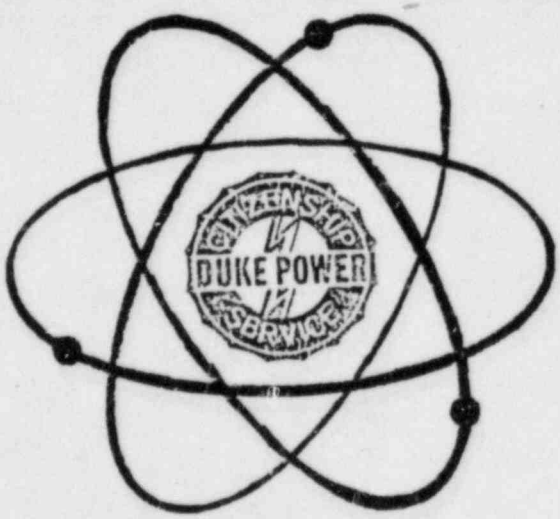
DUKE POWER COMPANY

OCONEE NUCLEAR STATION

EMERGENCY PLAN IMPLEMENTING PROCEDURES



APPROVED:

M. S. Tuckman

M. S. Tuckman, Station Manager

6/7/84

Date Approved

June 7, 1984

Effective Date

Revision 84-2
June, 1984

DUKE POWER COMPANY
OCONEE NUCLEAR STATION
P. O. BOX 1439
SENECA, S. C. 29678
TELEPHONE: AREA 803
882-5363

June 20, 1984

TO: NRC/NRR CONTROL COPY NO. (47B-48B)

SUBJECT: Oconee Nuclear Station
Emergency Implementing Procedures Manual
Revision No. 84-2 (June, 1984)

Please make the following changes to the Volume B, Implementing Procedures Manual, Oconee Nuclear Station Emergency Plan. New labels to be affixed to AP, S. D. 2.9.1, and RP Tabs are in the small envelope attached.

	REMOVE		INSERT
1.	Title Page, Revision 84-1	1.	Title Page, Revision 84-2
2.	Table of Contents, Pages 1, 2, and 3	2.	Table of Contents, Pages 1, 2, and 3
3.	Emergency Telephone Numbers Revision 84-2	3.	Emergency Telephone Numbers Revision 84-3
4.	AP/0/B/1000/01	4.	RP/0/B/1000/01 (06/01/84), affix new Tab over AP
5.	AP/0/B/1000/02	5.	RP/0/B/1000/02 (06/01/84), " " " " "
6.	AP/0/B/1000/03	6.	RP/0/B/1000/03 (06/01/84), " " " " "
7.	AP/0/B/1000/04	7.	RP/0/B/1000/04 (06/01/84), " " " " "
8.	AP/0/B/1000/05	8.	RP/0/B/1000/05 (06/01/84), " " " " "
9.	AP/0/B/1000/06	9.	RP/0/B/1000/06 (06/01/84), " " " " "
10.	S. D. 2.9.1	10.	RP/0/B/1000/09 (06/01/84), " " " " S. D.
11.	RP/0/B/1000/10	11.	RP/0/B/1000/10 (06/01/84), " " " " RP
12.	CP/1/A/2002/04C	12.	CP/1/A/2002/04C (04/24/84)
13.	CP/2/A/2002/04C	13.	CP/2/A/2002/04C (04/24/84)
14.	CP/0/B/4003/01	14.	CP/0/B/4003/01 (04/18/84)
15.	HP/0/B/1009/11	15.	HP/0/B/1009/11 (06/05/84)
16.	HP/0/B/1009/14	16.	HP/0/B/1009/14 (06/05/84)
17.	IP/0/B/1601/03	17.	IP/0/B/1601/03 (05/23/84)
18.	HP/1/A/1009/17	18.	HP/1/A/1009/17 (05/22/84)
19.	HP/2/A/1009/17	19.	HP/2/A/1009/17 (05/22/84)
20.	HP/3/A/1009/17	20.	HP/3/A/1009/17 (05/22/84)

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INFORMATION ONLY

Confidential
Not For Publication

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Not For Publication

EMERGENCY TELEPHONE NUMBERS

This enclosure provides a listing of telephone numbers for various personnel and agencies that may have a part in dealing with an emergency situation or providing other assistance as needed at Oconee Nuclear Station.

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TABLE OF CONTENTS

12. WATER DEPARTMENTS

Should releases of radioactive effluent into Lake Keowee or Lake Hartwell potentially effect municipal water intakes or exceed technical specifications. Contact the appropriate authorities as indicated below:

Lake Keowee

Seneca, H. J. Balding, Office . . . . . .
Home . . . . . .

Lake Hartwell

City of Clemson

Mayor of Clemson, Office . . . . . .
Home . . . . . .

