nd Alt. - Barry Millsaps	868-2814			

b. I&E Engineer

Primary - Don Havice	878-4940
Alt. - John Shaw	882-2662
Alt. - Donnie McMahan	638-7809
Alt. - Furman Whitmire	878-7379

c. Mechanical Maintenance Engineer

Primary - Danny Thompson	261-8884
Alt. - Jerry Adams	287-4283
Alt. - George Hawkins	296-9049
Alt. - Leonard Brock	268-3048

d. T.S.C Maintenance Communicator

Basil Carney	882-4256	George Hawkins Leonard Brock	296-9049
Tom Glenn	224-8468	Jerry Adams	287-4283
Dave Larson	882-6389	Doug Hunter	638-3687
Pam Forrester	843-2555	John Shaw	882-2662
Rick Matheson	647-9620	Donnie McMahan	638-7809
George O'Neal	654-5660	Bill Holcombe	638-7596
Ted Royal	654-1518	Furman Whitmire	878-7379
Ronnie Weatherford	882-3064	Dana Moore	882-9994
Bill McAlister	638-3439	Pat Street	868-2751

e. Transmission Department Oconee Support Engineer

		Beeper
Primary - Gary Edens	882-6258	895
Alt. - B. J. McDaniel	639-2439	894
Alt. - Doug Fields	963-5521	613
Alt. - Donnie Wilson	244-6092	510
Alt. - Carol Groce	879-3562	414
Alt. - Jenks Petty, Jr.	288-4742	
Alt. - Roy Holmes, Jr.	554-1471	

f. Maintenance Administrative Supervisor

Primary - Joyce Peebles	882-3895
Alt. - Betty Dacus	843-6695
Alt. - Bonnie Holcombe	944-1065

ATTACHMENT 2

TECHNICAL SUPPORT CENTER CHECKLIST

1. Superintendent of Maintenance in TSC with phone operable

2. Maintenance TSC Communicator present (See Attachment #1)

3. OSC Coordinator in place in the OSC with maintenance crews available

4. Manpower needs being evaluated

   a. Number of Maintenance people on site
   b. Site Assembly still taking place or have they been returned to work?
   c. If still at Site Assembly, what are the activity levels at the Assembly areas?
   d. Evacuation process which crews are released first with information when they are to return, etc.?

5. Determine alternate methods of communication should problems occur with telephones.

ATTACHMENT 3

OSC COORDINATOR CHECKLIST

I & E Shift Supervisor setting up the OSC during Backshift, Holiday, and Weekends shall determine:

1. Phones are operable in the OSC.

2. Intercom system, telecopier and copy machine operable.

3. Emergency Response radios available for all groups (I&E, MM, Chemistry, HP, Safety).

4. Supervisors in place for each section represented.

5. Establish Liaison with Operations.

6. Appropriate information update process established.

ATTACHMENT 4
TRANSMISSION DEPARTMENT AND
SUBSTATION DIVISION CONTACT LIST
PERSONNEL TO BE CALLED IN CASE OF TROUBLE AT
OCONEE NUCLEAR STATION

SUBSTATION MAINTENANCE

1) Relays (Protective Relays, Carriers, Pilotwire, Batteries & Chargers)

	Work Phone	Home Phone	Beeper
First - H. D. Fields (Doug)	(8) or (60) - 234-4150	1-(803)-963-5521	613
Second - C. D. Wilson (Donnie)	(8) or (60) - 234-4149	60-244-6092	510
Third - C. D. Groce (Carol)	(8) or (60) - 234-4151	1-(803)-879-3695	414

2) Metering (E-A Recorders, Oscillographs, SERs, AOC & SOC, Analog & Digital Telemetering, Voltmeters, Ammeters, Watthour Meters) & Supervisory Control

	Work Phone	Home Phone	Beeper
First - C. D. Wilson (Donnie)	(8) or (60) - 234-4149	60-244-6092	510
Second - H. D. Fields (Doug)	(8) or (60) - 234-4150	1-(803)-963-5521	613
Third - C. D. Groce (Carol)	(8) or (60) - 234-4151	1-(803)-879-3695	414

