Duke Energy

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

Re: McGuire Nuclear Station
Docket Nos. 50-369 and 50-370
Emergency Plan Implementing Procedures

Enclosed for NRC staff use and review are the following Emergency Plan Implementing Procedures:

EPIP Index Page 1
EPIP Index Page 2
EPIP Index Page 3
HP/0/B/1009/022
OP/0/B/6200/090

No privacy information is contained in these procedures. This correspondence does not contain any regulatory commitments.

Two copies are also being forwarded to NRC Region II, Atlanta, Georgia.

Very truly yours,

H. B. Barron
Vice President
McGuire Site

HBB:jcm

Attachments

A045

xc: (w/attachment)
Mr. Luis Reyes,
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EP File 111

DUKE

McGUIRE NUCLEAR SITE

EMERGENCY PLAN IMPLEMENTING PROCEDURES

APPROVED: _____
SAFETY ASSURANCE MANAGER

DATE APPROVED 1/26/00

EPIP Index Page 1	Dated 01/26/2000
EPIP Index Page 2	Dated 01/26/2000
EPIP Index Page 3	Dated 01/26/2000
HP/0/B/1009/022	Dated 01/26/2000
OP/0/B/6200/090	Dated 01/26/2000

EMERGENCY PLAN IMPLEMENTING PROCEDURES INDEX

PROCEDURE #	TITLE	REVISION NUMBER
RP/0/A/5700/000	Classification of Emergency	Rev. 004
RP/0/A/5700/001	Notification of Unusual Event	Rev. 012
RP/0/A/5700/002	Alert	Rev. 012
RP/0/A/5700/003	Site Area Emergency	Rev. 012
RP/0/A/5700/004	General Emergency	Rev. 012
RP/0/A/5700/05	Care and Transportation of Contaminated Injured Individual(s) From Site to Offsite Medical Facility	DELETE
RP/0/A/5700/006	Natural Disasters	Rev. 005
RP/0/A/5700/007	Earthquake	Rev. 006
RP/0/A/5700/008	Release of Toxic or Flammable Gases	Rev. 003
RP/0/A/5700/09	Collisions/Explosions	Rev. 000
RP/0/A/5700/010	NRC Immediate Notification Requirements	Rev. 010
RP/0/A/5700/011	Conducting a Site Assembly, Site Evacuation or Containment Evacuation	Rev. 005
RP/0/A/5700/012	Activation of the Technical Support Center (TSC)	Rev. 016
RP/0/A/5700/013	Activation of the Emergency Operations Facility (EOF)	DELETE
RP/0/A/5700/14	Emergency Telephone Directory	DELETE
RP/0/A/5700/015	Notifications to the State and Counties from the EOF	Rev. 008
RP/0/A/5700/16	EOF Commodities and Facilities Procedure	DELETE
RP/0/A/5700/17	Emergency Data Transmittal System Access	DELETE
RP/0/A/5700/018	Notifications to the State and Counties from the TSC	Rev. 005
RP/0/A/5700/019	Core Damage Assessment	Rev. 003
RP/0/A/5700/020	Activation of the Operations Support Center (OSC)	Rev. 010
RP/0/A/5700/21	EOF Access Control	DELETE
RP/0/A/5700/022	Spill Response Procedure	Rev. 009
RP/0/A/5700/024	Recovery and Reentry Procedure	Rev. 001
RP/0/A/5700/026	Operations/Engineering Technical Evaluations in the Technical Support Center (TSC)	Rev. 000
RP/0/B/5700/023	Community Relations Emergency Response Plan	Rev. 000
OP/0/B/6200/090	PALSS Operation for Accident Sampling	Rev. 010

EMERGENCY PLAN IMPLEMENTING PROCEDURES INDEX

PROCEDURE #	TITLE	REVISION NUMBER
HP/0/B/1009/002	Alternative Method for Determining Dose Rate Within the Reactor Building	Rev. 002
HP/0/B/1009/003	Recovery Plan	Rev. 002
HP/0/B/1009/05	Initial Evaluation of Protective Action Guides Due to Abnormal Plant Conditions	DELETED
HP/0/B/1009/006	Procedure for Quantifying High Level Radioactivity Releases During Accident Conditions	Rev. 004
HP/0/B/1009/010	Releases of Radioactive Effluents Exceeding Selected Licensee Commitments	Rev. 005
HP/1/B/1009/015	Unit 1 Nuclear Post-Accident Containment Air Sampling System Operating Procedure	Rev. 003
HP/2/B/1009/015	Unit 2 Nuclear Post-Accident Containment Air Sampling System Operating Procedure	Rev. 003
HP/0/B/1009/016	Distribution of Potassium Iodide Tablets in the Event of a Radioiodine Release	Rev. 001
HP/0/B/1009/020	Manual Procedure for Offsite Dose Projections	DELETED
HP/0/B/1009/021	Estimating Food Chain Doses Under Post-Accident Conditions	Rev. 001
HP/0/B/1009/022	Accident and Emergency Response	Rev. 002
HP/0/B/1009/023	Environmental Monitoring for Emergency Conditions	Rev. 002
HP/0/B/1009/024	Personnel Monitoring for Emergency Conditions	Rev. 000
HP/0/B/1009/029	Initial Response On-Shift Dose Assessment	Rev. 004
SH/0/B/2005/001	Emergency Response Offsite Dose Projections	Rev. 000
SH/0/B/2005/002	Protocol for the Field Monitoring Coordinator During Emergency Conditions	Rev. 000
SR/0/B/2000/01	Standard Procedure for Public Affairs Response to the Emergency Operations Facility	Rev. 001
SR/0/B/2000/002	Standard Procedure for EOF Commodities and Facilities	Rev. 001
SR/0/B/2000/003	Activation of the Emergency Operations Facility	Rev. 003

EMERGENCY PLAN IMPLEMENTING PROCEDURES INDEX

PROCEDURE #	TITLE		REVISION NUMBER
McGuire Site Directive 280	Site Assembly/Accountability and Evacuation/Containment Evacuation		DELETED
EP Group Manual	Section 1.1	Emergency Organization	Rev. 017
MNS RP Manual:	Section 18.1	Accident and Emergency Response	DELETED
	Section 18.2	Environmental Monitoring for Emergency Conditions	DELETED
	Section 18.3	Personnel Monitoring for Emergency Conditions	DELETED
	Section 18.4	Planned Emergency Exposure	DELETED

(R06-97)

Duke Power Company

PROCEDURE PROCESS RECORD

(1) ID No. **OP/0/B/6200/090**

Revision No. **010**

PREPARATION

(2) Station **McGuire Nuclear Station**

Procedure Title **PALSS Operation for Accident Sampling**

(4) Prepared By Milton Cashion Date 12/13/99

(5) Requires 10CFR50.59 evaluation?

- ☑ Yes (New procedure or reissue with major changes)
- ☐ No (Reissue with minor change)
- ☐ No (to incorporate previously approved changes)

(6) Reviewed By Orlando Leid (QR) Date 12-13-99

Cross-Disciplinary Review By [illegible] (QR) NA ___ Date 01/10/00

Reactivity Mgmt Review By ___ (QR) NA MW Date 01/26/00

(7) Additional Reviews

Reviewed G F Terrell Date 12-15-99

Reviewed [illegible] Date 1/26/00

(8) Temporary Approval (*if necessary*)

By ___ (SRO/QR) Date ___

By ___ (QR) Date ___

(9) Approved By [illegible] Date 1-26-00

PERFORMANCE (Compare with Control Copy every 14 calendar days while work is being performed)

(10) Compared with Control Copy ___ Date ___

Compared with Control Copy ___ Date ___

Compared with Control Copy ___ Date ___

(11) Date(s) Performed ___

Work Order Number (WO#) ___

COMPLETION

(12) Procedure Completion Verification

- ☐ Yes ☐ N/A Check lists and/or blanks initialed, signed, dated, or filled in N/A 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 Procedure requirements met?

Verified by ___ Date ___

(13) Procedure Completion Approved ___ Date ___

(14) Remarks (*attach additional pages, if necessary*)

Duke Power Company McGuire Nuclear Station **PALSS Operation for Accident Sampling** **Multiple Use**	Procedure No. OP/0/B/6200/090 Revision No. 010 Electronic Reference No. MC00471B

This procedure requires a Cross-Disciplinary review by Operations Group per Chemistry Manual Section 2.9 (V&V/Cross-Disciplinary Review).

PALSS Operation for Accident Sampling

1. Purpose

The Post Accident Liquid Sampling System (PALSS) provides the capability to obtain reactor coolant samples under accident conditions in accordance with NUREG-0737.

The PALS II+ system is designed to conform to station design parameters of 650°F and 2485 psig for the sample inlet line. It will trap a 100 microliter, 1 milliliter, and/or 5 milliliter liquid sample. Routine liquid analyses include pH, chloride concentration, radioisotopes, and boron concentration.

Five hundred milliliters of reactor coolant can be degassed and the gas analyzed by two different methods: nitrogen stripping method or total gas method. Gas analysis gives indication of hydrogen and noble gasses (xenon, krypton, etc.) dissolved in reactor coolant.

Sample acquisition during accident conditions will help evaluate information related to:
- Extent of core damage which has occurred or is occurring
- Types and quantities of fission products released to containment liquid and gas phases
- Reactor Coolant chemistry and radiochemistry.

This procedure has been classified as **MULTIPLE USE:**
- **REFERENCE USE** - Enclosure 20.7 (PALSS Sampling)
- **CONTINUOUS USE** - all other sections and enclosures.

2. Limits and Precautions

2.1 This procedure should be used when one or more of the following conditions exist:
- Reactor Coolant System (NC) Gross Specific Activity is expected to be or is known to be greater than 200 µCi/ml
- Radiation levels in the Nuclear Sampling Laboratory (NM Lab) and at local sample points for the Residual Heat Removal System (ND) prohibit access
- Post accident sampling is being simulated.

2.2 **IF** PALSS is determined to be inoperable, request Operations log PALSS as inoperable in the Tech Spec Logbook. Once PALSS is operable, request Operations log PALSS as operable in the Tech Spec Logbook. This information should also be logged in the Primary Chemistry Log, Primary Status Board and documented by R&R.

2.3 During an accident situation, Radiation Protection (RP) personnel must assess the need for radiation monitoring during sampling at the liquid sample and control panels in the Auxiliary Building.

2.4 The following list from Chemistry Manual Section 2.6 (Chemistry Safety) has been identified as applicable for this procedure. Comply with these and other applicable sections:{1}

- General Work Practices
- Personnel Conduct in Contaminated Areas
- Hazardous Chemicals/Substances and Atmospheric Hazards
- Housekeeping
- Incident Reporting
- Personal Protective Equipment
- Walking/Working Surfaces
- Compressed Gas Cylinder Practices.

2.5 **WHEN** handling radioactive samples, comply with applicable SRWP/RWP.

2.6 Breaker for the Unit 1 PALSS panel and sump pump is located on 750' elevation at column MM56, PNLBD 1KJ, breaker #34 (PALSS Panel Breaker).
Phone at Control panel - Ext. 2392
Phone at Sample panel - Ext. 2374.

2.7 Breaker for the Unit 2 PALSS panel and sump pump is located on 750' elevation at column NN57, PNLBD 2KJ, breaker #46 (PALSS Panel Breaker).
Phone at Control panel - Ext. 2387
Phone at Sample panel - Ext. 2374.

2.8 During Phase A Isolation, inside and outside containment isolation valves for NC Hot Leg sample line and PALSS sample return line will close. Once this happens, the valves **CANNOT** be opened by normal methods. **IF** a sample is needed during this isolation period, these valves can be opened by bypassing the isolation signal. The bypass switches are located in the Control Room. Upon Chemistry request and with approval of the Emergency Coordinator, these switches can be placed in "Bypass" position to allow Hot Leg and PALSS inside and outside containment isolation valves to be opened. It may be necessary to isolate the Hot Leg EMF before introducing flow through NC Hot Leg sample line. The decision to pull a sample, desired sample (i.e., ND, NC Hotleg via natural or forced recirc), and use of the bypass switches will be made by the Emergency Coordinator.

2.9 During a Phase A Isolation, KC flow is lost to the NM lab heat exchangers. In this case PALSS is the only cooled reactor coolant sample obtainable. The KC non-essential header must be reestablished by Operations before NM samples can be obtained.

2.10 Sample loop volumes as supplied by the manufacturer are nominal and should be verified. Refer to OP/1/B/6200/048 (Unit 1 PALSS Routine Operation) and OP/2/B/6200/048 (Unit 2 PALSS Routine Operation) for current loop volumes. A volume of 2 microliters is also added to each loop volume to account for the volume of Rheodyne valves.

2.11 Waste Drain Tank (WDT) design pressure is 150 psig maximum. The PALSS system must be operated to discharge < 150 psig when aligned to the WDT.

3. Preparation

3.1 Initial Conditions

☐ There are no outstanding R&Rs and/or Special Orders that will interfere with PALSS Panel operation.

3.2 Procedure

☐ 3.2.1 Review Section 2 (Limits and Precautions) before continuing.

WARNING: During an accident situation, Radiation Protection (RP) personnel must assess the need for radiation monitoring during sampling at the liquid sample and control panels in the Auxiliary Building.

☐ 3.2.2 Contact RP to determine if RP coverage is necessary.{2}

☐ 3.2.3 **IF** procedure is being used for drill purpose, portions may be simulated as dictated by management.

3.2.4 **IF** OSC Chemistry Duty personnel are available to support PALSS sampling, verify procedure revisions agree with the Control Copy.

3.2.5 IF Unit 1 Hot Leg Sample is desired during post accident recovery, perform the following:

☐ 3.2.5.1 Notify TSC that:
- 1NM-26B (NC Hotleg Sample Hdr Outside Cont Isol) has been tagged closed due to failure of 1NM-22A (NC Hotleg 1 Sample Line Inside Cont Isol) to fully close.
- During accident recovery, NC Hotleg Sample can be obtained with TSC concurrence, after restoring power to 1NM-26B.
- A representative primary system sample may be obtained by sampling ND when **one** of the following conditions exist:
  - ND is on RHR and has sufficiently circulated through NC system.
  - ND and NS are aligned to Cold Leg Recirc, all ice in ice condenser is melted, and ND has sufficiently circulated contents of sump through NC System.

☐ 3.2.5.2 Request guidance from TSC on where and when to obtain sample.

☐ 3.2.5.3 IF Hot Leg Sample is still desired during post accident recovery, request Operations to restore power to 1NM-26B (NC Hotleg Sample Hdr Outside Cont Isol).

☐ 3.2.5.4 IF power is restored to 1NM-26B (NC Hotleg Sample Hdr Outside Cont Isol), notify Control Room to monitor the following continuous action step:

- IF AT ANY TIME a Phase A signal occurs, ensure 1NM-26B (NC Hotleg Sample Hdr Outside Cont Isol) closes.

NOTE: The next step allows all Control Room contacts to be coordinated by OSC duty person while panel operator makes initial sampling preparations.

☐ 3.2.6 IF OSC duty person is available for support, OSC duty person may perform appropriate enclosure:
- Enclosure 20.1 (Unit 1 PALSS Contact Checklist)
- Enclosure 20.2 (Unit 2 PALSS Contact Checklist).

☐ 3.2.7 **IF** OSC duty person is unavailable to assist, panel operator must perform appropriate enclosure:
- Enclosure 20.1 (Unit 1 PALSS Contact Checklist)
- Enclosure 20.2 (Unit 2 PALSS Contact Checklist).

☐ 3.2.8 **IF** gas samples are required, leak check gas syringes.

NOTE: The vacuum connection nearest Hot Lab vacuum pump should provide sufficient vacuum. A needle with plastic tubing to connect to vacuum connection is located in the PALSS cabinet.

☐ 3.2.9 **IF** necessary, evacuate sample vials used for liquid samples.

☐ 3.2.10 **IF** pH analysis will be performed, note actual values for pH buffer solutions and last date probe was buffered:
Buffer A _____
Buffer B _____
Probe last buffered _____.

☐ 3.2.11 **WHEN** sampling, the following items are needed:
- Sample carrier (bucket, tray, etc.)
- **IF** stripped gas samples are required, leak test two or three 1 ml glass locking syringes
- Panel keys located in PALSS cabinet
- Timepiece capable of measuring seconds
- Sample vials with septum/cap or sample bottles for liquid sample
- Protective and monitoring equipment per applicable RP instruction
- Transport pig and hand trucks at RP discretion
- **IF** lighting is out, obtain a flashlight.

3.2.12 **PRIOR** to sampling, perform the following:

☐ 3.2.12.1 **IF** sampling Unit 1, verify the following valves are open:
1KC-873 PALSS Return to KC
1KC-973 KC to PALSS Supply Isol.

☐ 3.2.12.2 **IF** sampling Unit 2, verify the following valves are open:
2KC-973 KC to PALSS Supply Isol
2KC-974 Liquid Sample Panel Outlet Isol.

☐ 3.2.12.3 **IF** non-essential KC is isolated, verify appropriate EMF-48 is isolated:
1EMF-48 U1 Reactor Coolant Rad Monitor
2EMF-48 2EMF-48 Reactor Coolant Rad Monitor.

☐ 3.2.13 **IF** a stripped gas sample will be pulled, open CV-603 (Stripping N_2 Isolation Valve) located inside PALSS sample panel.

☐ 3.2.14 **IF** waste will be routed to Containment Sump, close appropriate Unit valve:
1WL-1304 2WL-1304 WDT Manual Isol.

☐ 3.2.15 **IF** waste will be routed to the WDT, close appropriate Unit valve:
1WL-1303 2WL-1303 Containment Sump Manual Isol

☐ 3.2.16 Throttle appropriate N_2 regulator to supply ≈ 100 psig nitrogen to PALS Panel:
1NM-458 2NM-458 PALS Nitrogen Header Regulator.

4. PALSS Control Panel Test

4.1 Initial Conditions

☐ 4.1.1 Valve power switch SW1 and Panel AC power switch KS1 are in the "Off" position.

☐ 4.1.2 All control valves (CV) and solenoid valves (SV) are de-energized and in the vertical position.

4.2 Procedure

☐ 4.2.1 **IF** any item on control or sample panel is **NOT** clearly identified, refer to the following enclosures as necessary:
- Enclosure 20.3 (Diagram of Control Panel)
- Enclosure 20.4 (Diagram of Sample Panel)
- Enclosure 20.5 (Elementary Flow Diagram).

☐ 4.2.2 Check 401 and 402 are in a throttled position corresponding to ≈ 3.0 on control dial.

☐ 4.2.3 Insert key into switch KS1.

☐ 4.2.4 Turn system power on.

☐ 4.2.5 Ensure Pushbutton (PB) switches 1 - 6 have green lamps illuminated.

☐ 4.2.6 Ensure no other lamps are illuminated.

NOTE: LT1 and LT2 indicate sump level.

☐ 4.2.7 **IF** LT1 **AND** LT2 are illuminated at anytime other than lamp test, investigate sample panel for leakage.

☐ 4.2.8 Turn lamp test switch SW2 to "On" position.

☐ 4.2.9 **IF** any lamp on control panel is **NOT** functional, replace or repair malfunctioning lamp at earliest convenience.

☐ 4.2.10 Turn lamp test switch SW2 "Off".

☐ 4.2.11 **IF** a sample will be pulled, go to Section 5 (Base Parameters).

☐ 4.2.12 **IF** no sample will be pulled, go to Section 17 (System Shutdown).

5. Base Parameters

5.1 Initial Conditions

None.

5.2 Procedure

_____ Hours 5.2.1 Record time panel is energized.

☐ 5.2.2 Place SW1 (valve power) in "On" position.

☐ 5.2.3 Open the following valves to align transmitters PT 4 and PT 5 to atmospheric pressure:
201
203.

☐ 5.2.4 Record atmospheric pressure readings:
PG4 = _____ psia
PG5 = _____ psia.

☐ 5.2.5 Close the following valves:
203
201.

NOTE: SS2 toggles TG2 from one RTD to the other.

☐ 5.2.6 **WHEN** TG2 stabilizes, record RTD starting temperatures:
RD1 = _____ °F 500 cc Gas Tank
RD2 = _____ °F 30 cc Gas Tank.

NOTE: SS1 switches TG1 from one thermocouple to another.

☐ 5.2.7 **WHEN** TG1 stabilizes, record thermocouple temperatures:
TE1 = _____ °F (TG1 Sample In)
TE2 = _____ °F (TG1 Sample Out)
TE3 = _____ °F (TG1 KC In)
TE4 = _____ °F (TG1 KC Out).

☐ 5.2.8 **IF** pH analysis will **NOT** be performed, go to Section 7 (pH Housing and Gas Tank Evacuation).

6. pH Meter Calibration

6.1 Initial Conditions

None.

6.2 Procedure

6.2.1 Perform the following to purge pH probe housing of demineralized water:

☐ 6.2.1.1 Close the following valves:
401
402.

6.2.1.2 Open the following valves:
☐ 202
☐ 204
☐ 206
☐ 103
☐ 102
☐ 105.

☐ 6.2.1.3 **AFTER** a minimum of 40 seconds, close 105 to stop purge.

☐ 6.2.2 **IF** pH meter has been calibrated within past 30 days, go to Step 6.2.18.8.

6.2.3 Perform the following to pressurize buffer tank A:

☐ 6.2.3.1 Turn 209 to "A" position to open 209A.

☐ 6.2.3.2 **AFTER** a minimum 15 seconds, return 209 to "Off" position.

☐ 6.2.4 Close 202.

☐ 6.2.5 Open the following valves to evacuate pH housing:
208
201.

☐ 6.2.6 **WHEN** PG4 reads below 5 psia **AND** stabilizes, close 102.

_____ psia 6.2.7 Record pH housing pressure from PG4 for Buffer A calibration.

6.2.8 Close the following valves to secure evacuation lineup:
- ☐ 201
- ☐ 103
- ☐ 206
- ☐ 204
- ☐ 208.

6.2.9 pH Calibration With Buffer A

☐ 6.2.9.1 Place 209 in "A" position to transfer Buffer A into pH housing.

☐ 6.2.9.2 Wait at least 15 seconds.

☐ 6.2.9.3 Place SV 209 in "Off" position.

☐ 6.2.9.4 Press [HOLD] on pH meter until "HOLD" flashes on lower left side of display (this must occur before continuing).

☐ 6.2.9.5 Allow pH meter reading to stabilize.

NOTE: The words "SET" and "STD" will appear on upper left side of LCD when [STD/SLOPE] is pressed.

☐ 6.2.9.6 Press [STD/SLOPE].

NOTE: **IF** numeric value begins to flash, this indicates there is insufficient difference in pH between the two buffer solutions or electrode may be cracked.

6.2.9.7 **IF** numeric value begins to flash:

☐ A. Press [pH/ORP/TEMP] to cancel slope adjustment.

☐ B. Select a different buffer.