(If the mayor cannot be reached, call one of the following:

Clemson Administrator's Office . . . . . .
Home . . . . . .

Clemson Filter Plant [redacted] . . . . . .

Clemson University

President's Office . . . . . .

Home . . . . . .

Security - Police (24 hours) . . . . . .
(If the President cannot be reached, call)
Clemson University Physical Plant [redacted] . . .

Anderson Water Works (24 Hr. Number) . . . . . .

AGENCIES THAT MAY RESPOND TO AN EMERGENCY AT THE OCONEE NUCLEAR STATION

LAW ENFORCEMENT (24-hour numbers)

S. C. Highway Patrol (Greenville, S.C.) . . . . . .

S. C. Enforcement Division (Columbia, S.C.) . . . . . .

FBI (Columbia, S.C.) . . . . . .

BOMB DISPOSAL

Explosives Ordinance Disposal Control (24-hour) . . . . .
(Fort Jackson, Columbia, S.C.)

6. SOUTH CAROLINA DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL, (Warning Point State of South Carolina)

Bureau of Radiological Health (0800-1700) . . . . . .
Answering Service after hours, weekends, holidays . . . . .

*State Emergency Operations Center, Columbia, S.C. . .

*Forward Emergency Operations Center, Clemson, S. C. .

Alternate Number . . . .

*NOTE: These numbers are to be used once the State has established their Emergency Operations.

7. COUNTY EMERGENCY PREPAREDNESS AGENCIES

Oconee County Emergency Preparedness . . . . . .
Alternate Number - 24 hour, page
Alternate Number - 24 hour, page

Pickens County Emergency Preparedness. . . . . .
Alternate Number -
Alternate Number - 24 hour, page

8. COUNTY SHERIFF'S DEPARTMENTS

Oconee County (24 hours) . . . . . .
Alternate Number . . . . .

Pickens County (24 hours) . . . . . .
Alternate Number . . . . .
Alternate Number . . . . .
Alternate Number . . . . .

9. MEDICAL ASSISTANCE

Oconee Memorial Hospital Ambulance Service . . . . . .
Oconee Memorial Hospital Switchboard/Supervisor or Nursing .

Additional Medical assistance may be provided through the following institutions:

Pickens County Ambulance Service . . . . . .
Cannon Memorial Hospital/Supervisor of Nursing . . . . . .
Easley Baptist Hospital/Supervisor of Nursing . . . . . .

10. FIRE ASSISTANCE

Oconee County Rural Fire Protection Association . . . . . .
Woods or Forest Fire (Oconee County, Oakway Tower) . . . . . .
Woods or Forest Fire (Pickens County, Woodall Mt. Tower) . . .

OCONEE NUCLEAR STATION

CRISIS COMMUNICATIONS DIRECTORY

The crisis directory is intended for use should the Oconee Emergency Plan require implementation. Both station and corporate level telephone numbers are provided. The station's emergency organization will operate from the Technical Support Center near the Units 1 and 2 Control Room. The corporate emergency organization will operate from the Crisis Management Center located in the Visitors Center and Oconee Training Center.

EMERGENCY FACILITY LOCATIONS

Technical Support Center - Control Rooms 1 and 2

Operational Support Center - Control Room 3

Crisis Management Center - Oconee Training Center

Alternate Location: Liberty Retail Office

Crisis News Center - Keowee-Toxaway Visitors Center

Alternate Location: Liberty Retail Office

OCONEE NUCLEAR STATION

CRISIS PHONE DIRECTORY

TECHNICAL SUPPORT CENTER

POSITION/NAME	Telephone Number: Outside Line	Telephone Number: Station Number
Emergency Coordinator		
Supt. of Operations		
Supt. of Technical Services		
Supt. of Maintenance		
Supt. of Administration		
NRC Resident Engineer		FTS
B&W Resident Engineer		
Station Health Physicist		
HEALTH PHYSICS CENTER		
Field Monitoring Coordinator		
Data Report Coordinator (Off-Site Dose Projection)		
Dose Coordination to CMC		
FTS Line to NRC		

CONTROL ROOM

Unit 1 . . . . . .

Unit 2 . . . . . .

Unit 3 . . . . . .

Shift Supervisor (Unit 1 & 2) . . . . . .
Unit 3 . . . . . .

COMMUNICATIONS COORDINATION

Data Transmission Coordinator. . . . . .
Data Release (Vax Computer Program). . . . . .

Telecopier (Technical Support Center). . . . . .

Offsite Communicator . . . . . .

TSC Clerical Support . . . . . .

Emergency Response . . . . . .

EMERGENCY COUNT ROOM (Located in Visitor's Center). . . . . .