Power Apparatus (Circuit Breakers, Transformers, Capacitors, Switchgear, Doble and Ground Testing)

	Work Phone	Home Phone	Beeper
First - C. D. Groce (Carol)	(8) or (60) - 234-4151	(803) 879-3695	414
Second - H. D. Fields (Doug)	(8) or (60) - 234-4150	(803) 963-5521	613
Third - C. D. Wilson (Donnie)	(8) or (60) - 234-4149	60-244-6092	510
If unable to contact persons listed above, call			
First - C. J. Petty, Jr. (Jenks)	(8) or (60) - 234-4148	60-288-4742	
Second - R. E. Holmes, Jr. (Roy)	8-331-4315	1-704-554-1471	

8-950-0761 - Authorization Code - 704-554-1471

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*Spartanburg Dispatcher may also be contacted at 8-585-0100 or 8-585-0400 or 1-803-585-4419 or 4427 or on direct line from Control Room.
**To contact by beeper call Oconee Switchboard Operator.

*NOTE: Only Gary Edens or B. J. McDaniel will report to OSC during a drill unless specifically directed by ONS Superintendent of Maintenance.

ATTACHMENT 5

TYPICAL MAINTENANCE PERSONNEL

TO RETAIN AFTER STATION EVACUATION

MAINTENANCE SERVICES

A. Maintenance Services Engineer

B. Maintenance Coordinator-Materials or Materials Supervisor

C. Materials Coordinator

D. Storekeepers (2)

E. Mechanical Engineers (2)

PLANNING AND SCHEDULING

A. Maintenance Coordinator I&E Planning

B. Maintenance Coordinator Mechanical Planning

C. I&E Planner (2-3)

D. Mechanical Planner (2-3)

E. Engineering Specialist EQDB

F. Engineering Specialist NMDB

MECHANICAL

A. Day Shift Crew and Supervisor

B. Day Shift Crew and Supervisor (in training)

C. Two (2) other Mechanical Crews with Supervisors

D. Mechanical Coordinator (1 or 2)

I&E

A. Day Shift Crew and Supervisor

B. Day Shift Crew and Supervisor (in training)

C. Two (2) other I&E crews

D. I&E Coordinator (1 to 2)

E. I&E Engineers (2)

The above list is a suggested manpower staffing of the Maintenance organization after a station evacuation. This would be approximately 90 people.

ATTACHMENT 6

MAINTENANCE EVACUATION COORDINATOR LIST

A. I&E Maintenance

John Shaw	Russ Powell
Don McMahan	Bill McAlister
Furman Whitmire	Tom Glenn

B. Mechanical Maintenance

Leonard Brock	Jerry Adams
George Hawkins	L. J. Jones
Mike Alexander	George Randolph
Bill Matheson	

C. Planning & Scheduling

Dendy Clardy	Dana Moore
Bill Holcombe	Dave Larson
Doug Hunter	

D. Maintenance Services

Barry Millsaps	Pat Street
Basil Carney	Jim Sites

CONSTRUCTION AND MAINTENANCE DEPARTMENT

INFORMATION ONLY ~~SOUTHERN~~ DIVISION

TITLE SITE ASSEMBLY	APPROVED BY	DATE APPROVED
		1/28/87

PREPARED BY: Gerald E. Menzies DATE: Jan. 28, 1987

REVIEWED BY: Colleen C. Jennings DATE: January 28, 1987

QA REVIEW: _____ DATE: _____

DESIGN REVIEW: _____ DATE: _____

VENDOR REVIEW: _____ DATE: _____

QUARTERLY REVIEW: _____ DATE: _____

QUARTERLY REVIEW: _____ DATE: _____

QUARTERLY REVIEW: _____ DATE: _____

Section/Subject Page

1.0 PURPOSE

The purpose of this procedure is to establish the method to be used for personnel accountability during a Site Assembly.

2.0 SCOPE

This procedure applies to all CMD-SD employees, vendors and visitors.