☐ C. Retry procedure.

☐ D. **IF** necessary, replace electrode.

☐ 6.2.9.8 Press [↓] and [↑] keys to change value displayed to exact value of buffer solution listed in Step 3.2.10.

☐ 6.2.9.9 **WHEN** correct value is displayed, press [ENTER].

NOTE: pH reading should be within 0.05 pH units of actual value.

_____ 6.2.9.10 Record pH value displayed for Buffer A solution.
Buffer A pH

6.2.9.11 **IF** reading is more than ± 0.05 pH units of actual value, return to Step 6.2.9.6.

☐ 6.2.9.12 Open the following valves to flush pH housing with YM:
101
105
102
PB 5 Demin Water.

NOTE: The pH meter should fluctuate; FG1 should indicate flow, and PG3 should show pressure increase.

☐ 6.2.9.13 Monitor pH meter, FG1, and PG3 to ensure probe is flushed properly.

☐ 6.2.9.14 Flush ≈ 5 minutes.

☐ 6.2.9.15 **IF** necessary, additional purging per Step 6.2.1 and flushing per Steps 6.2.9.12 - 6.2.9.14 may be performed.

☐ 6.2.9.16 Close 101.

☐ 6.2.9.17 Close PB 5 Demin Water.

☐ 6.2.9.18 Open the following valves to purge YM out of pH housing with nitrogen:
202
204
206
103.

☐ 6.2.9.19 Wait at least 1 minute.

☐ 6.2.9.20 Close 105.

NOTE: Buffer B will normally be a pH 7 buffer.

☐ 6.2.10 Place 209 in "B" position to pressurize Buffer Tank B.

☐ 6.2.11 Wait at least 15 seconds.

☐ 6.2.12 Place 209 in "Off" position.

☐ 6.2.13 Close 202.

☐ 6.2.14 Open the following valves to evacuate pH housing:
208
201.

☐ 6.2.15 **WHEN** PG4 reads below 5 psia **AND** stabilizes, close 102.

_____ psia 6.2.16 Record pH housing pressure from PG4 for Buffer **B** calibration.

☐ 6.2.17 Close the following valves to secure the evacuation lineup:
201
103
206
204
208.

6.2.18 pH Calibration With Buffer B

☐ 6.2.18.1 Place 209 in "B" position to transfer Buffer B into pH housing.

☐ 6.2.18.2 Wait at least 15 seconds.

☐ 6.2.18.3 Place 209 in "Off" position.

NOTE: pH of buffer solution will be displayed.

☐ 6.2.18.4 Allow pH meter reading to stabilize.

NOTE:
1. "SET" and "SLOPE" will appear on left side of display.
2. A flashing numeric value indicates there is insufficient difference in pH between the two buffer solutions or electrode may be cracked.

☐ 6.2.18.5 Press [STD/SLOPE] twice.

6.2.18.6 **IF** numeric value begins flashing, perform the following:

☐ A. Press [pH/ORP/TEMP].

☐ B. Select a different buffer.

☐ C. Retry procedure.

☐ D. **IF** necessary, replace electrode.

NOTE: This will cancel the slope adjustment.

☐ 6.2.18.7 Press [↓] and [↑] keys to change value displayed to exact value of buffer solution in Step 3.2.10.

☐ 6.2.18.8 **WHEN** correct value is displayed, press [ENTER].

NOTE: Reading should be within 0.05 pH units of actual value.

_____ 6.2.18.9 Record pH value displayed for Buffer B solution.
Buffer B pH

☐ 6.2.18.10 Press [HOLD] to return instrument to normal operating mode for pH measurements.

☐ 6.2.18.11 Open the following valves to flush pH housing:
101
105
102
PB-5 (Demin Water).

☐ 6.2.18.12 Monitor pH meter to ensure probe is flushed properly.

☐ 6.2.18.13 Flush ≈ 5 minutes.

NOTE: pH meter should read between 6.0 and 7.5 (pH of YM).

☐ 6.2.18.14 **IF** necessary, additional purging may be performed per Step 6.2.1 and flushing per Steps 6.2.18.11 - 6.2.18.13.

☐ 6.2.18.15 Close the following valves to secure flush:
101
PB-5 (Demin Water).

☐ 6.2.18.16 Open the following valves to purge YM out of pH housing with nitrogen:
202
204
206
103.

☐ 6.2.18.17 Wait at least 40 seconds.

☐ 6.2.18.18 Close the following valves:
202
105.

7. pH Housing and Gas Tank Evacuation

7.1 Initial Conditions

None.

7.2 Procedure

☐ 7.2.1 **IF** pH **AND** H_2 analyses will **NOT** be performed, go to Section 8 (System YM Fill).

☐ 7.2.2 Open the following valves to evacuate pH housing and gas tanks:
208
201
205
207
103
102.

☐ 7.2.3 **WHEN** PG4 is below 10 psia, open 203.

☐ 7.2.4 **WHEN** PG5 pressure drops below 3 psia **AND** stabilizes, close 201.

☐ 7.2.5 Close 208.

_____ psia 7.2.6 Record pH housing pressure from PG5.

☐ 7.2.7 Close the following valves:
102
103
206
207.

_____ 500 cc/30 cc psia 7.2.8 Record gas tank pressure from PG5.

☐ 7.2.9 Close the following valves:
205
204
203.

8. System YM Fill

8.1 Initial Conditions

None.

8.2 Procedure

NOTE: This will help prevent water hammer from occurring when sample flow is established.

☐ 8.2.1 Open the following valves to fill liquid tank with YM:
PB-5 (Demin Water)
101
104
401 (fully open, ≈ 10.0 on dial).

☐ 8.2.2 Wait at least 1 minute.

☐ 8.2.3 Close the following valves to stop filling liquid tank:
401
104
101.

NOTE: Closing 402 prevents exceeding maximum flow rate of 300 ml/min when flow begins.

☐ 8.2.4 Check closed 402.

8.2.5 Open the following to begin filling sample loops:
- ☐ 107
- ☐ 503
- ☐ 502
- ☐ 501.

☐ 8.2.6 Open 402 while monitoring FG2.

☐ 8.2.7 Do **NOT** allow flow rate to exceed 300 ml/min on FG2.

☐ 8.2.8 Wait at least 1 minute.

8.2.9 Close the following to stop filling sample injection valves:
- ☐ PB-5 (Demin Water)
- ☐ 107
- ☐ 503
- ☐ 502
- ☐ 501
- ☐ 402.

9. Sample Trap

9.1 Initial Conditions

The following valves are closed:

- ☐ PB-5 (Demin Water)
- ☐ PB-6 Strainer Flush Return Valve
- ☐ 401
- ☐ 402.

9.2 Procedure

☐ 9.2.1 **IF** LT 1 **OR** LT 2 light at any time, close all valves and investigate sample panel for leaks.

☐ 9.2.2 Select PT1 on SS3.

☐ 9.2.3 Select TE2 on SS1.

9.2.4 Perform the following to select proper sample inlet line:

☐ 9.2.4.1 **IF** sampling **NC Hotleg 1 OR 4**, open PB-4.

☐ 9.2.4.2 **IF** sampling **ND**, ensure SW3 is in "LOCAL" mode.

☐ 9.2.4.3 **IF** sampling **ND Pump A Discharge**, open:
PB-1 ND Pump A Discharge
PB-3 ND Pump Discharge Sample Valve.

☐ 9.2.4.4 **IF** sampling **ND Pump B Discharge**, open:
PB-2 ND Pump B Discharge
PB-3 ND Pump Discharge Sample Valve.

☐ 9.2.5 Open the following valves:
104
101.

CAUTION: WDT is ASTM code tank designed to 150 psig pressure maximum. Only a slight turn on 401 is needed to obtain flow when sampling NC Hotleg.

☐ 9.2.6 Monitor PG3 to ensure outlet pressure does **NOT exceed 150 psig** when aligned to WDT.

☐ 9.2.7 **Slowly** open 401 and establish ≈ 1 - 2 gpm flow per FG1 without exceeding:
- 150 psig on PG3
- 120°F on TG1 (when aligned to TE2).

NOTE: This will slowly increase and normally does **NOT** exceed 100°F with current KC cooling flow. Other temperatures may be read by switching SS1 at discretion of operator.

9.2.8 **IF** necessary to reduce pressure, flow, or temperature, perform the following:

☐ 9.2.8.1 Close the following valves:
104
401.

☐ 9.2.8.2 Open 104.

☐ 9.2.8.3 **Slowly** open 401 and establish ≈ 1 - 2 gpm flow per FG1 without exceeding:
- 150 psig on PG3
- 120°F on TG1 (when aligned to TE2).

_____ gpm 9.2.9 Record flow rate on FG1.

_____ psig 9.2.10 Record pressure on PG3.

☐ 9.2.11 Purge at least 10 gallons through system (based on FG1 flowrate).

☐ 9.2.12 Close the following valves:
104
401
101.

_____ psig 9.2.13 Record 500 cc liquid tank pressure from PG1.

☐ 9.2.14 Move selector switch SS3 to "PT2" position to measure discharge pressure of sample valve header.

NOTE: 1. **WHEN** 501, 502, 503 are **activated**, sample goes through sample loop.

2. **WHEN** CV 501, 502, 503 are **de-activated**, sample loop is bypassed.

☐ 9.2.15 Activate (open) appropriate sample valve:

503	0.1 ml Loop
502	1 ml Loop
501	5 ml Loop.

_____ Sample Loop 9.2.16 Record Sample Loop activated.

☐ 9.2.17 Open 107.

CAUTION: Flow gauge FG2 is only calibrated to 303 ml/min.

☐ 9.2.18 Do **NOT** allow FG 2 flow rate to exceed 300 ml/min.

☐ 9.2.19 Adjust flow to stay within process limits below:
- PG1 - should read ≥ 40 psig.
- FG 2 - should **NOT** exceed 300 ml/min.

☐ 9.2.20 **Slowly** open 402 (increase number on dial) to achieve ≈ 150 ml/min on FG2 if possible.

☐ 9.2.21 **IF** FG2 is **NOT** operational, throttle 402 to obtain required pressure for appropriate sample point on PG1 for at least 4 minutes:
- ≈ 1000 psig for NC sample
- ≈ 80 psig for ND sample.

☐ 9.2.22 **AFTER** at least 2 minutes **AND** at least 10 loop volumes, close the following valves to trap sample fluid in sample injection loop:
501
502
503.

NOTE: The next step is the official sample time.

_____ Hours 9.2.23 Record time.

☐ 9.2.24 **IF NC Hotleg** was sampled, close PB4 to secure sample flow.

☐ 9.2.25 **IF ND A** was sampled, close PB-1 and PB-3 to secure sample flow.

☐ 9.2.26 **IF ND B** was sampled, close PB-2 and PB-3 to secure sample flow.

☐ 9.2.27 Wait at least 30 seconds.

☐ 9.2.28 Close 107.

☐ 9.2.29 Close 402.

☐ 9.2.30 **IF ND** was sampled, place switch SW3 in "REMOTE" position.

NOTE: Unit 1 PALSS clogged filter light currently comes on at ≈ 0.7 gpm due to a design error. A Station Problem Report has been initiated to correct this situation.

☐ 9.2.31 **IF** LT3 (Clogged Filter Light) came on during sampling **AND** flow was restricted to less than 0.5 gpm, go to Enclosure 20.6 (PALSS Inlet Filter/Strainer Backflush).

10. Depressurization of 500 cc Liquid Tank

10.1 Initial Conditions

None.

10.2 Procedure

☐ 10.2.1 **IF** hydrogen is **NOT** present in system **OR** if hydrogen analysis will **NOT** be performed, go to Step 10.2.7.

10.2.2 Perform the following to verify pressure in 500 cc gas tank approximates that recorded in Step 7.2.8:

☐ 10.2.2.1 Open the following valves:
205
203.

_____ 500 cc psi 10.2.2.2 Record PG5.

☐ 10.2.2.3 Close 205.

10.2.3 Perform the following to verify pressure in 30 cc gas tank approximates that recorded in Step 7.2.8:

☐ 10.2.3.1 Open 204.

_____ 10.2.3.2 Record PG5.
30 cc psia

☐ 10.2.3.3 Close 204.

☐ 10.2.3.4 Close 203.

☐ 10.2.4 **IF** pressure in 30 cc **AND** 500 cc Gas Tank is ± 0.2 psia of value recorded in Step 7.2.8, go to Step 10.2.7.

10.2.5 **IF** pressure in 30 cc **OR** 500 cc Gas Tank is greater than ± 0.2 psia of value in Step 7.2.8, open the following valves to evacuate tanks again:

☐ 204
☐ 205
☐ 201
☐ 208
☐ 203.

10.2.6 **IF** reading on PG5 approximates value recorded in Step 7.2.8 **AND** is stable, close the following valves:

☐ 204
☐ 205
☐ 201
☐ 208
☐ 203.

☐ 10.2.7 Place switch SS3 in "PT1" position.

☐ 10.2.8 Open 103.

☐ 10.2.9 Wait at least 30 seconds for depressurization to stabilize as indicated by PG1.

_____ 10.2.10 Record PG1 pressure.
psig

☐ 10.2.11 **IF** hydrogen analysis **AND/OR** stripped gas isotopic analysis will be performed, go to Section 11 (Gas Collection).

☐ 10.2.12 **IF** gas collection will **NOT** be performed, but pH analysis **will** be performed, go to Section 12 (pH Monitoring).

☐ 10.2.13 **IF** gas collection **AND** pH will **NOT** be performed, go to Section 13 (System Flush).

11. Gas Collection

11.1 Initial Conditions

None.

11.2 Procedure for Calculated Gas Method (30 cc Tank)

NOTE: This method uses 30 cc gas tank and associated tubing.

☐ 11.2.1 Place switch SS2 in "RD 2" position.

____ °F 11.2.2 Record initial temperature reading on TG2.

☐ 11.2.3 Open the following valves:
204
203.

☐ 11.2.4 Record initial pressure:
PG4 = _____ psia
PG5 = _____ psia.

☐ 11.2.5 Close 203.

NOTE: The next step allows gas to escape from top of liquid tank into 30 cc gas tank and energizes vibrator.

☐ 11.2.6 Open the following valves:
206
S-109 (Vibrator).

☐ 11.2.7 Monitor PG4.

☐ 11.2.8 **IF** pressure stays below 25 psia, open 203 to activate PT 5.

☐ 11.2.9 **IF** pressure does **NOT** stay below 25 psia, continue monitoring PG4.

☐ 11.2.10 **WHEN** pressure **AND** temperature stabilize (normally 1 - 2 minutes), record final temperature and pressure.
PG4 = _____ psia
PG5 = _____ psia (if used)
TG2 = _____ °F.

11.2.11 Close the following valves and de-energize vibrator:
- ☐ 203
- ☐ 204
- ☐ 206
- ☐ 103
- ☐ 109.

☐ 11.2.12 **IF** pH analysis will be performed, go to Section 12 (pH Monitoring).

☐ 11.2.13 **IF** pH analysis will **NOT** be performed, go to Section 13 (System Flush).

11.3 Procedure for Calculated Gas Method, Accident Condition

NOTE: This method uses 500 cc gas tank and associated tubing.

☐ 11.3.1 Place switch SS2 in "RD1" position.

_____ °F 11.3.2 Record initial temperature reading on TG2.

☐ 11.3.3 Open the following valves:
- 205
- 203.

☐ 11.3.4 Record initial pressure:
PG4 = _____ psia
PG5 = _____ psia.

☐ 11.3.5 Close 203.

NOTE: The next step allows gas to escape from top of liquid tank into 500 cc gas tank and energizes vibrator.

☐ 11.3.6 Open the following valves:
- 207
- S-109 (Vibrator).

☐ 11.3.7 Monitor PG4.

☐ 11.3.8 **IF** pressure stays below 25 psia, open 203.

☐ 11.3.9 **IF** pressure does **NOT** stay below 25 psia, continue monitoring PG4.

☐ 11.3.10 **WHEN** pressure **AND** temperature stabilize, record final temperature and pressure.
PG4 = _____ psia
PG5 = _____ psia (if used)
TG2 = _____ °F

11.3.11 Close the following valves and de-energize vibrator:
- ☐ 203
- ☐ 205
- ☐ 207
- ☐ 103
- ☐ 109.

☐ 11.3.12 **IF** pH analysis will be performed, go to Section 12 (pH Monitoring).

☐ 11.3.13 **IF** pH will **NOT** be performed, go to Section 13 (System Flush).

11.4 Procedure for Nitrogen Stripping Method

NOTE: This method uses both 30 cc and 500 cc gas tanks and tubing.

☐ 11.4.1 Open or check open 103.

☐ 11.4.2 Align 500 cc gas tank to liquid tank by opening 207.

☐ 11.4.3 Open 106 to bubble nitrogen through liquid tank.

☐ 11.4.4 Monitor PG1.

☐ 11.4.5 **WHEN** pressure in liquid tank is ≈ 3 psig greater than Step 10.2.10 pressure reading, close 207 to trap gas sample.

☐ 11.4.6 Open 205 and 204 to allow sample gas to flow into 30 cc gas tank.

☐ 11.4.7 Monitor pressure in gas tanks on PG4.

☐ 11.4.8 **WHEN** pressure stabilizes, isolate 30 cc gas cylinder by closing 204.

NOTE: The next step allows more gas to flow from liquid tank to 500 cc gas tank and energizes vibrator.

☐ 11.4.9 Open the following valves:
207
106
109.

☐ 11.4.10 Monitor PG4.

NOTE:
1. The next step traps sample in 500 cc gas tank.
2. Monitoring PT4 instead of PT1 will give better accuracy based on range of transmitters.

11.4.11 **WHEN** pressure in the 500 cc gas tank, PG4, is 1 psia greater than Step 5.2.4 pressure reading (atmospheric), close:
- ☐ 207
- ☐ 103
- ☐ 106
- ☐ 109.

☐ 11.4.12 Open 204 to allow more sample into 30 cc gas tank.

☐ 11.4.13 Monitor pressure on PG4 to ensure stabilization near atmospheric pressure (PG4 reading in Step 5.2.4).

NOTE: The next step traps sample in 30 cc gas tank.

☐ 11.4.14 **WHEN** stabilization near atmospheric pressure is obtained, close:
204
205.

☐ 11.4.15 This sample may be collected using gas syringe per Section 15 (Gas Sample Retrieval) or by using Enclosure 20.7 (PALSS Sampling).

☐ 11.4.16 **IF** pH analysis will **NOT** be performed, go to Section 13 (System Flush).

12. pH Monitoring

12.1 Initial Conditions

None.

12.2 Procedure

12.2.1 Open the following valves to pressurize liquid tank:

- ☐ 202
- ☐ 205
- ☐ 103
- ☐ 207.

☐ 12.2.2 Open 102 to move sample fluid into pH probe housing.

12.2.3 **AFTER** at least 20 seconds, close the following valves to secure flow path pressurizing pH probe housing:

- ☐ 102
- ☐ 103
- ☐ 207
- ☐ 205
- ☐ 202.

NOTE: The pH value for solution recirculated via ND sump after a LOCA is expected to be between 7.5 - 9.5; this pH range minimizes iodine evolution and the effect of chloride and caustic stress corrosion.

☐ 12.2.4 **WHEN** pH **AND** temperature stabilize, record pH and temperature from pH meter:
pH = _____
temp = _____°C.

☐ 12.2.5 **IF** Unit is on containment sump recirc **AND** pH is outside 7.5 - 9.5 range, immediately notify OSC Chemistry Representative.

13. System Flush

13.1 Initial Conditions

None.

13.2 Procedure

☐ 13.2.1 Ensure 204 and 206 remain **closed** and sample injection loop selected (501, 502 and/or 503) is de-activated.

13.2.2 **IF** either LT1 **OR** LT2 indicators are illuminated, perform the following:

☐ 13.2.2.1 Activate 110 (sump pump) until indicator light clears for LT2 and/or LT1.

☐ 13.2.2.2 De-activate 110.

13.2.3 Open the following valves to flush 500 cc liquid tank:
- ☐ 101
- ☐ 104
- ☐ 401 to ≈ 10.0 on dial
- ☐ PB-5 (Demin Water).

☐ 13.2.4 Flush at least 3 minutes.

☐ 13.2.5 Close the following valves to secure 500 cc liquid tank flush:
104
401.

☐ 13.2.6 **IF** pH housing was **NOT** used, go to Step 13.2.9.

☐ 13.2.7 Open the following valves to flush pH housing:
102
105.

☐ 13.2.8 Flush at least 3 minutes.

☐ 13.2.9 Close the following valves to secure pH housing flush:
101
102
105.

☐ 13.2.10 Open the following valves to flush sample header:
107
402.

☐ 13.2.11 Flush a minimum of 3 minutes.

☐ 13.2.12 Close the following valves to secure sample header flush:
402
107.

☐ 13.2.13 Open the following valves for piping flush:
101
104
401 to ≈ 10.0 on dial.

☐ 13.2.14 Flush a minimum of 4 minutes.

13.2.15 Close the following valves to secure flush:
- ☐ 101
- ☐ 104
- ☐ 401
- ☐ PB-5 (Demin Water).

☐ 13.2.16 **IF** gas syringe samples will **NOT** be taken, the following may be performed prior to retrieval of liquid sample:
- Section 16 (30 cc Gas Tank and 500 cc Gas Tank Purge)
- Section 17 (System Shutdown).

14. Liquid Sample Retrieval

NOTE: This section may also be performed using Enclosure 20.7 (PALSS Sampling).

14.1 Initial Conditions

☐ Sample vials have been evacuated.

14.2 Procedure

☐ 14.2.1 Insert sample vial onto appropriate needle.

☐ 14.2.2 Turn CV-612 to desired injection valve:
- 100 µl loop
- 1 ml loop
- 5 ml loop.

CAUTION: Operating CV-613 too rapidly may eject sample vial due to high pressure.

☐ 14.2.3 **Slowly** turn CV-613 toward "N_2" position until sample begins transfer.

☐ 14.2.4 Once liquid sample has been collected, turn CV-613 to "Vent" position.

☐ 14.2.5 Wait ≈ 2 seconds for sample line depressurization prior to removing vial.

☐ 14.2.6 **IF** additional loops will be sampled, repeat Steps 14.2.1 - 14.2.5.

☐ 14.2.7 Turn CV-612 to "Off" position.

NOTE: 1. Steps 14.2.8 and 14.2.9 may be performed at convenience of operator.

2. Buffer tanks will accommodate two separate calibrations.

☐ 14.2.8 **IF** buffer tank contents need to be replaced, fill only ≈ 80% full to allow for proper pressurization for transfer.

☐ 14.2.9 Remove dilution tank and refill with reagent grade water.

☐ 14.2.10 Reinstall dilution tank at earliest and safest time.

15. Gas Sample Retrieval

NOTE: 1. This section applicable for stripped gas samples only.