OCONEE NUCLEAR STATION
CRISIS PHONE DIRECTORY
GENERAL OFFICE SUPPORT CENTER

CORPORATE HEADQUARTERS
(Contact with the Governor)

A. C. Thies

W. H. Owen

WACHOVIA CENTER

RECOVERY MANAGER (Room 1010) (Speaker Phone)
(Dedicated line to State Director)

NRC

SCHEDULING/PLANNING (Room 1010)

TECHNICAL SERVICES SUPPORT (Room 2390)

OFFSITE RADIOLOGICAL COORDINATOR (Room 1222)

NRC FTS LINE

NUCLEAR ENGINEERING SERVICES STAFF (Room 1704)

ADMINISTRATION AND LOGISTICS (Room 0925)

NUCLEAR REGULATORY COMMISSION (Room 1488)

ELECTRIC CENTER

DESIGN AND CONSTRUCTION SUPPORT (Room 32, 3rd Floor)

CHARLOTTE SUPPLY BUILDING

CRISIS NEWS GROUP - DUKE (3rd Floor)

OCONEE NUCLEAR STATION

CRISIS PHONE DIRECTORY

BACKUP CRISIS MANAGEMENT CENTER

LIBERTY RETAIL OFFICE, LIBERTY, S.C.

AREA CODE - 803
Telephone Number

RECOVERY MANAGER

SCHEDULING/PLANNING

PUBLIC INFORMATION OFFICERS*

State of South Carolina
Oconee County
Pickens County

DESIGN AND CONSTRUCTION

NUCLEAR ENGINEERING SERVICES

OFFSITE RADIOLOGICAL COORDINATOR

ADMINISTRATION AND LOGISTICS

TECHNICAL SERVICES SUPPORT

GOVERNMENT AGENCIES*

NRC
State of South Carolina
Oconee County
Pickens County

*NOTE: Call any one of the numbers listed to reach the desired representative.

NRC HEALTH PHYSICS NETWORK TELEPHONES

The NRC's Health Physics Network (HPN or Black Phone) connects all Nuclear Power Plants and Fuel Facilities to NRC Regional Offices and to NRC Headquarters Operations Center. The phone is intended to support Health Physics Operations in an emergency but can be used for daily voice traffic and facsimile transmittal.

The Station has jacks for the HPN phones in the Performance Office (Control Room 1 & 2) and in the Oconee Training Center.

The phone is used normally with the exception; NO DIAL TONE OR RINGING IS HEARD. In addition, ringing only lasts 30 seconds, so after 30 seconds if the party has not answered, you must hang up and redial.

For convenience, the codes most often used are listed below:

	HPN Phone	Code
1.	NRC region 2 (Atlanta) office	[redacted]
2.	NRC headquarters (24 hours)	
3.	B&W Research Center	
4.	Oconee NRC Resident Inspector	
5.	Oconee Nuclear Station	
6.	All NRC region 2 Resident Inspectors	
7.	All region 2 Operating Nuclear Plants	

In addition, the calling party may "conference" any phones during conversation by simply dialing the appropriate code(s). Any number of stations may be added in this manner.

EMERGENCY OPERATION CENTER

Pickens County

Primary Number

EXECUTIVE GROUP*

Emergency Preparedness
County Administrator
County Council
Legal Officer

OPERATIONS GROUP*

Law Enforcement
Rescue Squad
EMS

Fire Service
Medical Service
Health Service
Dept. of Public Works

ASSESSMENT*

Transportation
Emergency Welfare Service
Shelter Service
Red Cross

Public Information
RADEF

Mental Health
Damage Assessment
Supply and Procurement

ALTERNATE NUMBER (to any group)

PUBLIC INFORMATION OFFICER

CRISIS NEWS CENTER-ONS*

State of South Carolina
Oconee County
Pickens County
NRC

CRISIS NEWS CENTER LIBERTY RETAIL OFFICE*

State of South Carolina
Oconee County
Pickens County
NRC

*Call any one of the listed numbers to reach group desired.

CONTROL COPY

Form SPD-1002-1

DUKE POWER COMPANY
PROCEDURE PREPARATION
PROCESS RECORD

(1) ID No: RP/O/B/1000/01
Change(s) 0 to
0 Incorporated

(2) STATION: STATION

(3) PROCEDURE TITLE: CLASSIFICATION OF EMERGENCY

(4) PREPARED BY: [signature] DATE: 5/30/84

(5) REVIEWED BY: [signature] DATE: 5/30/84

Cross-Disciplinary Review By: [signature] N/R: _____

(6) TEMPORARY APPROVAL (IF NECESSARY):

By: _____ (SRO) Date: _____

By: _____ Date: _____

(7) APPROVED BY: M. S. Tuckman Date: 6/1/84

(8) MISCELLANEOUS:

Reviewed/Approved By: _____ Date: _____

Reviewed/Approved By: _____ Date: _____

DUKE POWER COMPANY
OCONEE NUCLEAR STATION
CLASSIFICATION OF EMERGENCY

1.0 Symptoms

1.1 Notification of Unusual Event

1.1.1 Events are in progress or have occurred which indicate a potential degradation of the level of safety of the plant.