3.0 DEFINITIONS

3.1 NORMAL WORKING HOURS -- 0730-1600 Monday through Friday (excluding holidays).

3.2 ACCOUNTING INDIVIDUAL -- The individual designated by Supervision to account for members of the crew when assembled in the hot change room or the individual designated to account for vendor personnel not under direct CMD-SD supervision.

4.0 RESPONSIBILITIES

4.1	Division Manager	A. Assure that CMD-SD employees are trained per this procedure. B. Account for all personnel reporting to you. C. Report CMD-SD accountability during normal working hours.
4.2	Division Staff Managers	Account for all personnel reporting to you.
4.3	Human Resources Manager	Account for the employees of Consolidated Coin Caterers, Spartan Security and CMD-SD visitors.
4.4	Material and Equipment Manager	Account for CMD-SD vendors and contract personnel (not covered above) and material delivery personnel.
4.5	General Supervisors and Supervisors	Account for all personnel reporting to you.

5.0 PROCEDURE

5.1 Method for Responding During Normal Work Hours

5.1.1	Each person	A. Assemble with your supervisor (or designee) quickly and safely at the designated area.

		B. If working in a Radiation Control Area in protective clothing, leave your work area and go to the hot side of the change room to assemble with your supervisor or accounting individual. NOTE: Health Physics personnel may give you other or additional instructions at the hot change room and Reactor Building exit.
5.1.2	Supervision	A. Designate an area for all members of your crew to assemble. B. Report to your supervisor (or designee) within 10 minutes. C. Report your name and the names of any **unaccounted** persons. D. Assure that a member of your crew is designated to report in your absence. E. Assure that a member of your crew is designated Accounting Individual when any crew members are working in a Radiation Control Area in protective clothing.
5.1.3	Accounting Individual	A. Account for members of your crew and report to your supervisor (or designee) within 10 minutes. B. Report the names of any unaccounted persons.
5.1.4	General Supervisor	A. Report to your Staff Division Manager (or designee) within 10 minutes. B. Report your name, and the names of any **unaccounted** persons.
5.1.5	Division Staff Managers	A. Report to the Division Manager (or designee) within 15 minutes. B. Report your name, and the names of any **unaccounted** persons.

5.1.6 Division Manager

A. Report to the Oconee Nuclear Station Security Shift Lieutenant within 20 minutes.

B. Report the names of any **unaccounted** persons.

5.2 Method For Responding During Non Normal Work Hours

5.2.1 Each Person

A. Assemble with your supervisor (or designee) quickly and safely at your designated area.

B. If working in a Radiation control Area in protective clothing, leave your work area and go to the hot side of the change room and assemble with your supervisor or accounting individual.

NOTE: Health Physics personnel may give you other or additional instructions at the hot change room and Reactor Building exit.

5.2.2 Accounting Individual

A. Account for members of your crew and report to your supervisor (or designee) within 10 minutes.

B. Report the names of any **unaccounted** persons.

5.2.3 Supervisor

A. Designate an area for all members of your crew to assemble.

B. Report to the ONS Security Shift Lieutenant within 20 minutes.

C. Report your name, phone number of your assembly area, and the names of any unaccounted persons.

NOTE: Make this call even if all persons are accounted for.

D. Assure that a member of your crew is designated to report in your absence.

E. Assure that a member of your crew is designated Accounting Individual when any crew members are working in a Radiation Control Area in protective clothing.

5.2.4	General Supervisor Division Staff Managers Division Manager	A. Report to the ONS Security Shift Lieutenant within 20 minutes. B. Report your name and phone number.

CONSTRUCTION AND MAINTENANCE DEPARTMENT

SOUTHERN DIVISION

INFORMATION ONLY

TITLE	APPROVED BY	DATE APPROVED
STATION SUPPORT DURING A SITE EMERGENCY	C C Templeton	1/28/87

PREPARED BY: Gerald E. Menzies DATE: Jan. 28, 1987

REVIEWED BY: Coleman C. Jennings DATE: Jan. 28, 1987

QA REVIEW: _____ DATE: _____

DESIGN REVIEW: _____ DATE: _____

VENDOR REVIEW: _____ DATE: _____

QUARTERLY REVIEW: _____ DATE: _____

QUARTERLY REVIEW: _____ DATE: _____

QUARTERLY REVIEW: _____ DATE: _____

Section/Subject Page

1.0 PURPOSE

The purpose of this procedure is to establish guidelines for providing personnel and equipment to Oconee Nuclear Station during a site emergency.