2. This section may also be performed using Enclosure 20.7 (PALSS Sampling).

15.1 Initial Conditions

None.

15.2 Procedure

☐ 15.2.1 Insert needle through sample septum.

☐ 15.2.2 Purge syringe twice without withdrawing needle from septum.

☐ 15.2.3 Pull plunger back until 1 ml (or CC) of gas is obtained.

☐ 15.2.4 Lock syringe.

☐ 15.2.5 Withdraw needle from septum.

☐ 15.2.6 **IF** necessary, repeat Steps 15.2.1 through 15.2.5 for additional syringes.

16. 30 cc Gas Tank and 500 cc Gas Tank Purge

NOTE: This section is performed if liquid sample was relieved into gas tank for calculated method or stripped gas sample.

16.1 Initial Conditions

None.

16.2 Procedure

☐ 16.2.1 **IF** stripped gas sample will be obtained, do **NOT** purge until sample is retrieved.

16.2.2 Open the following valves for at least 1 minute:
- ☐ 202
- ☐ 204
- ☐ 206
- ☐ 103
- ☐ 104
- ☐ 401.

☐ 16.2.3 Close the following valves:
204
206.

☐ 16.2.4 Open the following valves:
205
207.

☐ 16.2.5 Continue purge at least 1 minute.

16.2.6 Close the following valves:
- ☐ 202
- ☐ 205
- ☐ 207
- ☐ 103
- ☐ 104
- ☐ 401.

17. System Shutdown

17.1 Initial Conditions

None.

17.2 Procedure

☐ 17.2.1 Check closed all motor operated (push button) valves.

☐ 17.2.2 Check closed all solenoid and control valves (place in vertical de-energized position).

☐ 17.2.3 Position 401 and 402 to ≈ "3.0" on control dials.

☐ 17.2.4 Return valve power switch, SW1, to "Off" position.

☐ 17.2.5 Return key switch KS1 to "OFF" position.

☐ 17.2.6 Remove key.

☐ 17.2.7 **IF Unit 1** was sampled, close or request Operations close the following valves:

1KC-973	KC to PALSS Supply Isol
1KC-873	PALSS Return to KC.

☐ 17.2.8 **IF Unit 2** was sampled, close or request Operations close the following valves:

2KC-974	Liquid Sample Panel Outlet Isol
2KC-973	KC to PALSS Supply Isol.

☐ 17.2.9 **IF** it is suspected that radiological conditions have significantly changed, contact RP for survey.

☐ 17.2.10 **IF** waste was routed to WDT, open appropriate Unit valve:

1WL-1303	2WL-1303	Containment Sump Manual Isol.

☐ 17.2.11 **IF** waste was routed to Containment Sump, open appropriate Unit valve:

1WL-1304	2WL-1304	WDT Manual Isol.

☐ 17.2.12 **IF** nitrogen strip method was used, close CV-603 (inside left of sample panel).

☐ 17.2.13 Close (back out) appropriate valve to remove supply pressure from PALSS Panel:

1NM-458	2NM-458	PALS Nitrogen Header Regulator.

18. Sample Analyses/Documentation of Unusual Alignments

18.1 Initial Conditions

None.

18.2 Procedure

☐ 18.2.1 **IF** EMF48 was isolated **OR** any other unusual alignments exist, document per Chemistry R&R and/or Operations Removal and Restoration.

☐ 18.2.2 Refer to appropriate procedure for sample loop sizes, dilution methods, etc., to complete sample analyses:
- OP/1/B/6200/048 (Unit 1 PALSS Routine Operation)
- OP/2/B/6200/048 (Unit 2 PALSS Routine Operation).

NOTE: During containment recirculation, coolant is exposed to the atmosphere and will be oxygen saturated.

☐ 18.2.3 **IF** chlorides are $\geq$ 150 ppb **AND** containment sump is **NOT** on recirculation, analyze for oxygen to evaluate corrosion potential.

☐ 18.2.4 **IF** Dose Equivalent Iodine exceeds Technical Specification Limits, refer to Technical Specifications to evaluate actions required.

19. References

19.1 NUREG-0737, Section II.B.3.

19.2 ONS Test Procedure for Operation of Post Accident Liquid Sampling System.

19.3 Post Accident Liquid Sampling System Manual.

19.4 MNS Technical Specification 6.8.1b.

19.5 April 23, 1987, Letter Rick Eaker to W.M. Funderburke, Subject: PALSS Definition of Operability and Reliability, File MC-715.15.

19.6 August 8, 1990, Letter Rick Eaker to Richard Michael, Subject: PALSS Accuracy Requirement for Radiochemical Analyses, File MC-715.15.

19.7 November 18, 1991 Memo to File, Subject: PALSS Total Gas Equation.

19.8 McGuire Nuclear Station, OP/1/B/6200/048 (Unit 1 PALSS Routine Operation), Primary Chemistry.

19.9 McGuire Nuclear Station, OP/2/B/6200/048 (Unit 2 PALSS Routine Operation), Primary Chemistry.

19.10 McGuire Nuclear Station, Chemistry Manual 2.6 (Chemistry Safety).

19.11 McGuire Nuclear Station, Chemistry Manual 2.11 (Chemistry Special Orders and Equipment Operability Log).

19.12 PIP # 0-M97-4254, Self Assessment CHM-SA 97-7 Assessment of Laboratory Practices.{1}

19.13 PIP # M-99-01315, Identify all Chemistry procedures that cause a significant change in radiological conditions. RP will perform cross-disciplinary reviews.{2}

20. Enclosures

20.1 Unit 1 PALSS Contact Checklist.

20.2 Unit 2 PALSS Contact Checklist.

20.3 Diagram of Control Panel.

20.4 Diagram of Sample Panel.

20.5 Elementary Flow Diagram.

20.6 PALSS Inlet Filter/Strainer Backflush.

20.7 PALSS Sampling.

Enclosure 20.1
Unit 1 PALSS Contact Checklist

☐ 1. **IF** this enclosure is being performed by OSC/TSC support personnel, verify enclosure with Control Copy via telephone.

☐ 2. **IF** sample temperature is expected to be ≥ 100°F, verify with Operations that **one** of the following conditions will exist while sampling:
- 1KC A Train will be in service
- 1KC B Train will be in service with two pumps running and crosstied to 1KC A Train.

NOTE: 1. 1KC-873 (PALSS Return to KC) is located on 733' elevation, 5' high, 20' north of KC pump 1A2.

2. 1KC-973 (KC to PALSS Supply Isol) is located on 733' elevation, 4' high, just north of KC pump 1A2.

☐ 3. **IF** sample temperature is expected to be ≥ 100°F, request permission to open or request Operations open the following valves **in order**:
1KC-873 PALSS Return to KC
1KC-973 KC to PALSS Supply Isol

☐ 4. Ensure YM is available.

☐ 5. **IF** sampling NC Hotleg 1 **OR** NC Hotleg 4 during Phase A containment isolation, go to Step 8.

☐ 6. **IF** sampling ND during Phase A containment isolation, perform the following:

☐ 6.1 "N/A" and Initial Step 8.

☐ 6.2 Go to Step 10.

☐ 7. **IF** Phase A containment isolation has **NOT** occurred, perform the following:

☐ 7.1 "N/A" and Initial Steps 8 - 10.

☐ 7.2 Go to Step 11.

NOTE: 1NM-479 (Supply Isolation To 1EMF 48) is a manual valve located at 1EMF 48 (U1 Reactor Coolant Rad Monitor). **WHEN** Phase A isolation occurs, KC cooling is lost to 1EMF 48. 1EMF 48 should be isolated **prior** to opening Hotleg containment isolation valves.

8. Close 1NM-479 (Supply Isolation to 1EMF-48).

_____
Initials

VERIFIED WITH CONTROL COPY _____/_____ (Initials/Date)

Unit 1

Enclosure 20.1
Unit 1 PALSS Contact Checklist

☐ 9. Ensure there are no sample valves open at sample sink.

_____ 10. Contact Operations Emergency Coordinator to:
Initials

☐ 10.1 Obtain permission to use containment isolation bypass switches as necessary to obtain a PALSS sample.

☐ 10.2 Check desired sample location (i.e., ND, NC Hotleg via forced or natural recirc).

☐ 11. **IF** PALSS waste will be returned to containment sump, request Control Room open the following valves:

1WL-1301B	PALSS Sample Return Outside Cont Isol Valve
1WL-1302A	PALSS Sample Return Inside Cont Isol Valve.

☐ 12. **IF** sampling **1NC Hotleg 1**, request Operations align the following valves:

Open	1NM-22A	NC Hotleg 1 Sample Line Inside Cont Isol
Open	1NM-26B	NC Hotleg Sample Hdr Outside Cont Isol
Close	1NM-25A	NC Hotleg 4 Sample Line Inside Cont Isol.

☐ 13. **IF** sampling **1NC Hotleg 4**, request Operations align the following valves:

Open	1NM-25A	NC Hotleg 4 Sample Line Inside Cont Isol
Open	1NM-26B	NC Hotleg Sample Hdr Outside Cont Isol
Close	1NM-22A	NC Hotleg 1 Sample Line Inside Cont Isol.

☐ 14. **IF** sampling **1ND A AND** ND is **NOT** injecting, request Operations open 1ND-68A (ND Pump 1A and Hx 1A Miniflow Stop).

☐ 15. **IF** sampling **1ND B AND** ND is **NOT** injecting, request Operations open 1ND-67B (ND Pump 1B and Hx 1B Miniflow Stop).

Enclosure 20.1
Unit 1 PALSS Contact Checklist

☐ 16. Complete and review the following information with PALSS operator/sampler to communicate:

- Desired sample point, analyses, conditions, etc.
- Outstanding items to be performed prior to actuating panel.

Sample point: _____ (1NC HL1, 1NC HL4, 1ND A, 1ND B)
Analyses required: _____ (pH, H_2, B, isotopic, Cl⁻)
Return waste to: _____ (containment or WDT)
Need 1KC-973 (KC to PALSS Supply Isol)?
Need 1KC-873 (PALSS Return to KC)? _____ (**IF** sample ≥ 100°F, YES)
Comments:_____
_____
_____

Phone/Beeper Numbers:

OSC Contact:	_____
PALSS Control panel:	2392
PALSS Sample panel:	2374
Chem Hot Lab:	2593/2592

Enclosure 20.2
Unit 2 PALSS Contact Checklist

☐ 1. **IF** this enclosure is being performed by OSC/TSC support personnel, verify enclosure with Control Copy via telephone.

☐ 2. **IF** sample temperature is expected to be ≥ 100°F, verify with Operations that **one** of the following conditions will exist while sampling:
- 2KC A Train will be in service
- 2KC B Train will be in service with two pumps running and crosstied to 2KC A Train.

NOTE: 1. 2KC-973 (KC to PALSS Supply Isol) is located on 750' elevation, 5' north of column GG-56, 8' high.

2. 2KC-974 (Liquid Sample Panel Outlet Isol) is located on 750' elevation, just north of column HH-58, 10' high.

☐ 3. **IF** sample temperature is expected to be ≥ 100°F, request permission to open or request Operations open the following valves:
2KC-973 KC to PALSS Supply Isol
2KC-974 Liquid Sample Panel Outlet Isol.

☐ 4. Ensure YM is available.

☐ 5. **IF** sampling NC Hotleg 1 **OR** NC Hotleg 4 during Phase A containment isolation, go to Step 8.

6. **IF** sampling ND during Phase A containment isolation, perform the following:

☐ 6.1 "N/A" and Initial Step 8.

☐ 6.2 Go to Step 10.

7. **IF** Phase A containment isolation has **NOT** occurred, perform the following:

☐ 7.1 "N/A" and Initial Steps 8 - 10.

☐ 7.2 Go to Step 11.

NOTE: 2NM-409 (Supply Isolation To 2EMF 48) is a manual valve located at 2EMF 48 (2EMF-48 Reactor Coolant Rad Monitor). **WHEN** Phase A isolation occurs, KC cooling is lost to 2EMF 48. 2EMF 48 should be isolated **prior** to opening Hotleg containment isolation valves.

_____ 8. Close 2NM-409 (Supply Isolation to 2EMF-48).
Initials

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Unit 2

Enclosure 20.2
Unit 2 PALSS Contact Checklist

☐ 9. Ensure there are no sample valves open at sample sink.

10. Contact Operations Emergency Coordinator to:

Initials

☐ 10.1 Obtain permission to use containment isolation bypass switches as necessary to obtain a PALSS sample.

☐ 10.2 Check desired sample location (i.e., ND, NC Hotleg via forced or natural recirc).

☐ 11. **IF** PALSS waste will be returned to containment sump, request Control Room open the following valves:

2WL-1301B	PALSS Sample Return Outside Cont Isol Valve
2WL-1302A	PALSS Sample Return Inside Cont Isol Valve.

☐ 12. **IF** sampling **2NC Hotleg 1**, request Operations align the following valves:

Open	2NM-22A	NC Hotleg 1 Sample Line Inside Cont Isol
Open	2NM-26B	NC Hotleg Sample Hdr Outside Cont Isol
Close	2NM-25A	NC Hotleg 4 Sample Line Inside Cont Isol.

☐ 13. **IF** sampling **2NC Hotleg 4**, request Operations align the following valves:

Open	2NM-25A	NC Hotleg 4 Sample Line Inside Cont Isol
Open	2NM-26B	NC Hotleg Sample Hdr Outside Cont Isol
Close	2NM-22A	NC Hotleg 1 Sample Line Inside Cont Isol.

☐ 14. **IF** sampling **2ND A AND** ND is **NOT** injecting, request Operations open 2ND-68A (ND Pump 2A and Hx 2A Miniflow Stop).

☐ 15. **IF** sampling **2ND B AND** ND is **NOT** injecting, request Operations open 2ND-67B (ND Pump 2B and Hx 2B Miniflow Stop).

Enclosure 20.2
Unit 2 PALSS Contact Checklist

☐ 16. Complete and review the following information with PALSS operator/sampler to communicate:

- Desired sample point, analyses, conditions, etc.
- Outstanding items to be performed prior to actuating panel.

Sample point: _____ (2NC HL1, 2NC HL4, 2ND A, 2ND B)
Analyses required: _____ (pH, H_2, B, isotopic, Cl^-)
Return waste to: _____ (containment or WDT)
Need 2KC-973 (KC to PALSS Supply Isol)?
Need 2KC-974 (Liquid Sample Panel Outlet Isol)? _____ (**IF** sample ≥ 100°F, YES)
Comments: _____

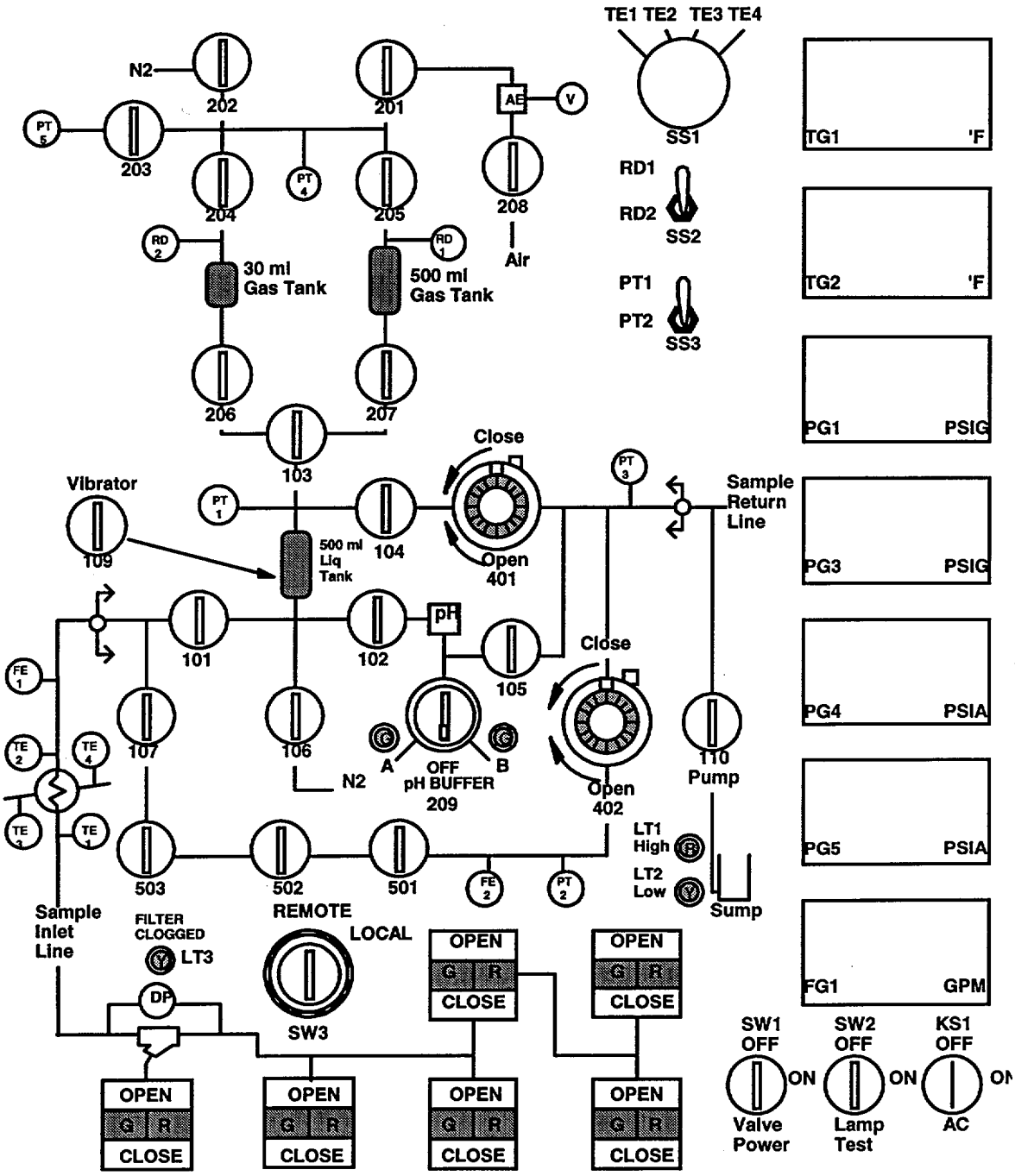
_____

_____

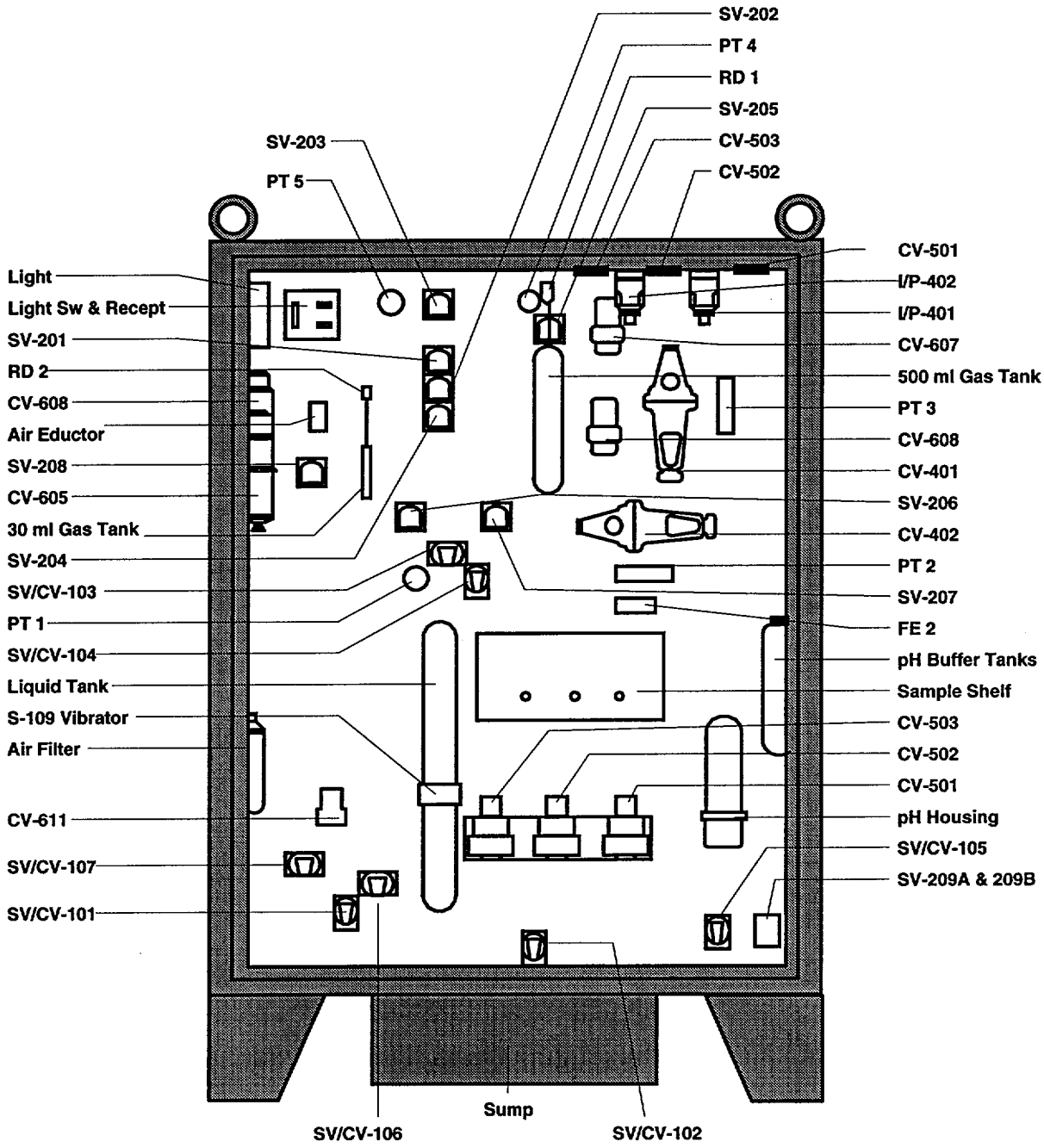
Phone/Beeper Numbers:

OSC Contact: _____
PALSS Control panel: 2387
PALSS Sample panel: 2374
Chem Hot Lab: 2593/2592