1.1.2 No releases of radioactive material requiring offsite response or monitoring are expected unless further degradation of safety occurs.

1.2 Alert

1.2.1 Events are in progress or have occurred which involve an actual or potential substantial degradation of the level of safety of the plant.

1.2.2 Any releases are expected to be limited to small fractions of the EPA Protection Action Guideline exposure levels.

1.3 Site Area Emergency

1.3.1 Events are in process or have occurred which involve actual or likely major failures of plant functions needed for protection of the public.

1.3.2 Any releases are not expected to exceed EPA Protective Action Guideline exposure levels except near the site boundary.

1.4 General Emergency

1.4.1 Events are in process or have occurred which involve actual or imminent substantial core degradation or melting with potential for loss of containment integrity.

1.4.2 Releases can be reasonably expected to exceed EPA Protective Action Guideline exposure levels offsite for more than the immediate site area.

2.0 Immediate Actions

2.1 Compare actual plant conditions to the Emergency Action Level(s) listed in Enclosure 4.1 then declare the appropriate Emergency Class as indicated.

2.2 Initiate the Emergency Response Procedure (RP) applicable to the Emergency Class as follows:

Notification of Unusual Event	RP/0/B/1000/02
Alert	RP/0/B/1000/03
Site Area Emergency	RP/0/B/1000/04
General Emergency	RP/0/B/1000/05

3.0 Subsequent Actions

3.1 To escalate, de-escalate or close out the Emergency, consult the procedure indicated by the action level.

4.0 Enclosures

4.1 Emergency Action Level(s) for Emergency Classes

ENCLOSURE 4.1.1
PRIMARY COOLANT LEAK

UNUSUAL EVENT

1. EXCEEDING EITHER PRIMARY TO SECONDARY LEAK RATE TS OR PRIMARY LEAK RATE TS. ONE OF THE FOLLOWING:
   - Unidentified leakage exceeds 1 GPM
   - Total primary Coolant leakage rate (identified) exceeds 10 GPM
   - Any leakage exists through RCS strength boundary (except S/G tubes)
   - OTSG tube leakage (Unit 1-.3 GPM Unit 2&3 - 1 GPM)
2. FAILURE OF A PRESSURIZER PORV TO CLOSE FOLLOWING REDUCTION OF APPLICABLE PRESSURE. ONE OR MORE OF THE FOLLOWING:
   - Acoustical monitor indication
   - PZR level increasing with decreasing RCS pressure
   - QT temp and pressure alarms

ALERT

1. PRIMARY COOLANT LEAK RATE GREATER THAN 50 GPM
   - Mismatch between makeup and total letdown (letdown plus controlled leakage greater than 50 gpm with PZR not increasing.)
2. RAPID GROSS FAILURE OF ONE OTSG TUBE WITH LOSS OF OFF-SITE POWER.
   *NOTE: Leak greater than 10 GPM but less 200 GPM
   - RIA 16, 17, 40 High alarm; AND
   - LDST level decreasing; AND
   - Undervoltage - underfrequency on MFB 1 and MFB 2, AND
   - RCS leak rate calculation
3. Rapid failure of steam generator tubes.
   *NOTE: Leak greater than 50 GPM but less 200 GPM
   - RIA 16, 17, 40 HIGH alarm AND
   - Rapidly decreasing PRZ level AND
   - Rapid depressurization of RCS

SITE AREA EMERGENCY

1. KNOWN LOCA GREATER THAN MAKEUP PUMP CAPACITY.

   PRIMARY LEAK
   - HIGH RB pressure, HIGH RB sump, RIA-4 HIGH alarm, OR
   - Decrease in RCS pressure AND
   - Loss of subcooling margin
   - Full HPI and PZR level decreasing

   P/S LEAK
   - Rx Trip on LOW RCS PRESSURE AND
   - RCS PRESSURE decreasing uncontrollably with T_{avg} constant AND
   - RIA 16/17 and 40 HIGH alarm AND
   - No significant increase in RB pressure and sump level
2. RAPID FAILURE OF STEAM GENERATOR TUBE LEAK (GREATER THAN 200 GPM) WITH LOSS OF OFFSITE POWER.
   - SAE #1 EAL's for P/S leak

     AND
   - Undervoltage-underfrequency alarms in the 230 KV switchyard.
3. STEAMLINE BREAK WITH GREATER THAN 50 GPM P/S LEAKAGE AND INDICATION OF FUEL DAMAGE.
   - Rx trip on Low RCS pressure AND
   - RCS pressure and T_{avg} decreasing uncontrollably AND
   - RIA 16/17 and 40 HIGH alarm AND
   - Chemistry sample analysis indicates fuel damage - I-131 concentration between 70 µCi/ml to 350 µCi/ml.