2.0 SCOPE

This procedure applies to those CMD-SD individuals designated to respond during a site emergency.

3.0 DEFINITIONS

3.1 OPERATION SUPPORT CENTER (OSC) -- When activated, the location designated for specially trained personnel to assemble to support the station during an emergency.

3.2 OSC COORDINATOR -- The individual designated by ONS management to direct operations of the OSC.

3.3 CMS-SD/OSC LIAISON -- The individual designated to report to the OSC to establish communications between the OSC and CMD-SD.

4.0 RESPONSIBILITIES

4.1	Division Manager	Assure that a trained workforce is available in the event of a site emergency.
4.2	Maintenance Manager	A. Assure that an effective program exists to assemble your workforce in a timely manner.
		B. Assure that an individual is on duty in your absence that can be reached by the OSC-Coordinator when CMD-SD support is required.
		C. Appoint the CMD-SD/OSC Liaison individual to report to the OSC.
4.3	Construction Manager	A. Assure that an effective program exists to assemble your workforce in a timely manner.
4.4	Material and Equipment Manager	A. Assure that an effective program exists to assemble your workforce in a timely manner.
		B. Assure that an effective program exists to provide materials and equipment (see Attachment 1) in a timely manner.

C. Assure that the equipment (see Attachment 1) is kept in operating condition.

5.0 PROCEDURE

5.1 When CMD-SD support is necessary during a site emergency, the OSC-Coordinator or designee will contact the CMD-SD Maintenance Manager or duty individual.

5.1.1 Maintenance Manager

A. Assemble your workforce.

B. Inform the worker where and who he/she shall report to.

C. Appoint the CMD-SD OSC Liaison Individual.

D. Contact the Construction Manager or designee.

E. Contact the Material and Equipment Manager or designee.

5.1.2 Construction Manager

A. Assemble your workforce.

B. Inform the worker where and who he/she shall report to.

5.1.3 Material and Equipment Manager

A. Assemble your workforce.

B. Inform the worker where and who he/she shall report to.

C. Locate and assemble the equipment designated (see Attachment 1) for use.

5.1.4 Trained Worker

Quickly and safely report to the area and individual as instructed.

ATTACHMENT 1

SITE EMERGENCY EQUIPMENT LIST

1.	Freightliner Road Tractor	Co No 03691
2.	Brockway Road Tractor	Co No 06088
3.	Road Trailer	Co No 07949
4.	Lowboy Trailer (Fruhauf) 2 axle	Co No 00236
5.	Dyna-Hoe Backhoe	Co No 10098
6.	Demag 90T Hydraulic Truck Crane	Co No 03778
7.	40 Ton, 3 axle trailer	
8.	Forklift	Co No 19805 DV#74
9.	Forklift	Co No 16796 DV#73
10.	Portable Welding Machine	Co No 15886
11.	Portable Welding Machine	Co No 15887
12.	Portable Air Compressor (1200 CFM Gardner-Denver)	Co No 10308
13.	(2) Gas Powered Sump Pumps	
14.	Dump Truck	Co No 08158
15.	Airpowered Core Drill Machine	Co No 18751
16.	Boom Truck	Co No 02569 DV#72
17.	Boom Truck	Co No 01562 DV#58
18.	Diesel Generator ONAN 30DW	Co No 10171 (Bad Ck)
19.	Diesel Generator Cummings 265KW	Co No 17826 (Bad Ck)
20.	Forklift	Co No 17463
21.	Boom Truck	Co No 07658 DV#59
22.	Portable Generator WINCO 4.5KW	Co No 19255
23.	Portable Generator WINCO 4.5KW	Co No 19256