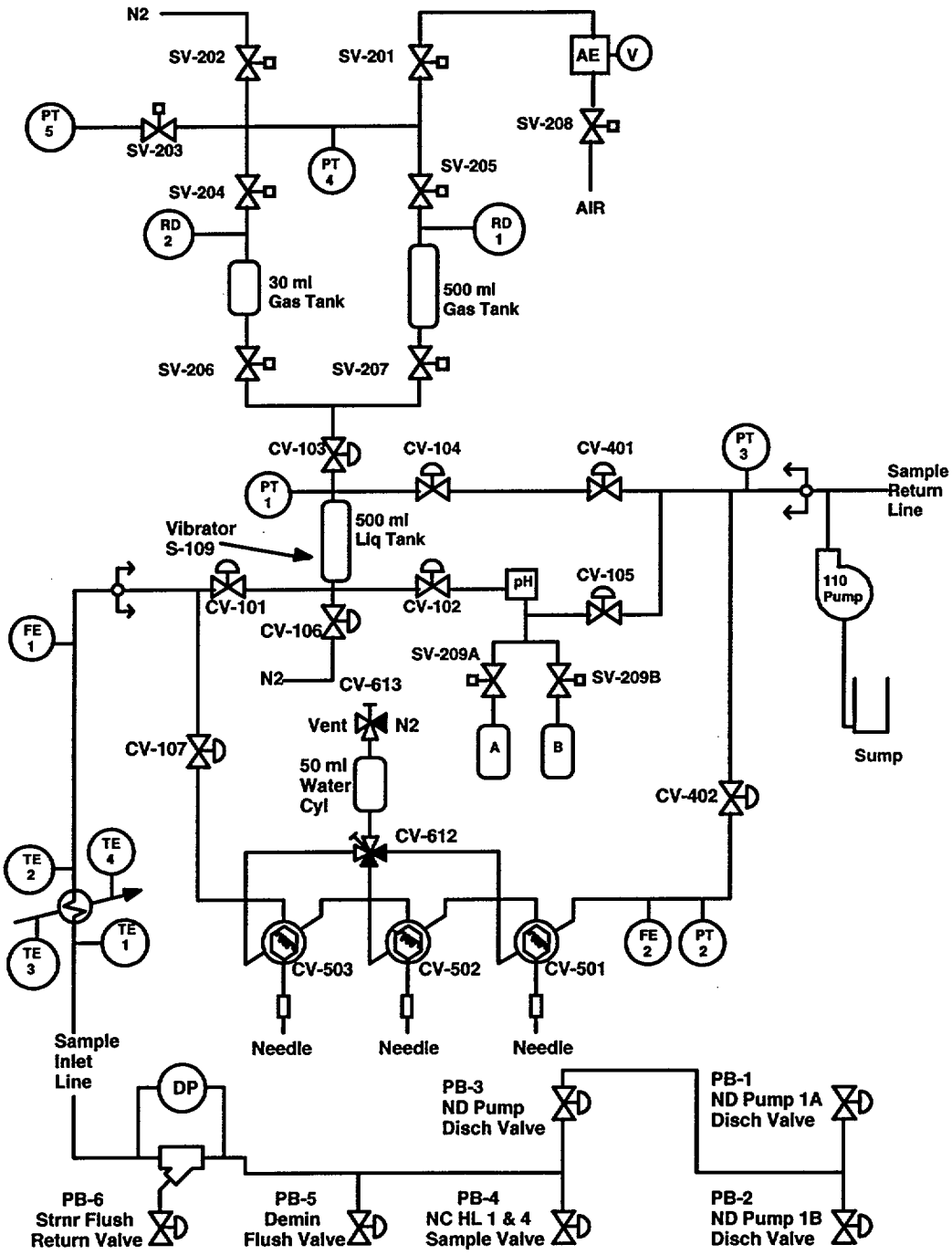
Enclosure 20.3
Diagram of Control Panel



Enclosure 20.4
Diagram of Sample Panel



Enclosure 20.5
Elementary Flow Diagram



Enclosure 20.6
PALSS Inlet Filter/Strainer Backflush

☐ 1. **IF** LT3 is illuminated, close appropriate sample supply valve:
PB-1
PB-2
PB-3
PB-4.

☐ 2. Close the following valves:
101
104.

☐ 3. Open the following valves:
PB 5
PB 6.

☐ 4. Flush at least 3 minutes.

☐ 5. Close the following valves:
PB 5
PB 6.

☐ 6. Open appropriate sample supply valve to resume sampling:
PB-1
PB-2
PB-3
PB-4.

☐ 7. Open the following valves:
104
101.

☐ 8. **IF** LT3 is still illuminated **AND** flow is limited to less than 0.25 gpm as shown on FG1, **stop** sampling and service strainer.

☐ 9. Notify Chemistry Management of maintenance performed.

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Enclosure 20.7
PALSS Sampling

NOTE:	This enclosure has been classified as **REFERENCE USE.**

1. Limits and Precautions

1.1 One or more of the following conditions exist:
- Reactor Coolant System (NC) Gross Specific Activity is expected to be or is known to be greater than 200 µCi/ml
- Radiation levels in the Nuclear Sampling Laboratory (NM Lab) and at local sample points for the Residual Heat Removal System (ND) prohibit access
- Post accident sampling is being simulated.

1.2 **IF** PALSS is determined to be inoperable, request Operations log PALSS as inoperable in Tech Spec Logbook. Once PALSS is operable, request Operations log PALSS as operable in Tech Spec Logbook. This information should also be logged in Primary Chemistry Log, Primary Status Board, and documented by R&R.

1.3 During an accident situation, Radiation Protection (RP) personnel must assess the need for radiation monitoring during sampling at the liquid sample and control panels in the Auxiliary Building.

1.4 The following list from Chemistry Manual Section 2.6 (Chemistry Safety) has been identified as applicable for this procedure. Comply with these and other applicable sections: {1}
- General Work Practices
- Personnel Conduct in Contaminated Areas
- Hazardous Chemicals/Substances and Atmospheric Hazards
- Housekeeping
- Incident Reporting
- Personal Protective Equipment
- Walking/Working Surfaces
- Compressed Gas Cylinder Practices.

1.5 **WHEN** handling radioactive samples, comply with applicable SRWP/RWP.

1.6 Breaker for the Unit 1 PALSS panel and sump pump is located on 750' elevation at column MM56, PNLBD 1KJ, breaker #34 (PALSS Panel Breaker).
Phone at Control panel - Ext. 2392
Phone at Sample panel - Ext. 2374.

VERIFIED WITH CONTROL COPY _____/_____ (Initials/Date)

1.7 Breaker for the Unit 2 PALSS panel and sump pump is located on 750' elevation at column NN57, PNLBD 2KJ, breaker #46 (PALSS Panel Breaker).
Phone at Control panel - Ext. 2387
Phone at Sample panel - Ext. 2374.

1.8 During Phase A Isolation, inside and outside containment isolation valves for NC Hot Leg sample line and PALSS sample return line will close. Once this happens, valves **CANNOT** be opened by normal methods. **IF** a sample is needed during this isolation period, these valves can be opened by bypassing isolation signal. The bypass switches are located in Control Room. Upon Chemistry request and with approval of Emergency Coordinator, these switches can be placed in "Bypass" position to allow Hot Leg and PALSS inside and outside containment isolation valves to be opened. It may be necessary to isolate Hot Leg EMF before introducing flow through NC Hot Leg sample line. The decision to pull a sample and use bypass switches will be made by Emergency Coordinator.

1.9 During a Phase A Isolation, KC flow is lost to NM lab heat exchangers. In this case, PALSS is the only cooled reactor coolant sample obtainable. The KC non-essential header must be reestablished by Operations before NM samples can be obtained.

1.10 Sample loop volumes as supplied by the manufacturer are nominal and should be verified. Refer to OP/1/B/6200/048 (Unit 1 PALSS Routine Operation) and OP/2/B/6200/048 (Unit 2 PALSS Routine Operation) for current loop volumes. A volume of 2 microliters is also added to each loop volume to account for the volume of Rheodyne valves.

1.11 Waste Drain Tank (WDT) design pressure is 150 psig maximum. The PALSS system must be operated to discharge < 150 psig when aligned to WDT.

2. Initial Conditions

Sample vials have been evacuated for Liquid Sample Retrieval.

3. Procedure

3.1 Liquid Sample Retrieval

WARNING: During an accident situation, Radiation Protection (RP) personnel must assess the need for radiation monitoring during sampling at the liquid sample and control panels in the Auxiliary Building.

3.1.1 Contact RP to determine if RP coverage is necessary.{2}

3.1.2 Insert sample vial onto appropriate needle.

3.1.3 Turn CV-612 to desired injection valve:
- 100 µl loop
- 1 ml loop
- 5 ml loop.

CAUTION: Operating CV-613 too rapidly may eject sample vial due to high pressure.

3.1.4 **Slowly** turn CV-613 toward "N_2" position until sample begins transfer.

3.1.5 Once liquid sample has been collected, turn CV-613 to "Vent" position.

3.1.6 Wait ≈ 2 seconds for sample line depressurization prior to removing vial.

3.1.7 **IF** additional loops will be sampled, repeat Steps 3.1.2 - 3.1.6.

3.1.8 Turn CV-612 to "Off" position.

NOTE: 1. Steps 3.1.9 and 3.1.10 may be performed at convenience of operator.

2. Buffer tanks will accommodate two separate calibrations.

3.1.9 **IF** buffer tank contents need to be replaced, fill only ≈ 80% full to allow for proper pressurization for transfer.

3.1.10 Remove dilution tank and refill with reagent grade water.

3.2 Gas Sample Retrieval

NOTE: This section applicable for stripped gas samples only.

3.2.1 Insert needle through sample septum.

3.2.2 Purge syringe twice without withdrawing needle from septum.

3.2.3 Pull plunger back until 1 ml (or CC) of gas is obtained.

3.2.4 Lock syringe.

3.2.5 Withdraw needle from septum.

3.2.6 **IF** necessary, repeat Steps 3.2.1 through 3.2.5 for additional syringes.

(R06-97)

Duke Power Company

PROCEDURE PROCESS RECORD

(1) ID No. **OP/0/B/6200/090**

Revision No. **010**

PREPARATION

(2) Station **McGuire Nuclear Station**

Procedure Title **PALSS Operation for Accident Sampling**

(4) Prepared By Milton Cashion Date 12/13/99

(5) Requires 10CFR50.59 evaluation?

- ☑ Yes (New procedure or reissue with major changes)
- ☐ No (Reissue with minor change)
- ☐ No (to incorporate previously approved changes)

(6) Reviewed By Orlando Reid (QR) Date 12-13-99

Cross-Disciplinary Review By [illegible] (QPS) (QR) NA___ Date 01/10/00

Reactivity Mgmt Review By _____ (QR) NA MW Date 01/26/00

(7) Additional Reviews

Reviewed G F Terrell Date 12-15-99

Reviewed [illegible] Date 1/26/00

(8) Temporary Approval (*if necessary*)

By _____ (SRO/QR) Date _____

By _____ (QR) Date _____

(9) Approved By Lawrence Lowton Date 1-26-00

PERFORMANCE (Compare with Control Copy every 14 calendar days while work is being performed)

(10) Compared with Control Copy _____ Date _____

Compared with Control Copy _____ Date _____

Compared with Control Copy _____ Date _____

(11) Date(s) Performed _____

Work Order Number (WO#) _____

COMPLETION

(12) Procedure Completion Verification

- ☐ Yes ☐ N/A Check lists and/or blanks initialed, signed, dated, or filled in N/A 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 Procedure requirements met?

Verified by _____ Date _____

(13) Procedure Completion Approved _____ Date _____

(14) Remarks (*attach additional pages, if necessary*)

Duke Power Company McGuire Nuclear Station **PALSS Operation for Accident Sampling** **Multiple Use**	Procedure No. OP/0/B/6200/090 Revision No. 010 Electronic Reference No. MC00471B

This procedure requires a Cross-Disciplinary review by Operations Group per Chemistry Manual Section 2.9 (V&V/Cross-Disciplinary Review).

PALSS Operation for Accident Sampling

1. Purpose

The Post Accident Liquid Sampling System (PALSS) provides the capability to obtain reactor coolant samples under accident conditions in accordance with NUREG-0737.

The PALS II+ system is designed to conform to station design parameters of 650°F and 2485 psig for the sample inlet line. It will trap a 100 microliter, 1 milliliter, and/or 5 milliliter liquid sample. Routine liquid analyses include pH, chloride concentration, radioisotopes, and boron concentration.

Five hundred milliliters of reactor coolant can be degassed and the gas analyzed by two different methods: nitrogen stripping method or total gas method. Gas analysis gives indication of hydrogen and noble gasses (xenon, krypton, etc.) dissolved in reactor coolant.

Sample acquisition during accident conditions will help evaluate information related to:
- Extent of core damage which has occurred or is occurring
- Types and quantities of fission products released to containment liquid and gas phases
- Reactor Coolant chemistry and radiochemistry.

This procedure has been classified as **MULTIPLE USE:**
- **REFERENCE USE** - Enclosure 20.7 (PALSS Sampling)
- **CONTINUOUS USE** - all other sections and enclosures.

2. Limits and Precautions

2.1 This procedure should be used when one or more of the following conditions exist:
- Reactor Coolant System (NC) Gross Specific Activity is expected to be or is known to be greater than 200 µCi/ml
- Radiation levels in the Nuclear Sampling Laboratory (NM Lab) and at local sample points for the Residual Heat Removal System (ND) prohibit access
- Post accident sampling is being simulated.

2.2 **IF** PALSS is determined to be inoperable, request Operations log PALSS as inoperable in the Tech Spec Logbook. Once PALSS is operable, request Operations log PALSS as operable in the Tech Spec Logbook. This information should also be logged in the Primary Chemistry Log, Primary Status Board and documented by R&R.

2.3 During an accident situation, Radiation Protection (RP) personnel must assess the need for radiation monitoring during sampling at the liquid sample and control panels in the Auxiliary Building.

2.4 The following list from Chemistry Manual Section 2.6 (Chemistry Safety) has been identified as applicable for this procedure. Comply with these and other applicable sections:{1}

- General Work Practices
- Personnel Conduct in Contaminated Areas
- Hazardous Chemicals/Substances and Atmospheric Hazards
- Housekeeping
- Incident Reporting
- Personal Protective Equipment
- Walking/Working Surfaces
- Compressed Gas Cylinder Practices.

2.5 **WHEN** handling radioactive samples, comply with applicable SRWP/RWP.

2.6 Breaker for the Unit 1 PALSS panel and sump pump is located on 750' elevation at column MM56, PNLBD 1KJ, breaker #34 (PALSS Panel Breaker).
Phone at Control panel - Ext. 2392
Phone at Sample panel - Ext. 2374.

2.7 Breaker for the Unit 2 PALSS panel and sump pump is located on 750' elevation at column NN57, PNLBD 2KJ, breaker #46 (PALSS Panel Breaker).
Phone at Control panel - Ext. 2387
Phone at Sample panel - Ext. 2374.

2.8 During Phase A Isolation, inside and outside containment isolation valves for NC Hot Leg sample line and PALSS sample return line will close. Once this happens, the valves **CANNOT** be opened by normal methods. **IF** a sample is needed during this isolation period, these valves can be opened by bypassing the isolation signal. The bypass switches are located in the Control Room. Upon Chemistry request and with approval of the Emergency Coordinator, these switches can be placed in "Bypass" position to allow Hot Leg and PALSS inside and outside containment isolation valves to be opened. It may be necessary to isolate the Hot Leg EMF before introducing flow through NC Hot Leg sample line. The decision to pull a sample, desired sample (i.e., ND, NC Hotleg via natural or forced recirc), and use of the bypass switches will be made by the Emergency Coordinator.

2.9 During a Phase A Isolation, KC flow is lost to the NM lab heat exchangers. In this case PALSS is the only cooled reactor coolant sample obtainable. The KC non-essential header must be reestablished by Operations before NM samples can be obtained.

.0 Sample loop volumes as supplied by the manufacturer are nominal and should be verified. Refer to OP/1/B/6200/048 (Unit 1 PALSS Routine Operation) and OP/2/B/6200/048 (Unit 2 PALSS Routine Operation) for current loop volumes. A volume of 2 microliters is also added to each loop volume to account for the volume of Rheodyne valves.

2.11 Waste Drain Tank (WDT) design pressure is 150 psig maximum. The PALSS system must be operated to discharge < 150 psig when aligned to the WDT.

3. Preparation

3.1 Initial Conditions

☐ There are no outstanding R&Rs and/or Special Orders that will interfere with PALSS Panel operation.

3.2 Procedure

☐ 3.2.1 Review Section 2 (Limits and Precautions) before continuing.

WARNING: During an accident situation, Radiation Protection (RP) personnel must assess the need for radiation monitoring during sampling at the liquid sample and control panels in the Auxiliary Building.

☐ 3.2.2 Contact RP to determine if RP coverage is necessary.{2}

☐ 3.2.3 **IF** procedure is being used for drill purpose, portions may be simulated as dictated by management.

3.2.4 **IF** OSC Chemistry Duty personnel are available to support PALSS sampling, verify procedure revisions agree with the Control Copy.

3.2.5 **IF** Unit 1 Hot Leg Sample is desired during post accident recovery, perform the following:

☐ 3.2.5.1 Notify TSC that:

- 1NM-26B (NC Hotleg Sample Hdr Outside Cont Isol) has been tagged closed due to failure of 1NM-22A (NC Hotleg 1 Sample Line Inside Cont Isol) to fully close.
- During accident recovery, NC Hotleg Sample can be obtained with TSC concurrence, after restoring power to 1NM-26B.
- A representative primary system sample may be obtained by sampling ND when **one** of the following conditions exist:
  - ND is on RHR and has sufficiently circulated through NC system.
  - ND and NS are aligned to Cold Leg Recirc, all ice in ice condenser is melted, and ND has sufficiently circulated contents of sump through NC System.

☐ 3.2.5.2 Request guidance from TSC on where and when to obtain sample.

☐ 3.2.5.3 **IF** Hot Leg Sample is still desired during post accident recovery, request Operations to restore power to 1NM-26B (NC Hotleg Sample Hdr Outside Cont Isol).

☐ 3.2.5.4 **IF** power is restored to 1NM-26B (NC Hotleg Sample Hdr Outside Cont Isol), notify Control Room to monitor the following continuous action step:

- **IF** AT ANY TIME a Phase A signal occurs, ensure 1NM-26B (NC Hotleg Sample Hdr Outside Cont Isol) closes.

NOTE: The next step allows all Control Room contacts to be coordinated by OSC duty person while panel operator makes initial sampling preparations.

☐ 3.2.6 **IF** OSC duty person is available for support, OSC duty person may perform appropriate enclosure:

- Enclosure 20.1 (Unit 1 PALSS Contact Checklist)
- Enclosure 20.2 (Unit 2 PALSS Contact Checklist).

☐ 3.2.7 **IF** OSC duty person is unavailable to assist, panel operator must perform appropriate enclosure:
- Enclosure 20.1 (Unit 1 PALSS Contact Checklist)
- Enclosure 20.2 (Unit 2 PALSS Contact Checklist).

☐ 3.2.8 **IF** gas samples are required, leak check gas syringes.

NOTE: The vacuum connection nearest Hot Lab vacuum pump should provide sufficient vacuum. A needle with plastic tubing to connect to vacuum connection is located in the PALSS cabinet.

☐ 3.2.9 **IF** necessary, evacuate sample vials used for liquid samples.

☐ 3.2.10 **IF** pH analysis will be performed, note actual values for pH buffer solutions and last date probe was buffered:
Buffer A _____
Buffer B _____
Probe last buffered _____.

☐ 3.2.11 **WHEN** sampling, the following items are needed:
- Sample carrier (bucket, tray, etc.)
- **IF** stripped gas samples are required, leak test two or three 1 ml glass locking syringes
- Panel keys located in PALSS cabinet
- Timepiece capable of measuring seconds
- Sample vials with septum/cap or sample bottles for liquid sample
- Protective and monitoring equipment per applicable RP instruction
- Transport pig and hand trucks at RP discretion
- **IF** lighting is out, obtain a flashlight.

3.2.12 **PRIOR** to sampling, perform the following:

☐ 3.2.12.1 **IF** sampling Unit 1, verify the following valves are open:
1KC-873 PALSS Return to KC
1KC-973 KC to PALSS Supply Isol.

☐ 3.2.12.2 **IF** sampling Unit 2, verify the following valves are open:
2KC-973 KC to PALSS Supply Isol
2KC-974 Liquid Sample Panel Outlet Isol.

☐ 3.2.12.3 **IF** non-essential KC is isolated, verify appropriate EMF-48 is isolated:
1EMF-48 U1 Reactor Coolant Rad Monitor
2EMF-48 2EMF-48 Reactor Coolant Rad Monitor.

☐ 3.2.13 **IF** a stripped gas sample will be pulled, open CV-603 (Stripping N_2 Isolation Valve) located inside PALSS sample panel.

☐ 3.2.14 **IF** waste will be routed to Containment Sump, close appropriate Unit valve:
1WL-1304 2WL-1304 WDT Manual Isol.

☐ 3.2.15 **IF** waste will be routed to the WDT, close appropriate Unit valve:
1WL-1303 2WL-1303 Containment Sump Manual Isol

☐ 3.2.16 Throttle appropriate N_2 regulator to supply ≈ 100 psig nitrogen to PALSS Panel:
1NM-458 2NM-458 PALS Nitrogen Header Regulator.

4. PALSS Control Panel Test

4.1 Initial Conditions

☐ 4.1.1 Valve power switch SW1 and Panel AC power switch KS1 are in the "Off" position.

☐ 4.1.2 All control valves (CV) and solenoid valves (SV) are de-energized and in the vertical position.

4.2 Procedure

☐ 4.2.1 **IF** any item on control or sample panel is **NOT** clearly identified, refer to the following enclosures as necessary:
- Enclosure 20.3 (Diagram of Control Panel)
- Enclosure 20.4 (Diagram of Sample Panel)
- Enclosure 20.5 (Elementary Flow Diagram).

☐ 4.2.2 Check 401 and 402 are in a throttled position corresponding to ≈ 3.0 on control dial.

☐ 4.2.3 Insert key into switch KS1.

☐ 4.2.4 Turn system power on.

☐ 4.2.5 Ensure Pushbutton (PB) switches 1 - 6 have green lamps illuminated.

☐ 4.2.6 Ensure no other lamps are illuminated.

NOTE: LT1 and LT2 indicate sump level.

☐ 4.2.7 **IF** LT1 **AND** LT2 are illuminated at anytime other than lamp test, investigate sample panel for leakage.

☐ 4.2.8 Turn lamp test switch SW2 to "On" position.

☐ 4.2.9 **IF** any lamp on control panel is **NOT** functional, replace or repair malfunctioning lamp at earliest convenience.

☐ 4.2.10 Turn lamp test switch SW2 "Off".

☐ 4.2.11 **IF** a sample will be pulled, go to Section 5 (Base Parameters).

☐ 4.2.12 **IF** no sample will be pulled, go to Section 17 (System Shutdown).

5. Base Parameters

5.1 Initial Conditions

None.

5.2 Procedure

_____ Hours 5.2.1 Record time panel is energized.

☐ 5.2.2 Place SW1 (valve power) in "On" position.

☐ 5.2.3 Open the following valves to align transmitters PT 4 and PT 5 to atmospheric pressure:
201
203.