GENERAL EMERGENCY

1. SMALL AND LARGE LOCAS WITH FAILURE OF ECCS - LEADS TO CORE MELT.
   - LOCA EALs-SAE #1 or SAE #2

     AND
   - HPI system failure AND
   - LPI system failure
2. SMALL LOCA AND INITIALLY SUCCESSFUL ECCS WITH FAILURE OF RB HEAT REMOVAL SYSTEMS OVER SEVERAL HOURS LEADS TO LEADS TO CORE MELT AND FAILURE OF CONTAINMENT.
   - LOCA EALs in SAE #1 AND
   - RB temperature rising AND
   - RB spray system fails to function

INITIAL NOTIFICATION REQUIREMENTS: CONSULT EMERGENCY TELEPHONE DIRECTORY

Notify: 1,2,4,6,7 | Notify: 1,2,6,7 | Notify: 1,2,6,7 | Notify: 1,2,6,7

ENCLOSURE 4.1.1
PRIMARY COOLANT LEAK

UNUSUAL EVENT	ALERT	SITE AREA EMERGENCY	GENERAL EMERGENCY

4. STEAMLINE BREAK WITH GREATER THAN 10 BUT LESS THAN 50 GPM P/S LEAK RATE.

STEAM LINE BREAK INSIDE RB

- Unexpected increase in Rx power AND
- Rapid decrease in T_{avg}, PZR level, RCS Pressure, Steam pressure AND
- Increased RB pressure and temperature

STEAM LINE BREAK OUTSIDE RB

- Unexpected increase in Rx power AND
- Rapid decrease in T_{avg}, PZR level, RCS pressure, Steam pressure AND
- Increased PR pressure and temperature if steam line break inside PR.

INITIAL NOTIFICATION REQUIREMENTS: CONSULT EMERGENCY TELEPHONE DIRECTORY

Notify: 1,2,6,7

ENCLOSURE 4.1.2
FUEL DAMAGE

UNUSUAL EVENT

1. FUEL DAMAGE INDICATION

High activity sample results

- Total activity of RCS due to half lives longer than 30 min exceeds 224 / E μCi/ml when the Rx is critical
- I-131 concentration in the secondary side of the steam generator exceeds 1.4 μCi/ml

Total failed fuel exceeds 1%

- I-131 concentration in the RCS is between 70 μCi/ml and 350 μCi/ml

2. ABNORMAL COOLANT TEMPERATURE AND/OR PRESSURE OR ABNORMAL FUEL TEMPERATURE OUTSIDE TS LIMITS

- Exceeding interim brittle fracture curve WITHOUT RC pumps on

OR

- Exceeding NDT limit WITH RC pumps on

OR

- Shift Supervisor's judgement.

ALERT

1. SEVERE LOSS OF FUEL CLADDING:

*NOTE: Mechanical clad failure or flow-induced failure.

- RCS sample - 350 μCi/ml to 1770 μCi/ml - I-131 concentration.
- RCS sample shows an increase of 70 μCi/ml in a 30 minute period of time.

OR

- 5% to 25% total fuel failures (greater than 350 μCi/ml I-131)

SITE AREA EMERGENCY

1. DEGRADED CORE WITH POSSIBLE LOSS OF COOLABLE GEOMETRY

Flow induced -

- RCS sample indicates GAP activity

Fuel Over-temperature-

- Incore thermocouple readings greater than 700°F AND
- Excess H_2O in RB or RCS sample AND
- RCS sample results indicate I-131 concentration is between 1300 μCi/ml to 13,000 μCi/ml

Fuel melt conditions

- Incore thermocouple readings are above 2300°F AND
- RCS sample results indicate I-131 concentration is between 1180 to 11,800 μCi/ml.

GENERAL EMERGENCY

1. LOSS OF 2 OF 3 FISSION PRODUCT PRODUCT BARRIERS WITH A POTENTIAL FOR LOSS 3RD BARRIER:

Any one of the following are indications of the specific barrier lost:

CLADDING FAILURE

- RCS sample results indicate GAP activity.

LOSS OF CONTAINMENT

- RB penetrations are not valved off or closed.
- Steamline break upstream from MSSV and MSSV malfunction.
- Steamline break or stop valve failure with S/G tube leak.