☐ 5.2.4 Record atmospheric pressure readings:
PG4 = _____ psia
PG5 = _____ psia.

☐ 5.2.5 Close the following valves:
203
201.

NOTE: SS2 toggles TG2 from one RTD to the other.

☐ 5.2.6 **WHEN** TG2 stabilizes, record RTD starting temperatures:
RD1 = _____ °F 500 cc Gas Tank
RD2 = _____ °F 30 cc Gas Tank.

NOTE: SS1 switches TG1 from one thermocouple to another.

☐ 5.2.7 **WHEN** TG1 stabilizes, record thermocouple temperatures:
TE1 = _____ °F (TG1 Sample In)
TE2 = _____ °F (TG1 Sample Out)
TE3 = _____ °F (TG1 KC In)
TE4 = _____ °F (TG1 KC Out).

☐ 5.2.8 **IF** pH analysis will **NOT** be performed, go to Section 7 (pH Housing and Gas Tank Evacuation).

6. pH Meter Calibration

6.1 Initial Conditions

None.

6.2 Procedure

6.2.1 Perform the following to purge pH probe housing of demineralized water:

☐ 6.2.1.1 Close the following valves:
401
402.

6.2.1.2 Open the following valves:
☐ 202
☐ 204
☐ 206
☐ 103
☐ 102
☐ 105.

☐ 6.2.1.3 **AFTER** a minimum of 40 seconds, close 105 to stop purge.

☐ 6.2.2 **IF** pH meter has been calibrated within past 30 days, go to Step 6.2.18.8.

6.2.3 Perform the following to pressurize buffer tank A:

☐ 6.2.3.1 Turn 209 to "A" position to open 209A.

☐ 6.2.3.2 **AFTER** a minimum 15 seconds, return 209 to "Off" position.

☐ 6.2.4 Close 202.

☐ 6.2.5 Open the following valves to evacuate pH housing:
208
201.

☐ 6.2.6 **WHEN** PG4 reads below 5 psia **AND** stabilizes, close 102.

_____ psia 6.2.7 Record pH housing pressure from PG4 for Buffer **A** calibration.

6.2.8 Close the following valves to secure evacuation lineup:
- ☐ 201
- ☐ 103
- ☐ 206
- ☐ 204
- ☐ 208.

6.2.9 pH Calibration With Buffer A

☐ 6.2.9.1 Place 209 in "A" position to transfer Buffer A into pH housing.

☐ 6.2.9.2 Wait at least 15 seconds.

☐ 6.2.9.3 Place SV 209 in "Off" position.

☐ 6.2.9.4 Press [HOLD] on pH meter until "HOLD" flashes on lower left side of display (this must occur before continuing).

☐ 6.2.9.5 Allow pH meter reading to stabilize.

NOTE: The words "SET" and "STD" will appear on upper left side of LCD when [STD/SLOPE] is pressed.

☐ 6.2.9.6 Press [STD/SLOPE].

NOTE: **IF** numeric value begins to flash, this indicates there is insufficient difference in pH between the two buffer solutions or electrode may be cracked.

6.2.9.7 **IF** numeric value begins to flash:

☐ A. Press [pH/ORP/TEMP] to cancel slope adjustment.

☐ B. Select a different buffer.

☐ C. Retry procedure.

☐ D. **IF** necessary, replace electrode.

☐ 6.2.9.8 Press [↓] and [↑] keys to change value displayed to exact value of buffer solution listed in Step 3.2.10.

☐ 6.2.9.9 **WHEN** correct value is displayed, press [ENTER].

NOTE: pH reading should be within 0.05 pH units of actual value.

_____ 6.2.9.10 Record pH value displayed for Buffer A solution.
Buffer A pH

6.2.9.11 **IF** reading is more than ± 0.05 pH units of actual value, return to Step 6.2.9.6.

☐ 6.2.9.12 Open the following valves to flush pH housing with YM:
101
105
102
PB 5 Demin Water.

NOTE: The pH meter should fluctuate; FG1 should indicate flow, and PG3 should show pressure increase.

☐ 6.2.9.13 Monitor pH meter, FG1, and PG3 to ensure probe is flushed properly.

☐ 6.2.9.14 Flush ≈ 5 minutes.

☐ 6.2.9.15 **IF** necessary, additional purging per Step 6.2.1 and flushing per Steps 6.2.9.12 - 6.2.9.14 may be performed.

☐ 6.2.9.16 Close 101.

☐ 6.2.9.17 Close PB 5 Demin Water.

☐ 6.2.9.18 Open the following valves to purge YM out of pH housing with nitrogen:
202
204
206
103.

☐ 6.2.9.19 Wait at least 1 minute.

☐ 6.2.9.20 Close 105.

NOTE: Buffer B will normally be a pH 7 buffer.

☐ 6.2.10 Place 209 in "B" position to pressurize Buffer Tank B.

☐ 6.2.11 Wait at least 15 seconds.

☐ 6.2.12 Place 209 in "Off" position.

☐ 6.2.13 Close 202.

☐ 6.2.14 Open the following valves to evacuate pH housing:
208
201.

☐ 6.2.15 **WHEN** PG4 reads below 5 psia **AND** stabilizes, close 102.

____ psia 6.2.16 Record pH housing pressure from PG4 for Buffer **B** calibration.

☐ 6.2.17 Close the following valves to secure the evacuation lineup:
201
103
206
204
208.

6.2.18 pH Calibration With Buffer B

☐ 6.2.18.1 Place 209 in "B" position to transfer Buffer B into pH housing.

☐ 6.2.18.2 Wait at least 15 seconds.

☐ 6.2.18.3 Place 209 in "Off" position.

NOTE: pH of buffer solution will be displayed.

☐ 6.2.18.4 Allow pH meter reading to stabilize.

NOTE:
1. "SET" and "SLOPE" will appear on left side of display.
2. A flashing numeric value indicates there is insufficient difference in pH between the two buffer solutions or electrode may be cracked.

☐ 6.2.18.5 Press [STD/SLOPE] twice.

6.2.18.6 **IF** numeric value begins flashing, perform the following:

☐ A. Press [pH/ORP/TEMP].

☐ B. Select a different buffer.

☐ C. Retry procedure.

☐ D. **IF** necessary, replace electrode.

NOTE: This will cancel the slope adjustment.

☐ 6.2.18.7 Press [↓] and [↑] keys to change value displayed to exact value of buffer solution in Step 3.2.10.

☐ 6.2.18.8 **WHEN** correct value is displayed, press [ENTER].

NOTE: Reading should be within 0.05 pH units of actual value.

_____ 6.2.18.9 Record pH value displayed for Buffer B solution.
Buffer B pH

☐ 6.2.18.10 Press [HOLD] to return instrument to normal operating mode for pH measurements.

☐ 6.2.18.11 Open the following valves to flush pH housing:
101
105
102
PB-5 (Demin Water).

☐ 6.2.18.12 Monitor pH meter to ensure probe is flushed properly.

☐ 6.2.18.13 Flush ≈ 5 minutes.

NOTE: pH meter should read between 6.0 and 7.5 (pH of YM).

☐ 6.2.18.14 **IF** necessary, additional purging may be performed per Step 6.2.1 and flushing per Steps 6.2.18.11 - 6.2.18.13.

☐ 6.2.18.15 Close the following valves to secure flush:
101
PB-5 (Demin Water).

☐ 6.2.18.16 Open the following valves to purge YM out of pH housing with nitrogen:
202
204
206
103.

☐ 6.2.18.17 Wait at least 40 seconds.

☐ 6.2.18.18 Close the following valves:
202
105.

7. pH Housing and Gas Tank Evacuation

7.1 Initial Conditions

None.

7.2 Procedure

☐ 7.2.1 **IF** pH **AND** H_2 analyses will **NOT** be performed, go to Section 8 (System YM Fill).

☐ 7.2.2 Open the following valves to evacuate pH housing and gas tanks:
208
201
205
207
103
102.

☐ 7.2.3 **WHEN** PG4 is below 10 psia, open 203.

☐ 7.2.4 **WHEN** PG5 pressure drops below 3 psia **AND** stabilizes, close 201.

☐ 7.2.5 Close 208.

_____ psia 7.2.6 Record pH housing pressure from PG5.

☐ 7.2.7 Close the following valves:
102
103
206
207.

_____ 500 cc/30 cc psia 7.2.8 Record gas tank pressure from PG5.

☐ 7.2.9 Close the following valves:
205
204
203.

8. System YM Fill

8.1 Initial Conditions

None.

8.2 Procedure

NOTE: This will help prevent water hammer from occurring when sample flow is established.

☐ 8.2.1 Open the following valves to fill liquid tank with YM:
PB-5 (Demin Water)
101
104
401 (fully open, ≈ 10.0 on dial).

☐ 8.2.2 Wait at least 1 minute.

☐ 8.2.3 Close the following valves to stop filling liquid tank:
401
104
101.

NOTE: Closing 402 prevents exceeding maximum flow rate of 300 ml/min when flow begins.

☐ 8.2.4 Check closed 402.

8.2.5 Open the following to begin filling sample loops:
- ☐ 107
- ☐ 503
- ☐ 502
- ☐ 501.

☐ 8.2.6 Open 402 while monitoring FG2.

☐ 8.2.7 Do **NOT** allow flow rate to exceed 300 ml/min on FG2.

☐ 8.2.8 Wait at least 1 minute.

8.2.9 Close the following to stop filling sample injection valves:
- ☐ PB-5 (Demin Water)
- ☐ 107
- ☐ 503
- ☐ 502
- ☐ 501
- ☐ 402.

9. Sample Trap

9.1 Initial Conditions

The following valves are closed:

- ☐ PB-5 (Demin Water)
- ☐ PB-6 Strainer Flush Return Valve
- ☐ 401
- ☐ 402.

9.2 Procedure

☐ 9.2.1 **IF** LT 1 **OR** LT 2 light at any time, close all valves and investigate sample panel for leaks.

☐ 9.2.2 Select PT1 on SS3.

☐ 9.2.3 Select TE2 on SS1.

9.2.4 Perform the following to select proper sample inlet line:

☐ 9.2.4.1 **IF** sampling **NC Hotleg 1 OR 4**, open PB-4.

☐ 9.2.4.2 **IF** sampling **ND**, ensure SW3 is in "LOCAL" mode.

☐ 9.2.4.3 **IF** sampling **ND Pump A Discharge**, open:
PB-1 ND Pump A Discharge
PB-3 ND Pump Discharge Sample Valve.

☐ 9.2.4.4 **IF** sampling **ND Pump B Discharge**, open:
PB-2 ND Pump B Discharge
PB-3 ND Pump Discharge Sample Valve.

☐ 9.2.5 Open the following valves:
104
101.

CAUTION: WDT is ASTM code tank designed to 150 psig pressure maximum. Only a slight turn on 401 is needed to obtain flow when sampling NC Hotleg.

☐ 9.2.6 Monitor PG3 to ensure outlet pressure does **NOT exceed 150 psig** when aligned to WDT.

☐ 9.2.7 **Slowly** open 401 and establish ≈ 1 - 2 gpm flow per FG1 without exceeding:
- 150 psig on PG3
- 120°F on TG1 (when aligned to TE2).

NOTE: This will slowly increase and normally does **NOT** exceed 100°F with current KC cooling flow. Other temperatures may be read by switching SS1 at discretion of operator.

9.2.8 **IF** necessary to reduce pressure, flow, or temperature, perform the following:

☐ 9.2.8.1 Close the following valves:
104
401.

☐ 9.2.8.2 Open 104.

☐ 9.2.8.3 **Slowly** open 401 and establish ≈ 1 - 2 gpm flow per FG1 without exceeding:
- 150 psig on PG3
- 120°F on TG1 (when aligned to TE2).

_____ gpm 9.2.9 Record flow rate on FG1.

_____ psig 9.2.10 Record pressure on PG3.

☐ 9.2.11 Purge at least 10 gallons through system (based on FG1 flowrate).

☐ 9.2.12 Close the following valves:
104
401
101.

_____ psig 9.2.13 Record 500 cc liquid tank pressure from PG1.

☐ 9.2.14 Move selector switch SS3 to "PT2" position to measure discharge pressure of sample valve header.

NOTE: 1. **WHEN** 501, 502, 503 are **activated**, sample goes through sample loop.

2. **WHEN** CV 501, 502, 503 are **de-activated**, sample loop is bypassed.

☐ 9.2.15 Activate (open) appropriate sample valve:

503	0.1 ml Loop
502	1 ml Loop
501	5 ml Loop.

_____ Sample Loop 9.2.16 Record Sample Loop activated.

☐ 9.2.17 Open 107.

CAUTION: Flow gauge FG2 is only calibrated to 303 ml/min.

☐ 9.2.18 Do **NOT** allow FG 2 flow rate to exceed 300 ml/min.

☐ 9.2.19 Adjust flow to stay within process limits below:
- PG1 - should read $\geq$ 40 psig.
- FG 2 - should **NOT** exceed 300 ml/min.

☐ 9.2.20 **Slowly** open 402 (increase number on dial) to achieve $\approx$ 150 ml/min on FG2 if possible.

☐ 9.2.21 **IF** FG2 is **NOT** operational, throttle 402 to obtain required pressure for appropriate sample point on PG1 for at least 4 minutes:
- $\approx$ 1000 psig for NC sample
- $\approx$ 80 psig for ND sample.

☐ 9.2.22 **AFTER** at least 2 minutes **AND** at least 10 loop volumes, close the following valves to trap sample fluid in sample injection loop:
501
502
503.

NOTE: The next step is the official sample time.

_____ Hours 9.2.23 Record time.

☐ 9.2.24 **IF NC Hotleg** was sampled, close PB4 to secure sample flow.

☐ 9.2.25 **IF ND A** was sampled, close PB-1 and PB-3 to secure sample flow.

☐ 9.2.26 **IF ND B** was sampled, close PB-2 and PB-3 to secure sample flow.

☐ 9.2.27 Wait at least 30 seconds.

☐ 9.2.28 Close 107.

☐ 9.2.29 Close 402.

☐ 9.2.30 **IF ND** was sampled, place switch SW3 in "REMOTE" position.

NOTE: Unit 1 PALSS clogged filter light currently comes on at ≈ 0.7 gpm due to a design error. A Station Problem Report has been initiated to correct this situation.

☐ 9.2.31 **IF** LT3 (Clogged Filter Light) came on during sampling **AND** flow was restricted to less than 0.5 gpm, go to Enclosure 20.6 (PALSS Inlet Filter/Strainer Backflush).

10. Depressurization of 500 cc Liquid Tank

10.1 Initial Conditions

None.

10.2 Procedure

☐ 10.2.1 **IF** hydrogen is **NOT** present in system **OR** if hydrogen analysis will **NOT** be performed, go to Step 10.2.7.

10.2.2 Perform the following to verify pressure in 500 cc gas tank approximates that recorded in Step 7.2.8:

☐ 10.2.2.1 Open the following valves:
205
203.

_____ 500 cc psia 10.2.2.2 Record PG5.

☐ 10.2.2.3 Close 205.

10.2.3 Perform the following to verify pressure in 30 cc gas tank approximates that recorded in Step 7.2.8:

☐ 10.2.3.1 Open 204.

_____ 30 cc psia 10.2.3.2 Record PG5.

☐ 10.2.3.3 Close 204.

☐ 10.2.3.4 Close 203.

☐ 10.2.4 **IF** pressure in 30 cc **AND** 500 cc Gas Tank is ± 0.2 psia of value recorded in Step 7.2.8, go to Step 10.2.7.

10.2.5 **IF** pressure in 30 cc **OR** 500 cc Gas Tank is greater than ± 0.2 psia of value in Step 7.2.8, open the following valves to evacuate tanks again:

☐ 204
☐ 205
☐ 201
☐ 208
☐ 203.

10.2.6 **IF** reading on PG5 approximates value recorded in Step 7.2.8 **AND** is stable, close the following valves:

☐ 204
☐ 205
☐ 201
☐ 208
☐ 203.

☐ 10.2.7 Place switch SS3 in "PT1" position.

☐ 10.2.8 Open 103.

☐ 10.2.9 Wait at least 30 seconds for depressurization to stabilize as indicated by PG1.

_____ psig 10.2.10 Record PG1 pressure.

☐ 10.2.11 **IF** hydrogen analysis **AND/OR** stripped gas isotopic analysis will be performed, go to Section 11 (Gas Collection).

☐ 10.2.12 **IF** gas collection will **NOT** be performed, but pH analysis **will** be performed, go to Section 12 (pH Monitoring).

☐ 10.2.13 **IF** gas collection **AND** pH will **NOT** be performed, go to Section 13 (System Flush).

11. Gas Collection

11.1 Initial Conditions

None.

11.2 Procedure for Calculated Gas Method (30 cc Tank)

NOTE: This method uses 30 cc gas tank and associated tubing.

☐ 11.2.1 Place switch SS2 in "RD 2" position.

_____ °F 11.2.2 Record initial temperature reading on TG2.

☐ 11.2.3 Open the following valves:
204
203.

☐ 11.2.4 Record initial pressure:
PG4 = _____ psia
PG5 = _____ psia.

☐ 11.2.5 Close 203.

NOTE: The next step allows gas to escape from top of liquid tank into 30 cc gas tank and energizes vibrator.

☐ 11.2.6 Open the following valves:
206
S-109 (Vibrator).

☐ 11.2.7 Monitor PG4.

☐ 11.2.8 **IF** pressure stays below 25 psia, open 203 to activate PT 5.

☐ 11.2.9 **IF** pressure does **NOT** stay below 25 psia, continue monitoring PG4.

☐ 11.2.10 **WHEN** pressure **AND** temperature stabilize (normally 1 - 2 minutes), record final temperature and pressure.
PG4 = _____ psia
PG5 = _____ psia (if used)
TG2 = _____ °F.

11.2.11 Close the following valves and de-energize vibrator:
- ☐ 203
- ☐ 204
- ☐ 206
- ☐ 103
- ☐ 109.

☐ 11.2.12 **IF** pH analysis will be performed, go to Section 12 (pH Monitoring).

☐ 11.2.13 **IF** pH analysis will **NOT** be performed, go to Section 13 (System Flush).

11.3 Procedure for Calculated Gas Method, Accident Condition

NOTE: This method uses 500 cc gas tank and associated tubing.

☐ 11.3.1 Place switch SS2 in "RD1" position.

_____ °F 11.3.2 Record initial temperature reading on TG2.

☐ 11.3.3 Open the following valves:
- 205
- 203.

☐ 11.3.4 Record initial pressure:
PG4 = _____ psia
PG5 = _____ psia.

☐ 11.3.5 Close 203.

NOTE: The next step allows gas to escape from top of liquid tank into 500 cc gas tank and energizes vibrator.

☐ 11.3.6 Open the following valves:
- 207
- S-109 (Vibrator).

☐ 11.3.7 Monitor PG4.

☐ 11.3.8 **IF** pressure stays below 25 psia, open 203.

☐ 11.3.9 **IF** pressure does **NOT** stay below 25 psia, continue monitoring PG4.

☐ 11.3.10 **WHEN** pressure **AND** temperature stabilize, record final temperature and pressure.
PG4 = _____ psia
PG5 = _____ psia (if used)
TG2 = _____ °F

11.3.11 Close the following valves and de-energize vibrator:
- ☐ 203
- ☐ 205
- ☐ 207
- ☐ 103
- ☐ 109.

☐ 11.3.12 **IF** pH analysis will be performed, go to Section 12 (pH Monitoring).

☐ 11.3.13 **IF** pH will **NOT** be performed, go to Section 13 (System Flush).

11.4 Procedure for Nitrogen Stripping Method

NOTE: This method uses both 30 cc and 500 cc gas tanks and tubing.

☐ 11.4.1 Open or check open 103.

☐ 11.4.2 Align 500 cc gas tank to liquid tank by opening 207.

☐ 11.4.3 Open 106 to bubble nitrogen through liquid tank.

☐ 11.4.4 Monitor PG1.

☐ 11.4.5 **WHEN** pressure in liquid tank is ≈ 3 psig greater than Step 10.2.10 pressure reading, close 207 to trap gas sample.

☐ 11.4.6 Open 205 and 204 to allow sample gas to flow into 30 cc gas tank.

☐ 11.4.7 Monitor pressure in gas tanks on PG4.

☐ 11.4.8 **WHEN** pressure stabilizes, isolate 30 cc gas cylinder by closing 204.

NOTE: The next step allows more gas to flow from liquid tank to 500 cc gas tank and energizes vibrator.

☐ 11.4.9 Open the following valves:
207
106
109.

☐ 11.4.10 Monitor PG4.

NOTE:
1. The next step traps sample in 500 cc gas tank.
2. Monitoring PT4 instead of PT1 will give better accuracy based on range of transmitters.

11.4.11 **WHEN** pressure in the 500 cc gas tank, PG4, is 1 psia greater than Step 5.2.4 pressure reading (atmospheric), close:
- ☐ 207
- ☐ 103
- ☐ 106
- ☐ 109.

☐ 11.4.12 Open 204 to allow more sample into 30 cc gas tank.

☐ 11.4.13 Monitor pressure on PG4 to ensure stabilization near atmospheric pressure (PG4 reading in Step 5.2.4).

NOTE: The next step traps sample in 30 cc gas tank.

☐ 11.4.14 **WHEN** stabilization near atmospheric pressure is obtained, close:
204
205.

☐ 11.4.15 This sample may be collected using gas syringe per Section 15 (Gas Sample Retrieval) or by using Enclosure 20.7 (PALSS Sampling).

☐ 11.4.16 **IF** pH analysis will **NOT** be performed, go to Section 13 (System Flush).

12. pH Monitoring

12.1 Initial Conditions

None.

12.2 Procedure

12.2.1 Open the following valves to pressurize liquid tank:

- ☐ 202
- ☐ 205
- ☐ 103
- ☐ 207.

☐ 12.2.2 Open 102 to move sample fluid into pH probe housing.

12.2.3 **AFTER** at least 20 seconds, close the following valves to secure flow path pressurizing pH probe housing:

- ☐ 102
- ☐ 103
- ☐ 207
- ☐ 205
- ☐ 202.

NOTE: The pH value for solution recirculated via ND sump after a LOCA is expected to be between 7.5 - 9.5; this pH range minimizes iodine evolution and the effect of chloride and caustic stress corrosion.

☐ 12.2.4 **WHEN** pH **AND** temperature stabilize, record pH and temperature from pH meter:
pH = _____
temp = _____°C.

☐ 12.2.5 **IF** Unit is on containment sump recirc **AND** pH is outside 7.5 - 9.5 range, immediately notify OSC Chemistry Representative.

13. System Flush

13.1 Initial Conditions

None.

13.2 Procedure

☐ 13.2.1 Ensure 204 and 206 remain **closed** and sample injection loop selected (501, 502 and/or 503) is de-activated.

13.2.2 **IF** either LT1 **OR** LT2 indicators are illuminated, perform the following:

☐ 13.2.2.1 Activate 110 (sump pump) until indicator light clears for LT2 and/or LT1.

☐ 13.2.2.2 De-activate 110.

13.2.3 Open the following valves to flush 500 cc liquid tank:
- ☐ 101
- ☐ 104
- ☐ 401 to ≈ 10.0 on dial
- ☐ PB-5 (Demin Water).

☐ 13.2.4 Flush at least 3 minutes.

☐ 13.2.5 Close the following valves to secure 500 cc liquid tank flush:
104
401.

☐ 13.2.6 **IF** pH housing was **NOT** used, go to Step 13.2.9.

☐ 13.2.7 Open the following valves to flush pH housing:
102
105.

☐ 13.2.8 Flush at least 3 minutes.

☐ 13.2.9 Close the following valves to secure pH housing flush:
101
102
105.

☐ 13.2.10 Open the following valves to flush sample header:
107
402.

☐ 13.2.11 Flush a minimum of 3 minutes.

☐ 13.2.12 Close the following valves to secure sample header flush:
402
107.

☐ 13.2.13 Open the following valves for piping flush:
101
104
401 to ≈ 10.0 on dial.

☐ 13.2.14 Flush a minimum of 4 minutes.

13.2.15 Close the following valves to secure flush:
- ☐ 101
- ☐ 104
- ☐ 401
- ☐ PB-5 (Demin Water).

☐ 13.2.16 **IF** gas syringe samples will **NOT** be taken, the following may be performed prior to retrieval of liquid sample:
- Section 16 (30 cc Gas Tank and 500 cc Gas Tank Purge)
- Section 17 (System Shutdown).

14. Liquid Sample Retrieval

NOTE: This section may also be performed using Enclosure 20.7 (PALSS Sampling).

14.1 Initial Conditions

☐ Sample vials have been evacuated.

14.2 Procedure

☐ 14.2.1 Insert sample vial onto appropriate needle.

☐ 14.2.2 Turn CV-612 to desired injection valve:
- 100 µl loop
- 1 ml loop
- 5 ml loop.

CAUTION: Operating CV-613 too rapidly may eject sample vial due to high pressure.

☐ 14.2.3 **Slowly** turn CV-613 toward "N_2" position until sample begins transfer.

☐ 14.2.4 Once liquid sample has been collected, turn CV-613 to "Vent" position.

☐ 14.2.5 Wait ≈ 2 seconds for sample line depressurization prior to removing vial.

☐ 14.2.6 **IF** additional loops will be sampled, repeat Steps 14.2.1 - 14.2.5.

☐ 14.2.7 Turn CV-612 to "Off" position.

NOTE: 1. Steps 14.2.8 and 14.2.9 may be performed at convenience of operator.

2. Buffer tanks will accommodate two separate calibrations.

☐ 14.2.8 **IF** buffer tank contents need to be replaced, fill only ≈ 80% full to allow for proper pressurization for transfer.

☐ 14.2.9 Remove dilution tank and refill with reagent grade water.

☐ 14.2.10 Reinstall dilution tank at earliest and safest time.

15. Gas Sample Retrieval

NOTE: 1. This section applicable for stripped gas samples only.

2. This section may also be performed using Enclosure 20.7 (PALSS Sampling).

15.1 Initial Conditions

None.

15.2 Procedure

☐ 15.2.1 Insert needle through sample septum.

☐ 15.2.2 Purge syringe twice without withdrawing needle from septum.

☐ 15.2.3 Pull plunger back until 1 ml (or CC) of gas is obtained.

☐ 15.2.4 Lock syringe.

☐ 15.2.5 Withdraw needle from septum.

☐ 15.2.6 **IF** necessary, repeat Steps 15.2.1 through 15.2.5 for additional syringes.

16. 30 cc Gas Tank and 500 cc Gas Tank Purge

NOTE: This section is performed if liquid sample was relieved into gas tank for calculated method or stripped gas sample.

16.1 Initial Conditions

None.

16.2 Procedure

☐ 16.2.1 IF stripped gas sample will be obtained, do NOT purge until sample is retrieved.

16.2.2 Open the following valves for at least 1 minute:
- ☐ 202
- ☐ 204
- ☐ 206
- ☐ 103
- ☐ 104
- ☐ 401.

☐ 16.2.3 Close the following valves:
204
206.

☐ 16.2.4 Open the following valves:
205
207.

☐ 16.2.5 Continue purge at least 1 minute.

16.2.6 Close the following valves:
- ☐ 202
- ☐ 205
- ☐ 207
- ☐ 103
- ☐ 104
- ☐ 401.

17. System Shutdown

17.1 Initial Conditions

None.

17.2 Procedure

☐ 17.2.1 Check closed all motor operated (push button) valves.

☐ 17.2.2 Check closed all solenoid and control valves (place in vertical de-energized position).

☐ 17.2.3 Position 401 and 402 to ≈ "3.0" on control dials.

☐ 17.2.4 Return valve power switch, SW1, to "Off" position.

☐ 17.2.5 Return key switch KS1 to "OFF" position.

☐ 17.2.6 Remove key.

☐ 17.2.7 **IF Unit 1** was sampled, close or request Operations close the following valves:

1KC-973	KC to PALSS Supply Isol
1KC-873	PALSS Return to KC.

☐ 17.2.8 **IF Unit 2** was sampled, close or request Operations close the following valves:

2KC-974	Liquid Sample Panel Outlet Isol
2KC-973	KC to PALSS Supply Isol.

☐ 17.2.9 **IF** it is suspected that radiological conditions have significantly changed, contact RP for survey.

☐ 17.2.10 **IF** waste was routed to WDT, open appropriate Unit valve:

1WL-1303	2WL-1303	Containment Sump Manual Isol.

☐ 17.2.11 **IF** waste was routed to Containment Sump, open appropriate Unit valve:

1WL-1304	2WL-1304	WDT Manual Isol.

☐ 17.2.12 **IF** nitrogen strip method was used, close CV-603 (inside left of sample panel).

☐ 17.2.13 Close (back out) appropriate valve to remove supply pressure from PALSS Panel:

1NM-458	2NM-458	PALS Nitrogen Header Regulator.

18. Sample Analyses/Documentation of Unusual Alignments

18.1 Initial Conditions

None.

18.2 Procedure

☐ 18.2.1 **IF** EMF48 was isolated **OR** any other unusual alignments exist, document per Chemistry R&R and/or Operations Removal and Restoration.

☐ 18.2.2 Refer to appropriate procedure for sample loop sizes, dilution methods, etc., to complete sample analyses:
- OP/1/B/6200/048 (Unit 1 PALSS Routine Operation)
- OP/2/B/6200/048 (Unit 2 PALSS Routine Operation).

NOTE: During containment recirculation, coolant is exposed to the atmosphere and will be oxygen saturated.

☐ 18.2.3 **IF** chlorides are $\geq$ 150 ppb **AND** containment sump is **NOT** on recirculation, analyze for oxygen to evaluate corrosion potential.

☐ 18.2.4 **IF** Dose Equivalent Iodine exceeds Technical Specification Limits, refer to Technical Specifications to evaluate actions required.

19. References

19.1 NUREG-0737, Section II.B.3.

19.2 ONS Test Procedure for Operation of Post Accident Liquid Sampling System.

19.3 Post Accident Liquid Sampling System Manual.

19.4 MNS Technical Specification 6.8.1b.

19.5 April 23, 1987, Letter Rick Eaker to W.M. Funderburke, Subject: PALSS Definition of Operability and Reliability, File MC-715.15.

19.6 August 8, 1990, Letter Rick Eaker to Richard Michael, Subject: PALSS Accuracy Requirement for Radiochemical Analyses, File MC-715.15.

19.7 November 18, 1991 Memo to File, Subject: PALSS Total Gas Equation.

19.8 McGuire Nuclear Station, OP/1/B/6200/048 (Unit 1 PALSS Routine Operation), Primary Chemistry.

19.9 McGuire Nuclear Station, OP/2/B/6200/048 (Unit 2 PALSS Routine Operation), Primary Chemistry.

19.10 McGuire Nuclear Station, Chemistry Manual 2.6 (Chemistry Safety).

19.11 McGuire Nuclear Station, Chemistry Manual 2.11 (Chemistry Special Orders and Equipment Operability Log).

19.12 PIP # 0-M97-4254, Self Assessment CHM-SA 97-7 Assessment of Laboratory Practices.{1}

19.13 PIP # M-99-01315, Identify all Chemistry procedures that cause a significant change in radiological conditions. RP will perform cross-disciplinary reviews.{2}

20. Enclosures

20.1 Unit 1 PALSS Contact Checklist.

20.2 Unit 2 PALSS Contact Checklist.

20.3 Diagram of Control Panel.

20.4 Diagram of Sample Panel.

20.5 Elementary Flow Diagram.

20.6 PALSS Inlet Filter/Strainer Backflush.

20.7 PALSS Sampling.

Enclosure 20.1
Unit 1 PALSS Contact Checklist

☐ 1. **IF** this enclosure is being performed by OSC/TSC support personnel, verify enclosure with Control Copy via telephone.

☐ 2. **IF** sample temperature is expected to be ≥ 100°F, verify with Operations that **one** of the following conditions will exist while sampling:
- 1KC A Train will be in service
- 1KC B Train will be in service with two pumps running and crosstied to 1KC A Train.

NOTE: 1. 1KC-873 (PALSS Return to KC) is located on 733' elevation, 5' high, 20' north of KC pump 1A2.

2. 1KC-973 (KC to PALSS Supply Isol) is located on 733' elevation, 4' high, just north of KC pump 1A2.

☐ 3. **IF** sample temperature is expected to be ≥ 100°F, request permission to open or request Operations open the following valves **in order**:
1KC-873 PALSS Return to KC
1KC-973 KC to PALSS Supply Isol

☐ 4. Ensure YM is available.

☐ 5. **IF** sampling NC Hotleg 1 **OR** NC Hotleg 4 during Phase A containment isolation, go to Step 8.

☐ 6. **IF** sampling ND during Phase A containment isolation, perform the following:

☐ 6.1 "N/A" and Initial Step 8.

☐ 6.2 Go to Step 10.

☐ 7. **IF** Phase A containment isolation has **NOT** occurred, perform the following:

☐ 7.1 "N/A" and Initial Steps 8 - 10.

☐ 7.2 Go to Step 11.

NOTE: 1NM-479 (Supply Isolation To 1EMF 48) is a manual valve located at 1EMF 48 (U1 Reactor Coolant Rad Monitor). **WHEN** Phase A isolation occurs, KC cooling is lost to 1EMF 48. 1EMF 48 should be isolated **prior** to opening Hotleg containment isolation valves.

8. Close 1NM-479 (Supply Isolation to 1EMF-48).

_____
Initials

VERIFIED WITH CONTROL COPY _____/_____ (Initials/Date)

Unit 1

Enclosure 20.1
Unit 1 PALSS Contact Checklist

☐ 9. Ensure there are no sample valves open at sample sink.

_____ 10. Contact Operations Emergency Coordinator to:
Initials

☐ 10.1 Obtain permission to use containment isolation bypass switches as necessary to obtain a PALSS sample.

☐ 10.2 Check desired sample location (i.e., ND, NC Hotleg via forced or natural recirc).

☐ 11. **IF** PALSS waste will be returned to containment sump, request Control Room open the following valves:

1WL-1301B	PALSS Sample Return Outside Cont Isol Valve
1WL-1302A	PALSS Sample Return Inside Cont Isol Valve.

☐ 12. **IF** sampling **1NC Hotleg 1**, request Operations align the following valves:

Open	1NM-22A	NC Hotleg 1 Sample Line Inside Cont Isol
Open	1NM-26B	NC Hotleg Sample Hdr Outside Cont Isol
Close	1NM-25A	NC Hotleg 4 Sample Line Inside Cont Isol.

☐ 13. **IF** sampling **1NC Hotleg 4**, request Operations align the following valves:

Open	1NM-25A	NC Hotleg 4 Sample Line Inside Cont Isol
Open	1NM-26B	NC Hotleg Sample Hdr Outside Cont Isol
Close	1NM-22A	NC Hotleg 1 Sample Line Inside Cont Isol.

☐ 14. **IF** sampling **1ND A AND** ND is **NOT** injecting, request Operations open 1ND-68A (ND Pump 1A and Hx 1A Miniflow Stop).

☐ 15. **IF** sampling **1ND B AND** ND is **NOT** injecting, request Operations open 1ND-67B (ND Pump 1B and Hx 1B Miniflow Stop).

Enclosure 20.1
Unit 1 PALSS Contact Checklist

☐ 16. Complete and review the following information with PALSS operator/sampler to communicate:

- Desired sample point, analyses, conditions, etc.
- Outstanding items to be performed prior to actuating panel.

Sample point: _____ (1NC HL1, 1NC HL4, 1ND A, 1ND B)
Analyses required: _____ (pH, H_2, B, isotopic, Cl)
Return waste to: _____ (containment or WDT)
Need 1KC-973 (KC to PALSS Supply Isol)?
Need 1KC-873 (PALSS Return to KC)? _____ (**IF** sample ≥ 100°F, YES)
Comments:_____
_____
_____

Phone/Beeper Numbers:	OSC Contact: _____
	PALSS Control panel: 2392
	PALSS Sample panel: 2374
	Chem Hot Lab: 2593/2592

Enclosure 20.2
Unit 2 PALSS Contact Checklist

☐ 1. **IF** this enclosure is being performed by OSC/TSC support personnel, verify enclosure with Control Copy via telephone.

☐ 2. **IF** sample temperature is expected to be ≥ 100°F, verify with Operations that **one** of the following conditions will exist while sampling:
- 2KC A Train will be in service
- 2KC B Train will be in service with two pumps running and crosstied to 2KC A Train.

NOTE: 1. 2KC-973 (KC to PALSS Supply Isol) is located on 750' elevation, 5' north of column GG-56, 8' high.

2. 2KC-974 (Liquid Sample Panel Outlet Isol) is located on 750' elevation, just north of column HH-58, 10' high.

☐ 3. **IF** sample temperature is expected to be ≥ 100°F, request permission to open or request Operations open the following valves:
2KC-973 KC to PALSS Supply Isol
2KC-974 Liquid Sample Panel Outlet Isol.

☐ 4. Ensure YM is available.

☐ 5. **IF** sampling NC Hotleg 1 **OR** NC Hotleg 4 during Phase A containment isolation, go to Step 8.

6. **IF** sampling ND during Phase A containment isolation, perform the following:

☐ 6.1 "N/A" and Initial Step 8.

☐ 6.2 Go to Step 10.

7. **IF** Phase A containment isolation has **NOT** occurred, perform the following:

☐ 7.1 "N/A" and Initial Steps 8 - 10.

☐ 7.2 Go to Step 11.

NOTE: 2NM-409 (Supply Isolation To 2EMF 48) is a manual valve located at 2EMF 48 (2EMF-48 Reactor Coolant Rad Monitor). **WHEN** Phase A isolation occurs, KC cooling is lost to 2EMF 48. 2EMF 48 should be isolated **prior** to opening Hotleg containment isolation valves.

_____ 8. Close 2NM-409 (Supply Isolation to 2EMF-48).
Initials

VERIFIED WITH CONTROL COPY _____/_____ (Initials/Date)

Unit 2

Enclosure 20.2
Unit 2 PALSS Contact Checklist

☐ 9. Ensure there are no sample valves open at sample sink.

10. Contact Operations Emergency Coordinator to:

Initials

☐ 10.1 Obtain permission to use containment isolation bypass switches as necessary to obtain a PALSS sample.

☐ 10.2 Check desired sample location (i.e., ND, NC Hotleg via forced or natural recirc).

☐ 11. **IF** PALSS waste will be returned to containment sump, request Control Room open the following valves:

2WL-1301B	PALSS Sample Return Outside Cont Isol Valve
2WL-1302A	PALSS Sample Return Inside Cont Isol Valve.

☐ 12. **IF** sampling **2NC Hotleg 1**, request Operations align the following valves:

Open	2NM-22A	NC Hotleg 1 Sample Line Inside Cont Isol
Open	2NM-26B	NC Hotleg Sample Hdr Outside Cont Isol
Close	2NM-25A	NC Hotleg 4 Sample Line Inside Cont Isol.

☐ 13. **IF** sampling **2NC Hotleg 4**, request Operations align the following valves:

Open	2NM-25A	NC Hotleg 4 Sample Line Inside Cont Isol
Open	2NM-26B	NC Hotleg Sample Hdr Outside Cont Isol
Close	2NM-22A	NC Hotleg 1 Sample Line Inside Cont Isol.

☐ 14. **IF** sampling **2ND A AND** ND is **NOT** injecting, request Operations open 2ND-68A (ND Pump 2A and Hx 2A Miniflow Stop).

☐ 15. **IF** sampling **2ND B AND** ND is **NOT** injecting, request Operations open 2ND-67B (ND Pump 2B and Hx 2B Miniflow Stop).

Enclosure 20.2
Unit 2 PALSS Contact Checklist

☐ 16. Complete and review the following information with PALSS operator/sampler to communicate:

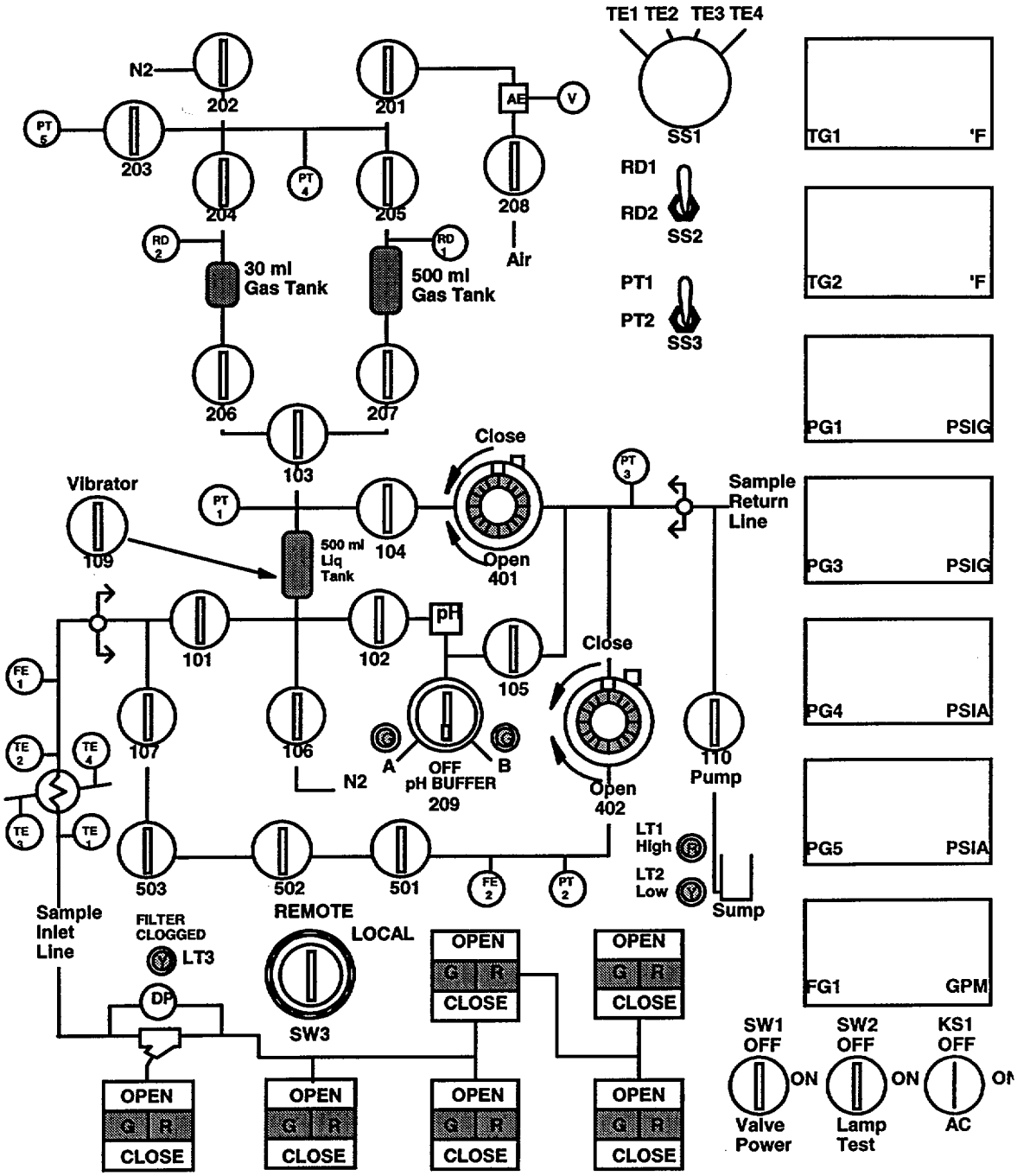
- Desired sample point, analyses, conditions, etc.
- Outstanding items to be performed prior to actuating panel.