LOSS OF PRIMARY COOLANT

- HIGH RB pressure
- HIGH RB sump level

LOSS OF PRIMARY COOLANT (CONTINUED)

- Loss of subcooling margin
- RIA 16/17 or 40 HIGH alarm
- RB pressure increases and approaches 59 psig and loss of RB spray or cooling units
- RCS pressure decreasing uncontrollably with T_{avg} constant.

INITIAL NOTIFICATION REQUIREMENTS: CONSULT EMERGENCY TELEPHONE DIRECTORY

tify: 1,2,4,6,7 | Notify: 1,2,6,7 | Notify: 1,2,6,7 | Notify: 1,2,

ENCLOSURE 4.1.3
STEAM SYSTEM FAILURE

UNUSUAL EVENT

1. FAILURE OF A MAIN STEAM RELIEF VALVE TO CLOSE FOLLOWING REDUCTION OF APPLICABLE PRESSURE.

   * Visual observation

2. RAPID DEPRESSURIZATION OF SECONDARY SIDE.

   * Rapid pressure decrease below relief valve and/or bypass valve setpoints

   OR

   * Excessive FDW flow to one or both OTSG WITH

   * Rapidly increasing level

   OR

   * Rapidly decreasing level

   OR

   * Observation of steam line break, open relief or other uncontrollable steam loss.

ALERT

1. STEAMLINE BREAK WITH GREATER THAN 10 BUT LESS THAN 50 GPM P/S LEAK RATE.

   STEAM LINE BREAK INSIDE RB

   * Unexpected increase in Rx power AND

   * Rapid decrease in T_{avg}, PZR level, RCS Pressure, Steam pressure AND

   * Increased RB pressure and temperature

   STEAM LINE BREAK OUTSIDE RB

   * Unexpected increase in Rx power AND

   * Rapid decrease in T_{avg}, PZR level, RCS pressure, Steam pressure AND

   * Increased PR pressure and temperature if steam line break inside PR.

SITE AREA EMERGENCY

1. STEAMLINE BREAK WITH GREATER THAN 50 GPM P/S LEAKAGE AND INDICATION OF FUEL DAMAGE.

   * Rx trip on Low RCS pressure AND

   * RCS pressure and T_{avg} decreasing uncontrollably AND

   * RIA 16/17 and 40 HIGH alarm AND

   * Chemistry sample analysis indicates fuel damage - I-131 concentration between 70 µCi/ml to 350 µCi/ml.

GENERAL EMERGENCY

INITIAL NOTIFICATION REQUIREMENTS: CONSULT EMERGENCY TELEPHONE DIRECTORY

Notify: 1,2,4,6,7 Notify: 1,2,6,7 Notify: 1,2,6,7

ENCLOSURE 4.1.4
HIGH RADIATION/RADIOLOGICAL EFFLUENTS

UNUSUAL EVENT

1. RADIOLOGICAL EFFLUENT TS LIMITS EXCEEDED

   NOTE: TS for ONS gaseous release Shared 3-Unit System

   GASEOUS EFFLUENT

   * RIA-45 in valid alarm mode for more than 1 hour AND
   * RIA-46 in valid alarm mode

   AND

   * Release rate calculations using vent sample analysis and flow rate data are in excess of TS limits per HP/0/B/1009/15.

   LIQUID EFFLUENT

   * RIA 33/34 alarm setpoint established in discharge permit exceeded AND
   * Flow not terminated AND
   * Samples at restricted area boundary exceed limits of TS 3.9.

ALERT

1. HIGH RADIATION LEVEL OR HIGH AIRBORNE CONTAMINATION:

   * Increase by a factor of 1000 times normal setpoint of RIA 32, 40, 35, 31, 41, 51, 53.

2. RADIOLOGICAL EFFLUENTS EXCEEDING 10 TIMES TS

   GASEOUS EFFLUENTS

   * RIA-46 in valid alarm mode verified by RIA-45

   AND

   * Release rate calculations using vent sample analysis and flow rate data are in excess of limits established by HP/0/B/1009/15.

   LIQUID EFFLUENTS

   * 10 x RIA-33/34 alarm setpoint established in discharge permit AND
   * Isolation valve fails to close and flow is not terminated.

   AND

   * Samples at restricted area boundary exceed 10 x limits of TS 3.9.

SITE AREA EMERGENCY

1. ACCIDENTAL RELEASE OF GASES AT THE SITE BOUNDARY UNDER METEOROLOGICAL CONDITIONS EXISTING AT THE TIME OF RELEASE.

   * RIA 45/46 in valid alarm mode

   AND

   * Gaseous effluent sample results shows I-131 equivalent concentration and noble gases (Xe-133), etc) being released results is 50 mR/hr WB for 30 minutes.

   OR

   * 500 mR/Hr WB for 2 minutes

2. RADIATION LEVEL IN CONTAINMENT WITH LEAK RATE APPROPRIATE FOR EXISTING RB PRESSURE.

   * RIA 57 or 58 HIGH alarm AND
   * Dose rate inside RB coupled with RB leak rate results in calculated dose rate at site boundary greater than 50 mR/Hr WB for 2 minutes or 500 mR/Hr WB for 2 minutes.

   OR

   * Radiation Monitoring teams measure I-131 equivalent greater than:

     250 mR/Hr (9×10^{-6}) µCi/ml for 30 min.

     OR

     2500 mR/Hr (9×10^{-7}) µCi/ml for 2 min. at the site boundary.

GENERAL EMERGENCY

1. ACCIDENTAL RELEASE UNDER ACTUAL METEOROLOGICAL CONDITIONS AT SITE BOUNDARY:

   * RIA 45/46 in valid alarm mode

   AND

   * Sample results with calculated Offsite Dose projection gives 1 R/Hr WB

   OR

   * 5 R/hr thyroid

2. RADIATION LEVEL IN RB WITH LEA RATE APPROPRIATE FOR EXISTING RB PRESSURE.

   * RIA 57 or 58 ALERT Alarm
   * Dose Projection equals 1 R/Hr WB

   OR

   * 5 R/Hr thyroid

   AND

   * Radiation Monitoring teams verify readings offsite past the Site Boundary.

INITIAL NOTIFICATION REQUIREMENTS: CONSULT EMERGENCY TELEPHONE DIRECTORY

UNUSUAL EVENT	ALERT	SITE AREA EMERGENCY	GENERAL EMERGENCY
Notify: 1,2,4,6,7 and 13 (Liquid releases only)	Notify: 1,2,6,7 and 13 (Liquid releases only)	Notify: 1,2,6,7	Notify: 1,2,6,7

ENCLOSURE 4.1.5
LOSS OF SHUTDOWN FUNCTIONS

UNUSUAL EVENT	ALERT	SITE AREA EMERGENCY	GENERAL EMERGENCY
	1. COMPLETE LOSS OF ANY FUNCTION NEEDED FOR PLANT COLD SHUTDOWN: * LPI system not functional OR * Inability to sustain either natural or forced circulation. 2. FAILURE OF THE RPS TO INITIATE AND COMPLETE A SCRAM WHICH BRINGS THE RX SUBCRITICAL * Rx remains critical after trip AND * Rods remain out.	1. COMPLETE LOSS OF ANY FUNCTION NEEDED FOR PLANT HOT SHUTDOWN * Inadequate HPI flow OR * Condenser not available and S/G bypass valves not operable OR * No FDW flow and no EFDW flow 2. TRANSIENT REQUIRING OPERATION OF SD SYSTEMS WITH FAILURE TO SCRAM. ASSUMPTION: Continued power generation and no core damage immediately evident. * 2 or more RPS channels trip AND * Control rods do not drop into core AND * RCS sample results indicates I-131 concentration less than 70 μCi/ml.	1. TRANSIENT REQUIRING RX TRIP WITH FAILURE TO SCRAM. ADDITIONAL FAILURE OF CORE COOLING AND ECCS WOULD LEAD TO CORE MELT: * RCS pressure greater than safety valve setpoint OR * Rapidly increasing RB pressure AND * Rx remains critical 2. TRANSIENT INITIATED BY LOSS OF FDW AND CONDENSATE SYSTEMS FOLLOWED BY FAILURE OF EFDW FOR EXTENDED PERIOD. CORE MELT POSSIBLE IN SEVERAL HOURS. * Loss of main condenser AND * No EFDW AND * No HPI OR * Loss of main condenser AND * No EFDW AND * Successful HPI AND * 30 minutes has elapsed * No LPI AND/OR * No EFDW
INITIAL NOTIFICATION REQUIREMENTS: CONSULT EMERGENCY TELEPHONE DIRECTORY			
	Notify: 1,2,6,7	Notify: 1,2,6,7	Notify: 1,2,6,7