Sample point: _____ (2NC HL1, 2NC HL4, 2ND A, 2ND B)
Analyses required: _____ (pH, H_2, B, isotopic, Cl^-)
Return waste to: _____ (containment or WDT)
Need 2KC-973 (KC to PALSS Supply Isol)?
Need 2KC-974 (Liquid Sample Panel Outlet Isol)? _____ (**IF** sample ≥ 100°F, YES)
Comments: _____
_____
_____

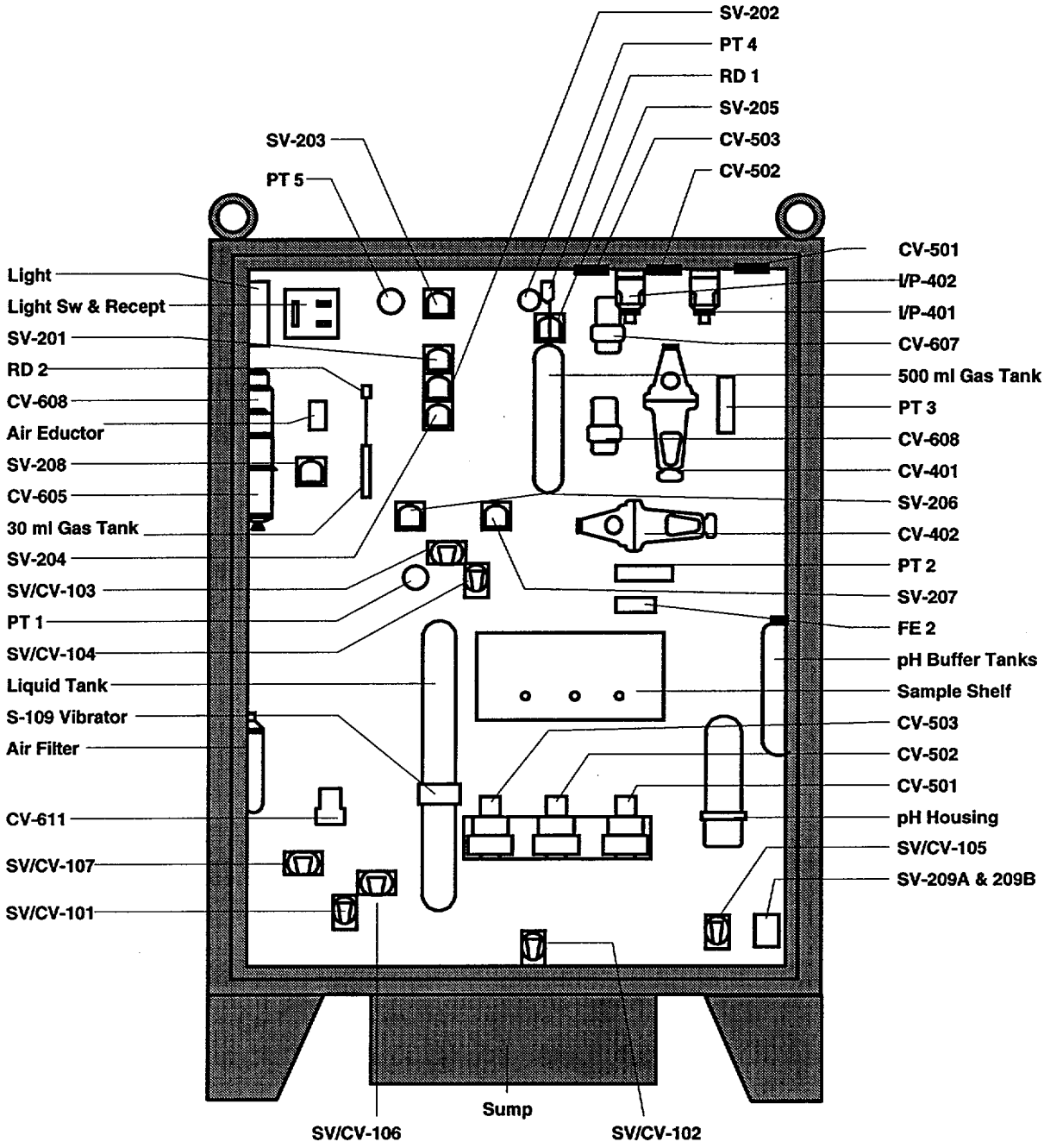
Phone/Beeper Numbers:

OSC Contact: _____
PALSS Control panel: 2387
PALSS Sample panel: 2374
Chem Hot Lab: 2593/2592

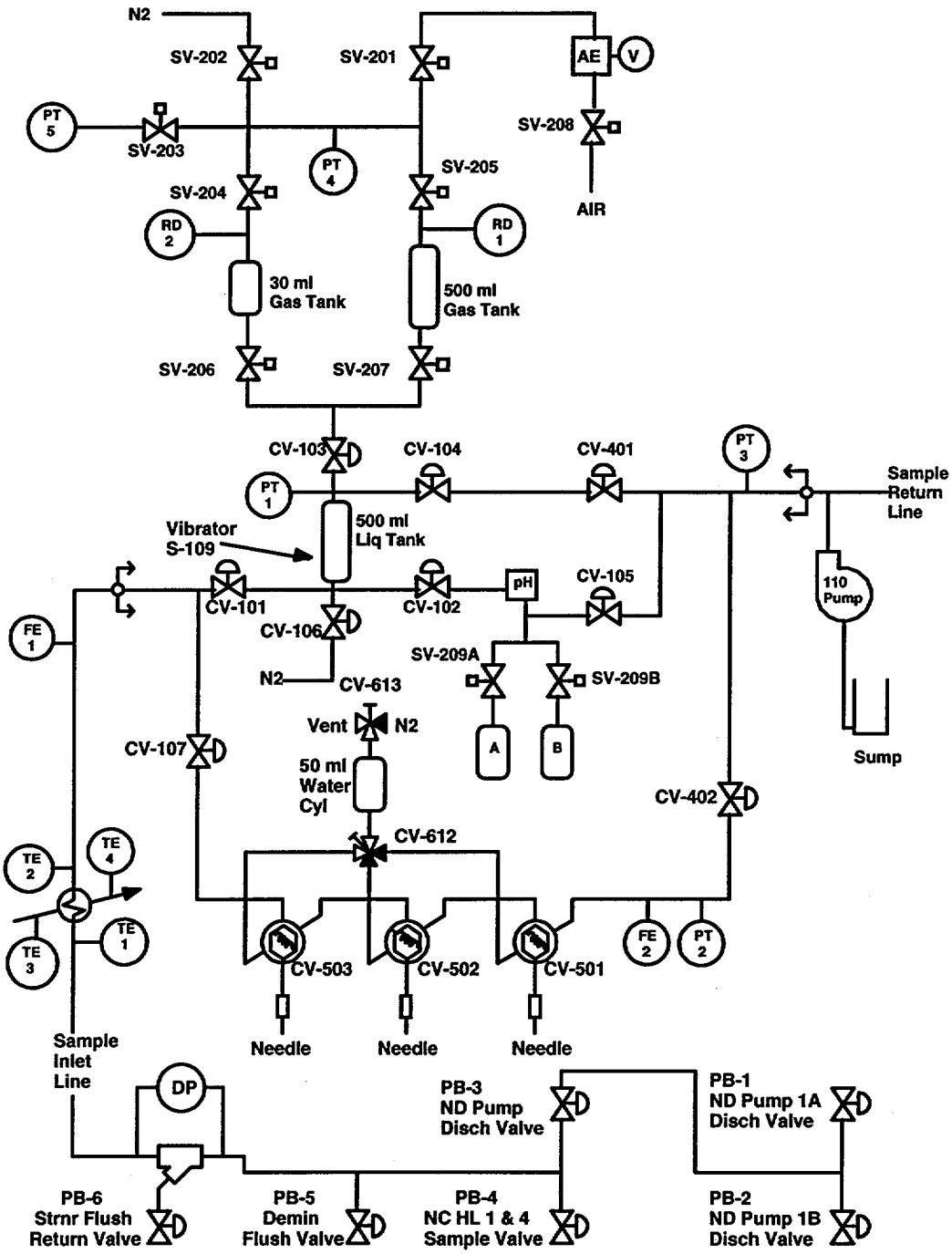
Enclosure 20.3
Diagram of Control Panel



Enclosure 20.4
Diagram of Sample Panel



Enclosure 20.5
Elementary Flow Diagram



Enclosure 20.6
PALSS Inlet Filter/Strainer Backflush

☐ 1. **IF** LT3 is illuminated, close appropriate sample supply valve:
PB-1
PB-2
PB-3
PB-4.

☐ 2. Close the following valves:
101
104.

☐ 3. Open the following valves:
PB 5
PB 6.

☐ 4. Flush at least 3 minutes.

☐ 5. Close the following valves:
PB 5
PB 6.

☐ 6. Open appropriate sample supply valve to resume sampling:
PB-1
PB-2
PB-3
PB-4.

☐ 7. Open the following valves:
104
101.

☐ 8. **IF** LT3 is still illuminated **AND** flow is limited to less than 0.25 gpm as shown on FG1, **stop** sampling and service strainer.

☐ 9. Notify Chemistry Management of maintenance performed.

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Enclosure 20.7
PALSS Sampling

NOTE: This enclosure has been classified as **REFERENCE USE.**

1. Limits and Precautions

1.1 One or more of the following conditions exist:
- Reactor Coolant System (NC) Gross Specific Activity is expected to be or is known to be greater than 200 µCi/ml
- Radiation levels in the Nuclear Sampling Laboratory (NM Lab) and at local sample points for the Residual Heat Removal System (ND) prohibit access
- Post accident sampling is being simulated.

1.2 **IF** PALSS is determined to be inoperable, request Operations log PALSS as inoperable in Tech Spec Logbook. Once PALSS is operable, request Operations log PALSS as operable in Tech Spec Logbook. This information should also be logged in Primary Chemistry Log, Primary Status Board, and documented by R&R.

1.3 During an accident situation, Radiation Protection (RP) personnel must assess the need for radiation monitoring during sampling at the liquid sample and control panels in the Auxiliary Building.

1.4 The following list from Chemistry Manual Section 2.6 (Chemistry Safety) has been identified as applicable for this procedure. Comply with these and other applicable sections: {1}
- General Work Practices
- Personnel Conduct in Contaminated Areas
- Hazardous Chemicals/Substances and Atmospheric Hazards
- Housekeeping
- Incident Reporting
- Personal Protective Equipment
- Walking/Working Surfaces
- Compressed Gas Cylinder Practices.

1.5 **WHEN** handling radioactive samples, comply with applicable SRWP/RWP.

1.6 Breaker for the Unit 1 PALSS panel and sump pump is located on 750' elevation at column MM56, PNLBD 1KJ, breaker #34 (PALSS Panel Breaker).
Phone at Control panel - Ext. 2392
Phone at Sample panel - Ext. 2374.

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1.7 Breaker for the Unit 2 PALSS panel and sump pump is located on 750' elevation at column NN57, PNLBD 2KJ, breaker #46 (PALSS Panel Breaker).
Phone at Control panel - Ext. 2387
Phone at Sample panel - Ext. 2374.

1.8 During Phase A Isolation, inside and outside containment isolation valves for NC Hot Leg sample line and PALSS sample return line will close. Once this happens, valves **CANNOT** be opened by normal methods. **IF** a sample is needed during this isolation period, these valves can be opened by bypassing isolation signal. The bypass switches are located in Control Room. Upon Chemistry request and with approval of Emergency Coordinator, these switches can be placed in "Bypass" position to allow Hot Leg and PALSS inside and outside containment isolation valves to be opened. It may be necessary to isolate Hot Leg EMF before introducing flow through NC Hot Leg sample line. The decision to pull a sample and use bypass switches will be made by Emergency Coordinator.

1.9 During a Phase A Isolation, KC flow is lost to NM lab heat exchangers. In this case, PALSS is the only cooled reactor coolant sample obtainable. The KC non-essential header must be reestablished by Operations before NM samples can be obtained.

1.10 Sample loop volumes as supplied by the manufacturer are nominal and should be verified. Refer to OP/1/B/6200/048 (Unit 1 PALSS Routine Operation) and OP/2/B/6200/048 (Unit 2 PALSS Routine Operation) for current loop volumes. A volume of 2 microliters is also added to each loop volume to account for the volume of Rheodyne valves.

1.11 Waste Drain Tank (WDT) design pressure is 150 psig maximum. The PALSS system must be operated to discharge < 150 psig when aligned to WDT.

2. Initial Conditions

Sample vials have been evacuated for Liquid Sample Retrieval.

3. Procedure

3.1 Liquid Sample Retrieval

WARNING: During an accident situation, Radiation Protection (RP) personnel must assess the need for radiation monitoring during sampling at the liquid sample and control panels in the Auxiliary Building.

3.1.1 Contact RP to determine if RP coverage is necessary.{2}

3.1.2 Insert sample vial onto appropriate needle.

3.1.3 Turn CV-612 to desired injection valve:
- 100 µl loop
- 1 ml loop
- 5 ml loop.

CAUTION: Operating CV-613 too rapidly may eject sample vial due to high pressure.

3.1.4 **Slowly** turn CV-613 toward "N_2" position until sample begins transfer.

3.1.5 Once liquid sample has been collected, turn CV-613 to "Vent" position.

3.1.6 Wait ≈ 2 seconds for sample line depressurization prior to removing vial.

3.1.7 **IF** additional loops will be sampled, repeat Steps 3.1.2 - 3.1.6.

3.1.8 Turn CV-612 to "Off" position.

NOTE:
1. Steps 3.1.9 and 3.1.10 may be performed at convenience of operator.
2. Buffer tanks will accommodate two separate calibrations.

3.1.9 **IF** buffer tank contents need to be replaced, fill only ≈ 80% full to allow for proper pressurization for transfer.

3.1.10 Remove dilution tank and refill with reagent grade water.

3.2 Gas Sample Retrieval

NOTE: This section applicable for stripped gas samples only.

3.2.1 Insert needle through sample septum.

3.2.2 Purge syringe twice without withdrawing needle from septum.

3.2.3 Pull plunger back until 1 ml (or CC) of gas is obtained.

3.2.4 Lock syringe.

3.2.5 Withdraw needle from septum.

3.2.6 **IF** necessary, repeat Steps 3.2.1 through 3.2.5 for additional syringes.

(R06-97)

Duke Power Company
PROCEDURE PROCESS RECORD

(1) ID No. **HP/0/B/1009/022**
Revision No. **002**

PREPARATION

(2) Station **McGuire Nuclear Station**

(3) Procedure Title **Accident and Emergency Response**

(4) Prepared By G.E. Terrell Date 1/12/00

(5) Requires 10CFR50.59 evaluation?

- ☑ Yes (New procedure or revision with major changes)
- ☐ No (Revision with minor changes)
- ☐ No (To incorporate previously approved changes)

(6) Reviewed By Robert E. Beckham (QR) Date 1/13/00

Cross-Disciplinary Review By _____ (QR) NA RES Date 1/13/00

Reactivity Mgmt. Review By _____ (QR) NA RES Date 1/13/00

(7) Additional Reviews

Reviewed By K.L. Murray Date 1-18-00

Reviewed By [signature] Date 1/26/00

(8) Temporary Approval (*if necessary*)

By _____ (SRO/QR) Date _____

By _____ (QR) Date _____

(9) Approved By [signature] Date ~~1/18/00~~ G.E. Terrell 1/26/00

PERFORMANCE (Compare with Control Copy every 14 calendar days while work is being performed.)

(10) Compared with Control Copy _____ Date _____

Compared with Control Copy _____ Date _____

Compared with Control Copy _____ Date _____

(11) Date(s) Performed _____

Work Order Number (WO#) _____

COMPLETION

(12) Procedure Completion Verification

- ☐ Yes ☐ NA Check lists and/or blanks initialed, signed, dated, or filled in NA, as appropriate?
- ☐ Yes ☐ NA Listed enclosures attached?
- ☐ Yes ☐ NA Data sheets attached, completed, dated, and signed?
- ☐ Yes ☐ NA Charts, graphs, etc. attached dated, identified, and marked?
- ☐ Yes ☐ NA Procedure requirements met?

Verified By _____ Date _____

(13) Procedure Completion Approved _____ Date _____

(14) Remarks (*Attach additional pages, if necessary*)

Duke Power Company McGuire Nuclear Station **Accident and Emergency Response** **Information Use**	Procedure No. HP/**0**/B/1009/022 Revision No. 002 Electronic Reference No. MC0095LX

Accident and Emergency Response

1. Purpose

This procedure describes the actions to be taken by personnel to effectively and efficiently cope with a variety of accident conditions. Responses for the following accidents are included in this procedure:

1.1 Spills

1.2 Airborne releases

1.3 Personnel injury involving contamination

1.4 Fires in the Restricted Area

1.5 New Fuel Storage - Inadvertent Criticality Event

1.6 Kr-85 Hazard following a spent fuel accident

The level of use for this procedure is Reference Use.

2. References

2.1 RP/0/A/5700/05, Care and Transportation of Contaminated Individuals

2.2 SH/0/B/2001/003, Investigation of Skin and Clothing Contaminations

2.3 HP/0/B/1008/010, Airborne Radioactivity Control and Accountability

2.4 HP/0/B/1009/023, Environmental Monitoring for Emergency Conditions

2.5 Radiation Protection Policy Manual, Policy Number II-02, Planned Special Exposures and Emergency Dose Limits for Occupationally Exposed Personnel

2.6 Radiation Protection Policy Manual, Policy Number II-01, Occupational Dose Limits

2.7 SH/0/B/2000/005, Posting of Radiation Control Zones

2.8 Nuclear System Directive 112, Fire Brigade Organization, Training Responsibilities

2.9 SH/0/B/2000/004, Taking, Counting, and Recording Surveys

2.10 HP/0/B/1009/003, Recovery Plan

3. Limits and Precautions

3.1 The Station Radiation Protection Manager (RPM) or his designee shall determine the need for high range personnel and/or extremity dosimetry and respiratory protection prior to any recovery personnel entering the plant after an accident/incident.

3.2 In accident conditions where exposure in excess of normal quarterly limits is anticipated, i.e., planned emergency exposure, refer to Radiation Protection Policy Manual Policy Number II-02 (Reference 2.5).

3.3 Personnel decontamination shall not take precedence over proper medical/surgical care.

3.4 The Station Radiation Protection Manager is to be notified as soon as possible of all incidents involving radioactive materials (spills, leaks, source breakage, loss, etc.) and of all radiation accidents, accidental releases, or injuries to personnel (wounds, contamination, overexposure, ingestion or inhalation of radioactive material).

4. Procedure

4.1 Spills

4.1.1 The general rule of thumb for spills is the SWIMS concept:

4.1.1.1 Stop the spill - by righting the container; isolating the system, if possible.

4.1.1.2 Warn others - notify other personnel in the area or who may be affected by the spill and Radiation Protection.

4.1.1.3 Isolate the area - through the use of barricades, signs, etc.

4.1.1.4 Minimize exposure and contamination spread - using only those personnel necessary for cleanup and utilizing absorbent material at the outer edges.

4.1.1.5 Secure unfiltered exhaust and all supply ventilation in cases where airborne contamination may be a problem.

4.1.2 Major Spills

4.1.2.1 Handle as in 4.1.1.

4.1.2.2 Notify the Operations Shift Manager/Designee of the circumstances.

4.1.2.3 If the spill is uncontrollable or cannot be contained inside the RCA notify the Station Radiation Protection Manager as soon as possible.

4.2 Inadvertent release of radioactive particulates and/or iodines within the Radiation Control Area.

4.2.1 Notify all persons to vacate the room or immediate areas at once, and to proceed to the nearest safe location, taking care not to spread contamination unnecessarily.

4.2.2 Notify the Operations Shift Manager/Designee immediately.

4.2.3 Notify Radiation Protection immediately and report all known or suspected inhalation of radioactive materials. Assume that all persons immediately involved were exposed.

4.2.4 Proceed to nearest contaminated change room.

4.2.5 Take immediate steps to monitor and decontaminate personnel involved.

4.2.6 Radiation Protection shall:

4.2.6.1 Monitor all persons suspected of being contaminated, and assist with their decontamination.

4.2.6.2 Take immediate steps to evaluate the radiological situation, and determine the requirements to reenter the area.

4.2.6.3 Determine the cause of the contamination, and take steps to remedy the situation.

4.2.6.4 Supervise reentry, decontamination and recovery work.

4.2.6.5 Approve or limit further use of the area or equipment involved.

4.2.6.6 Perform a complete survey of the area before permitting resumption of work, after decontamination and cleanup have been completed.

4.2.6.7 Prepare records of the incident, for station records and report purposes.

4.2.6.8 Notify the Compliance Engineer about the incident and reports.

4.3 Personnel injury involving radiation or radioactive materials.

4.3.1 In the event of an injury involving radiation or radioactive materials notify the Operations Shift Manager/Designee immediately.

4.3.2 Radiation Protection shall evaluate the radiological implications and shall assist in radiation and contamination control and in decontaminating personnel as necessary per SH/0/B/2001/003 (Reference 2.2).

4.3.3 In case of severe injury, decontamination shall not interfere with or take precedence over proper medical and surgical care.

NOTE: MERT responders are responsible for all decisions involving patient care, including the need for transportation to an off-site facility.

4.3.3.1 Notify the Operations Shift Manager/Designee of any special considerations (i.e., type of injury, contamination levels present, etc.) according to RP/0/A/5700/05, Care and Transportation of Contaminated Injured Individual(s) from Site to Offsite Medical Facility (Reference 2.1). Operations Shift Manager/Designee will notify off-site facilities.

4.3.3.2 First aid shall be given, and a Senior Radiation Protection Technician shall accompany the injured person(s) to the doctor or hospital, taking precautions to prevent the spread of contamination. If Radiation Protection personnel are available, one technician should accompany each vehicle transporting injured person.

4.3.3.3 If a contaminated injury occurs during nights, weekends, or holidays notify one of the designated management personnel by telephone or emergency pager. A call list is posted in the Shift Lab and at the S&C duty desk. They will meet the Senior RP Technician at the medical facility.

4.3.3.4 In all cases, where injuries or illnesses have occurred within the RCA, documentation of the event shall be performed by a Senior Radiation Protection Specialist or Senior Contract Technician.

4.3.3.5 In situations where personnel have been decontaminated prior to transport to a medical facility, documentation of the event shall be performed per SH/0/B/2001/003 (Reference 2.2).

4.3.3.6 In situations where personnel have **not** been contaminated as a result of injury or illness within the RCA, document the event on Enclosure 6.7 from SH/0/B/2000/004 (Reference 2.9), stating that the injured/ill individual was evaluated for contamination and released.

4.3.3.7 Radiation Protection shall notify the Operations Shift Manager/Designee when the person has been deconned below station limits or determined to be free of contamination so that the event can be terminated.

4.3.3.8 Upon completion of medical aid, Radiation Protection shall survey the medical facility for contamination and assist in any necessary decontamination to be performed.

4.3.3.9 Any liquid or debris either in the ambulance or at the medical facility that is found to be contaminated or has the possibility of being contaminated (i.e. liquid used to flush a contaminated wound) with byproduct material from McGuire Nuclear Station (MNS) must be deconned or brought back to MNS for processing. (The bag(s) will be tagged "Medical Waste", placed in a separate RCZ in Room 1202 and RMC will be contacted.)

4.4 Fires Within the Restricted Area

4.4.1 Nuclear System Directive 112 (Reference 2.8) requires that a minimum of one (1) Radiation Protection Technician trained to Radiation Protection Fire Response, respond to a fire or fire drill. When an actual fire or fire drill in the Radiation Control Area is announced over the public address system (or beeper system) at least one person qualified to task RP-280 shall respond with the following equipment:

- radio on channel 2 (located in Shift Lab)
- E-520 w/pancake probe, (located in Shift Lab)
- high range ion chamber and/or teletector, (located in Shift Lab)
- smears, (Shift fire response kit)
- air sampler (Shift fire response kit)
- particulate and charcoal cartridges (Shift fire response kit)
- 50 foot extension cord (Shift fire response kit)

- red RP vest so the RP is easily identifiable (Shift fire response kit)

4.4.1.1 At first notification of a fire outside the RCA but inside the restricted area, RP technicians can respond with a single ion chamber instrument. If the severity of radiological conditions increases, call the RP Shift Lab, (4282), RP S&C Lab, (2027) or OSC (4978), for equipment support.

4.4.2 The RP technician(s) shall report to the fire brigade leader at the fire site and provide radiological assistance. This assistance includes assessing airborne activity, radiation levels, contamination control and ensuring everyone has the proper dosimetry. The RP technician(s) are expected to perform their duties from outside the established hot zone. Only fire brigade qualified personnel dressed in appropriate turnout gear will be allowed inside the hot zone. If the fire involves or potentially involves radioactive material, perform the following:

4.4.2.1 Establish an airborne radioactivity area boundary. Without jeopardizing safety precautions, pull a grab air sample as close as possible to the area where fire fighters will combat the fire. Pull sequential air samples every 30 ft. from the hot zone until a boundary of < .25 DAC (100 ccpm on E-520 setup for cpm) can be established.

A. Perform DAC accounting for all personnel who enter the airborne radioactivity area boundary per HP/0/B/1008/010 (Reference 2.3).

B. Under situations where the airborne radioactivity area boundary is established further away from the fire than the Hot Zone boundary, ensure the fire brigade leader and other support personnel move to an area of < 10 DAC (4000 ccpm on E-520 setup for cpm) or utilize appropriate respiratory protection.

C. The only time it is necessary to pull an air sample in "smoke clouds" is outside where burning radioactive material would constitute an effluent release that is not monitored or controlled. In this instance pull an air sample downwind of the smoke plume.

D. If the fire is within the restricted area but outside of buildings that have electrical sockets, other power sources must be located. Inform the fire brigade leader to request a portable gas powered generator or the emergency van. This equipment will provide a power source for air samples.

4.4.2.2 Establish radiation levels in the area where firefighters will combat the fire. Determine the following:

A. Do firefighting personnel have sufficient remaining dose to combat the casualty? i.e, will whole body and/or administrative limits be exceeded?

B. Will extremity dosimetry be necessary?

1. The Radiation Protection Technician shall inform the fire brigade leader if exposure limits may be exceeded, and to do so without the approval described in Radiation Protection Policy Manual Policy Number II-01 (Reference 2.6) will result in a 10CFR20 and/or a Tech. Spec. Violation. Several options are available including, request back up fire brigade members to combat the fire; request verbal approval for extensions over the radio/telephone; assume the responsibility of exceeding such limits; and/or stop fire fighting actions and plan emergency exposures as described in Radiation Protection Policy Manual Policy Number II-02 (Reference 2.5).

2. If extremity dosimetry or high range dosimetry will be necessary, continue firefighting actions and request the appropriate dosimetry via the fire brigade leader.

C. Establish an RCZ for radiation levels and contamination in accordance with SH/0/B/2000/005 (Reference 2.7), but far enough back to allow the firefighters to work unencumbered.

4.5 Fires at McGuire outside of the Restricted Area during the day shift.

4.5.1 On the day shift when a fire, or fire drill is announced over the page (or beeper system) at McGuire, any Radiation Protection Technician currently on the fire brigade shall report to the fire brigade assembly area in the truck corridor of the turbine building (outside the Maintenance Shop).

4.6 New Fuel Storage - Inadvertent Criticality Event

4.6.1 Indications of an inadvertent criticality event could occur during the receipt of new fuel or while new fuel is stored in the New Fuel Storage Vault. In either case:

4.6.1.1 The Control Room will contact RP Shift in the event that valid trip 2 alarms are received on either 1EMF20 and/or 1EMF21 (U-1 New Fuel Storage) or 2EMF7 and/or 2EMF8 (U-2 New Fuel Storage).

4.6.1.2 A valid reading could be confirmed by monitoring the OAC for increases on 1EMF20, 1EMF21 or 2EMF7, 2EMF8.

4.6.1.3 During normal working hours, RP Shift shall contact the RP S&C Duty Technician at 2027 or 4847 and relay any applicable information concerning EMF alarm conditions. S&C Technicians should respond immediately to the affected and follow the guidance in Section 4.6.2.

4.6.1.4 RP Shift shall monitor the affected Spent Fuel Building ventilation (1 or 2EMF42) and the affected Unit Vent for increase in activity, as time allows. Follow required sampling procedures should trip 2 conditions on either 1 or 2EMF42 and/or 1 or 2EMF36(L) exist.

4.6.2 RP Technicians responding to the affected Spent Fuel Building shall take the following actions:

4.6.2.1 Obtain appropriate ion chamber and portable neutron detection instruments. RP Technicians covering the receipt of new fuel should have portable neutron detection instruments in their possession. {56}

4.6.2.2 Immediately evacuate all personnel from the affected New Fuel Storage area and Spent Fuel Building. {55} Instruct personnel to use the CAD door emergency egress function to leave the area and report to the Hot Change Room for evaluation. {56}

4.6.2.3 Monitor gamma and neutron dose rates on 760' elevation.

4.6.2.4 Monitor gamma and neutron dose rates on the outside of the New Fuel Storage Vault and the North Yard to the site boundary fence. Evacuate personnel as necessary.

4.6.2.5 Inform the Operations Shift Manager, or qualified designee, of dose rates encountered in the Spent Fuel Building, the North Yard and at the site boundary fence.

4.6.2.6 Request Security to CAD secure access to the affected area. {56}

4.6.2.7 Post affected areas of the North Yard in accordance with SH/0/B/2000/005 (Reference 2.7).

4.6.2.8 Monitor and evaluate any personnel evacuated from the area for exposure received and internal deposition.

4.6.2.9 Do not enter the affected area until a complete assessment of conditions warrants safe re-entry. Follow the guidance in HP/0/B/1009/003 (Reference 2.10).

4.7 Kr-85 Hazard following a Spent Fuel Accident {59}

NOTE: Kr-85 can be a significant radiological skin dose hazard following a spent fuel bundle accident.

4.7.1 Take the following action if a bundle is dropped during movement or if a fuel bundle rupture is suspected:

4.7.1.1 Notify all persons to immediately vacate the area of concern and to proceed to the nearest safe location, taking care not to spread contamination unnecessarily.

4.7.1.2 Notify the Operations Shift Manager/designee immediately.

4.7.1.3 DO NOT enter the affected area until a complete assessment of conditions warrants safe re-entry. Follow the guidance in HP/0/B/1009/003 (Reference 2.10). The following are special considerations for re-entry following a spent fuel accident:

A. If possible before re-entering the area, collect a remote gas sample to determine the concentration of Kr-85.

B. Do not use an area radiation monitor to provide an indication that a high concentration of Kr-85 exists. Kr-85 has a low gamma abundance; consequently, an area radiation monitor would be unreliable.

C. Use an RO-2, an RSO-50, or equivalent sealed in a plastic bag with the beta window open to provide a direct Kr-85 dose rate. Be aware that the beta instrument may not indicate a high concentration of Kr-85 until the cloud reaches the detector.

5. Enclosures

5.1 Commitments for HP/0/B/1009/022

{55}	PIP 0-M97-0248	Emergency procedure requirements surrounding compliance with 10 CFR 70.24
{56}	PIP 1-M97-1361	Additional procedural guidance concerning Radiation Protection response to inadvertent criticality event.
{59}	IN 90-08	Kr-85 Hazard from Decayed Fuel. Ensure that specific hazards of Kr-85 are addressed during a spent fuel accident.

(R06-97)

Duke Power Company
PROCEDURE PROCESS RECORD

(1) ID No. **HP/0/B/1009/022**
Revision No. **002**

PREPARATION

(2) Station **McGuire Nuclear Station**

(3) Procedure Title **Accident and Emergency Response**

(4) Prepared By G.K. Terrell Date 1/12/00

(5) Requires 10CFR50.59 evaluation?

- ☑ Yes (New procedure or revision with major changes)
- ☐ No (Revision with minor changes)
- ☐ No (To incorporate previously approved changes)

(6) Reviewed By Robert E. Beckham (QR) Date 1/13/00

Cross-Disciplinary Review By _____ (QR) NA RBB Date 1/13/00

Reactivity Mgmt. Review By _____ (QR) NA RBB Date 1/13/00

(7) Additional Reviews

Reviewed By K.L. Murray Date 1-18-00

Reviewed By [signature] Date 1/26/00

(8) Temporary Approval (*if necessary*)

By _____ (SRO/QR) Date _____

By _____ (QR) Date _____

(9) Approved By [signature] Date ~~1/18/00~~ G.K. Terrell 1/26/00

PERFORMANCE (Compare with Control Copy every 14 calendar days while work is being performed.)

(10) Compared with Control Copy _____ Date _____

Compared with Control Copy _____ Date _____

Compared with Control Copy _____ Date _____

(11) Date(s) Performed _____

Work Order Number (WO#) _____

COMPLETION

(12) Procedure Completion Verification

- ☐ Yes ☐ NA Check lists and/or blanks initialed, signed, dated, or filled in NA, as appropriate?
- ☐ Yes ☐ NA Listed enclosures attached?
- ☐ Yes ☐ NA Data sheets attached, completed, dated, and signed?
- ☐ Yes ☐ NA Charts, graphs, etc. attached dated, identified, and marked?
- ☐ Yes ☐ NA Procedure requirements met?

Verified By _____ Date _____

(13) Procedure Completion Approved _____ Date _____

(14) Remarks (*Attach additional pages, if necessary*)

Duke Power Company McGuire Nuclear Station **Accident and Emergency Response** **Information Use**	Procedure No. HP/**0**/B/1009/022 Revision No. 002 Electronic Reference No. MC0095LX

Accident and Emergency Response

1. Purpose

This procedure describes the actions to be taken by personnel to effectively and efficiently cope with a variety of accident conditions. Responses for the following accidents are included in this procedure:

1.1 Spills

1.2 Airborne releases

1.3 Personnel injury involving contamination

1.4 Fires in the Restricted Area

1.5 New Fuel Storage - Inadvertent Criticality Event

1.6 Kr-85 Hazard following a spent fuel accident

The level of use for this procedure is Reference Use.

2. References

2.1 RP/0/A/5700/05, Care and Transportation of Contaminated Individuals

2.2 SH/0/B/2001/003, Investigation of Skin and Clothing Contaminations

2.3 HP/0/B/1008/010, Airborne Radioactivity Control and Accountability

2.4 HP/0/B/1009/023, Environmental Monitoring for Emergency Conditions

2.5 Radiation Protection Policy Manual, Policy Number II-02, Planned Special Exposures and Emergency Dose Limits for Occupationally Exposed Personnel

2.6 Radiation Protection Policy Manual, Policy Number II-01, Occupational Dose Limits

2.7 SH/0/B/2000/005, Posting of Radiation Control Zones

2.8 Nuclear System Directive 112, Fire Brigade Organization, Training Responsibilities

2.9 SH/0/B/2000/004, Taking, Counting, and Recording Surveys

2.10 HP/0/B/1009/003, Recovery Plan

3. Limits and Precautions

3.1 The Station Radiation Protection Manager (RPM) or his designee shall determine the need for high range personnel and/or extremity dosimetry and respiratory protection prior to any recovery personnel entering the plant after an accident/incident.

3.2 In accident conditions where exposure in excess of normal quarterly limits is anticipated, i.e., planned emergency exposure, refer to Radiation Protection Policy Manual Policy Number II-02 (Reference 2.5).

3.3 Personnel decontamination shall not take precedence over proper medical/surgical care.

3.4 The Station Radiation Protection Manager is to be notified as soon as possible of all incidents involving radioactive materials (spills, leaks, source breakage, loss, etc.) and of all radiation accidents, accidental releases, or injuries to personnel (wounds, contamination, overexposure, ingestion or inhalation of radioactive material).

4. Procedure

4.1 Spills

4.1.1 The general rule of thumb for spills is the SWIMS concept:

4.1.1.1 Stop the spill - by righting the container; isolating the system, if possible.

4.1.1.2 Warn others - notify other personnel in the area or who may be affected by the spill and Radiation Protection.

4.1.1.3 Isolate the area - through the use of barricades, signs, etc.

4.1.1.4 Minimize exposure and contamination spread - using only those personnel necessary for cleanup and utilizing absorbent material at the outer edges.

4.1.1.5 Secure unfiltered exhaust and all supply ventilation in cases where airborne contamination may be a problem.

4.1.2 Major Spills

4.1.2.1 Handle as in 4.1.1.

4.1.2.2 Notify the Operations Shift Manager/Designee of the circumstances.

4.1.2.3 If the spill is uncontrollable or cannot be contained inside the RCA notify the Station Radiation Protection Manager as soon as possible.

4.2 Inadvertent release of radioactive particulates and/or iodines within the Radiation Control Area.

4.2.1 Notify all persons to vacate the room or immediate areas at once, and to proceed to the nearest safe location, taking care not to spread contamination unnecessarily.

4.2.2 Notify the Operations Shift Manager/Designee immediately.

4.2.3 Notify Radiation Protection immediately and report all known or suspected inhalation of radioactive materials. Assume that all persons immediately involved were exposed.

4.2.4 Proceed to nearest contaminated change room.

4.2.5 Take immediate steps to monitor and decontaminate personnel involved.

4.2.6 Radiation Protection shall:

4.2.6.1 Monitor all persons suspected of being contaminated, and assist with their decontamination.

4.2.6.2 Take immediate steps to evaluate the radiological situation, and determine the requirements to reenter the area.

4.2.6.3 Determine the cause of the contamination, and take steps to remedy the situation.

4.2.6.4 Supervise reentry, decontamination and recovery work.

4.2.6.5 Approve or limit further use of the area or equipment involved.

4.2.6.6 Perform a complete survey of the area before permitting resumption of work, after decontamination and cleanup have been completed.

4.2.6.7 Prepare records of the incident, for station records and report purposes.

4.2.6.8 Notify the Compliance Engineer about the incident and reports.

4.3 Personnel injury involving radiation or radioactive materials.

4.3.1 In the event of an injury involving radiation or radioactive materials notify the Operations Shift Manager/Designee immediately.

4.3.2 Radiation Protection shall evaluate the radiological implications and shall assist in radiation and contamination control and in decontaminating personnel as necessary per SH/0/B/2001/003 (Reference 2.2).

4.3.3 In case of severe injury, decontamination shall not interfere with or take precedence over proper medical and surgical care.

NOTE: MERT responders are responsible for all decisions involving patient care, including the need for transportation to an off-site facility.

4.3.3.1 Notify the Operations Shift Manager/Designee of any special considerations (i.e., type of injury, contamination levels present, etc.) according to RP/0/A/5700/05, Care and Transportation of Contaminated Injured Individual(s) from Site to Offsite Medical Facility (Reference 2.1). Operations Shift Manager/Designee will notify off-site facilities.

4.3.3.2 First aid shall be given, and a Senior Radiation Protection Technician shall accompany the injured person(s) to the doctor or hospital, taking precautions to prevent the spread of contamination. If Radiation Protection personnel are available, one technician should accompany each vehicle transporting injured person.

4.3.3.3 If a contaminated injury occurs during nights, weekends, or holidays notify one of the designated management personnel by telephone or emergency pager. A call list is posted in the Shift Lab and at the S&C duty desk. They will meet the Senior RP Technician at the medical facility.

4.3.3.4 In all cases, where injuries or illnesses have occurred within the RCA, documentation of the event shall be performed by a Senior Radiation Protection Specialist or Senior Contract Technician.

4.3.3.5 In situations where personnel have been decontaminated prior to transport to a medical facility, documentation of the event shall be performed per SH/0/B/2001/003 (Reference 2.2).

4.3.3.6 In situations where personnel have **not** been contaminated as a result of injury or illness within the RCA, document the event on Enclosure 6.7 from SH/0/B/2000/004 (Reference 2.9), stating that the injured/ill individual was evaluated for contamination and released.

4.3.3.7 Radiation Protection shall notify the Operations Shift Manager/Designee when the person has been deconned below station limits or determined to be free of contamination so that the event can be terminated.

4.3.3.8 Upon completion of medical aid, Radiation Protection shall survey the medical facility for contamination and assist in any necessary decontamination to be performed.

4.3.3.9 Any liquid or debris either in the ambulance or at the medical facility that is found to be contaminated or has the possibility of being contaminated (i.e. liquid used to flush a contaminated wound) with byproduct material from McGuire Nuclear Station (MNS) must be deconned or brought back to MNS for processing. (The bag(s) will be tagged "Medical Waste", placed in a separate RCZ in Room 1202 and RMC will be contacted.)

4.4 Fires Within the Restricted Area

4.4.1 Nuclear System Directive 112 (Reference 2.8) requires that a minimum of one (1) Radiation Protection Technician trained to Radiation Protection Fire Response, respond to a fire or fire drill. When an actual fire or fire drill in the Radiation Control Area is announced over the public address system (or beeper system) at least one person qualified to task RP-280 shall respond with the following equipment:

- radio on channel 2 (located in Shift Lab)
- E-520 w/pancake probe, (located in Shift Lab)
- high range ion chamber and/or teletector, (located in Shift Lab)
- smears, (Shift fire response kit)
- air sampler (Shift fire response kit)
- particulate and charcoal cartridges (Shift fire response kit)
- 50 foot extension cord (Shift fire response kit)

- red RP vest so the RP is easily identifiable (Shift fire response kit)

4.4.1.1 At first notification of a fire outside the RCA but inside the restricted area, RP technicians can respond with a single ion chamber instrument. If the severity of radiological conditions increases, call the RP Shift Lab, (4282), RP S&C Lab, (2027) or OSC (4978), for equipment support.

4.4.2 The RP technician(s) shall report to the fire brigade leader at the fire site and provide radiological assistance. This assistance includes assessing airborne activity, radiation levels, contamination control and ensuring everyone has the proper dosimetry. The RP technician(s) are expected to perform their duties from outside the established hot zone. Only fire brigade qualified personnel dressed in appropriate turnout gear will be allowed inside the hot zone. If the fire involves or potentially involves radioactive material, perform the following:

4.4.2.1 Establish an airborne radioactivity area boundary. Without jeopardizing safety precautions, pull a grab air sample as close as possible to the area where fire fighters will combat the fire. Pull sequential air samples every 30 ft. from the hot zone until a boundary of < .25 DAC (100 ccpm on E-520 setup for cpm) can be established.

A. Perform DAC accounting for all personnel who enter the airborne radioactivity area boundary per HP/0/B/1008/010 (Reference 2.3).

B. Under situations where the airborne radioactivity area boundary is established further away from the fire than the Hot Zone boundary, ensure the fire brigade leader and other support personnel move to an area of < 10 DAC (4000 ccpm on E-520 setup for cpm) or utilize appropriate respiratory protection.

C. The only time it is necessary to pull an air sample in "smoke clouds" is outside where burning radioactive material would constitute an effluent release that is not monitored or controlled. In this instance pull an air sample downwind of the smoke plume.

D. If the fire is within the restricted area but outside of buildings that have electrical sockets, other power sources must be located. Inform the fire brigade leader to request a portable gas powered generator or the emergency van. This equipment will provide a power source for air samples.

4.4.2.2 Establish radiation levels in the area where firefighters will combat the fire. Determine the following:

A. Do firefighting personnel have sufficient remaining dose to combat the casualty? i.e, will whole body and/or administrative limits be exceeded?

B. Will extremity dosimetry be necessary?

1. The Radiation Protection Technician shall inform the fire brigade leader if exposure limits may be exceeded, and to do so without the approval described in Radiation Protection Policy Manual Policy Number II-01 (Reference 2.6) will result in a 10CFR20 and/or a Tech. Spec. Violation. Several options are available including, request back up fire brigade members to combat the fire; request verbal approval for extensions over the radio/telephone; assume the responsibility of exceeding such limits; and/or stop fire fighting actions and plan emergency exposures as described in Radiation Protection Policy Manual Policy Number II-02 (Reference 2.5).

2. If extremity dosimetry or high range dosimetry will be necessary, continue firefighting actions and request the appropriate dosimetry via the fire brigade leader.

C. Establish an RCZ for radiation levels and contamination in accordance with SH/0/B/2000/005 (Reference 2.7), but far enough back to allow the firefighters to work unencumbered.

4.5 Fires at McGuire outside of the Restricted Area during the day shift.

4.5.1 On the day shift when a fire, or fire drill is announced over the page (or beeper system) at McGuire, any Radiation Protection Technician currently on the fire brigade shall report to the fire brigade assembly area in the truck corridor of the turbine building (outside the Maintenance Shop).

4.6 New Fuel Storage - Inadvertent Criticality Event

4.6.1 Indications of an inadvertent criticality event could occur during the receipt of new fuel or while new fuel is stored in the New Fuel Storage Vault. In either case:

4.6.1.1 The Control Room will contact RP Shift in the event that valid trip 2 alarms are received on either 1EMF20 and/or 1EMF21 (U-1 New Fuel Storage) or 2EMF7 and/or 2EMF8 (U-2 New Fuel Storage).

4.6.1.2 A valid reading could be confirmed by monitoring the OAC for increases on 1EMF20, 1EMF21 or 2EMF7, 2EMF8.

4.6.1.3 During normal working hours, RP Shift shall contact the RP S&C Duty Technician at 2027 or 4847 and relay any applicable information concerning EMF alarm conditions. S&C Technicians should respond immediately to the affected and follow the guidance in Section 4.6.2.

4.6.1.4 RP Shift shall monitor the affected Spent Fuel Building ventilation (1 or 2EMF42) and the affected Unit Vent for increase in activity, as time allows. Follow required sampling procedures should trip 2 conditions on either 1 or 2EMF42 and/or 1 or 2EMF36(L) exist.

4.6.2 RP Technicians responding to the affected Spent Fuel Building shall take the following actions:

4.6.2.1 Obtain appropriate ion chamber and portable neutron detection instruments. RP Technicians covering the receipt of new fuel should have portable neutron detection instruments in their possession. {56}

4.6.2.2 Immediately evacuate all personnel from the affected New Fuel Storage area and Spent Fuel Building. {55} Instruct personnel to use the CAD door emergency egress function to leave the area and report to the Hot Change Room for evaluation. {56}

4.6.2.3 Monitor gamma and neutron dose rates on 760' elevation.

4.6.2.4 Monitor gamma and neutron dose rates on the outside of the New Fuel Storage Vault and the North Yard to the site boundary fence. Evacuate personnel as necessary.

4.6.2.5 Inform the Operations Shift Manager, or qualified designee, of dose rates encountered in the Spent Fuel Building, the North Yard and at the site boundary fence.

4.6.2.6 Request Security to CAD secure access to the affected area. {56}

4.6.2.7 Post affected areas of the North Yard in accordance with SH/0/B/2000/005 (Reference 2.7).

4.6.2.8 Monitor and evaluate any personnel evacuated from the area for exposure received and internal deposition.

4.6.2.9 Do not enter the affected area until a complete assessment of conditions warrants safe re-entry. Follow the guidance in HP/0/B/1009/003 (Reference 2.10).

4.7 Kr-85 Hazard following a Spent Fuel Accident {59}

NOTE: Kr-85 can be a significant radiological skin dose hazard following a spent fuel bundle accident.

4.7.1 Take the following action if a bundle is dropped during movement or if a fuel bundle rupture is suspected:

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A. If possible before re-entering the area, collect a remote gas sample to determine the concentration of Kr-85.

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