ENCLOSURE 4.1.6
LOSS OF POWER

UNUSUAL EVENT	ALERT	SITE AREA EMERGENCY	GENERAL EMERGENCY
1. LOSS OF OFFSITE POWER OR LOSS OF ONSITE POWER CAPABILITY * Switchyard isolation ON * Underfrequency-undervoltage on MFB #1 or #2	1. LOSS OF OFFSITE POWER AND LOSS OF ALL ONSITE AC POWER *NOTE: Alert declared as soon as power outage occurs. * Load rejection and Rx trip AND * SY isolation on undervoltage underfrequency AND * Loss of voltage on MFB 1 & 2 AND * Keowee emergency start with transfer of auxiliaries to SSBY buses. 2. LOSS OF ALL ONSITE DC POWER *NOTE: Alert declared as soon as a loss of DC power occurs. * Low voltage on all DC buses ON * DC buses unavailable to be closed. 3. RAPID GROSS FAILURE OF ONE OTSG TUBE WITH LOSS OF OFF-SITE POWER. *NOTE: Leak greater than 10 GPM but less 200 GPM. * RIA 16, 17, 40 HIGH alarm AND * LOST level decreasing; AND * Undervoltage - underfrequency on MFB 1 and MFB 2, AND * RCS leak rate calculation	1. LOSS OF OFFSITE POWER AND LOSS OF ONSITE AC POWER FOR MORE THAN 15 MINUTES * Undervoltage on MFB 1 & 2 AND * Keowee Hydro fails to start either manual or automatic 2. LOSS OF ALL VITAL ONSITE DC POWER FOR MORE THAN 15 MINUTES. * DC bus undervoltage alarms (all buses) AND * DC alarm on EPSL. 3. RAPID FAILURE OF STEAM GENERATOR TUBE LEAK (GREATER THAN 200 GPM) WITH LOSS OF OFFSITE POWER. * Rx trip on LOW RCS PRESSURE AND * RCS PRESSURE decreasing uncontrollably with T_{avg} constant AND * RIA 16/17 and 40 HIGH alarm AND * No significant increase in RB pressure and sump level AND * Undervoltage-underfrequency alarms in the 230 KV switchyard.	1. FAILURE OF OFFSITE AND ONSITE POWER ALONG WITH TOTAL LOSS OF EFDW MAKE-UP CAPABILITY FOR SEVERAL HOURS. * Undervoltage on MFB 1 & 2 alarms for greater than 2 hours AND * Keowee Hydro fails to start (either manual or automatic) AND * EFDW pumps fail to start. 2. SMALL AND LARGE LOCAS WITH FAILURE OF ECCS - LEADS TO CORE MELT. * LOCA EALs-SAE #1 or SAE #2 AND * HPI system failure AND * LPI system failure

INITIAL NOTIFICATION REQUIREMENTS: CONSULT EMERGENCY TELEPHONE DIRECTORY

tify: 1,2,4,6,7 | Notify: 1,2,6,7 | Notify: 1,2,6,7 | Notify: 1,2,

ENCLOSURE 4.1.7
FIRES AND SECURITY ACTIONS

UNUSUAL EVENT	ALERT	SITE AREA EMERGENCY	GENERAL EMERGENCY
1. FIRE WITHIN THE PLANT LASTING MORE THAN 10 MINUTES. *NOTE: Within the plant means: Aux Bldg., TB, RB, Keowee Hydro • Efforts to extinguish a fire within the plant lasts longer than 10 minutes. 2. SECURITY THREAT OR ATTEMPTED ENTRY OR ATTEMPTED SABOTAGE. • Shift Supervisor is made aware that the Safeguards Contingency Plan has been initiated.	1. FIRE POTENTIALLY AFFECTING SAFETY SYSTEMS. • Fire alarm in vital areas and visual observation of fires affecting safety related systems AND • Shift Supervisor's judgement 2. ONGOING SECURITY COMPROMISE • Security Safeguards Contingency event • Adversaries control over an area of the plant but not control over the SD capability or of any vital area in the ONS Safeguards Contingency Plan.	1. FIRE COMPROMISING THE FUNCTIONS OF SAFETY SYSTEMS. • Observation of a fire causing the loss of redundant safety systems trains or functions. 2. IMMINENT LOSS OF PHYSICAL CONTROL OF THE PLANT • Physical attack resulting in imminent occupancy of the CR, Aux SD panels, or other vital areas in the ONS Safeguards Contingency Plan.	1. ANY MAJOR INTERNAL OR EXTERNAL EVENTS WHICH COULD CAUSE MASSIVE CORE DAMAGE TO PLANT. • Visual observation of fires AND • Shift Supervisor's judgement 2. LOSS OF PHYSICAL CONTROL OF THE PLANT • Physical attack resulting in unauthorized personnel occupying the CR or any other vital area in the ONS Safeguards Contingency Plan.

INITIAL NOTIFICATION REQUIREMENTS: CONSULT EMERGENCY TELEPHONE DIRECTORY

Notify: 1,2,4,6,7 | Notify: 1,2,6,7 | Notify: 1,2,6,7 | Notify: 1,2,6,7

ENCLOSURE 4.1.9
SPENT FUEL DAMAGE

UNUSUAL EVENT	ALERT	SITE AREA EMERGENCY	GENERAL EMERGENCY
	1. FUEL DAMAGE ACCIDENT WITH RELEASE OF RADIOACTIVITY TO: • Containment - RIA-4 HIGH ALARM • Spent Fuel Pool - RIA-41, ALERT ALARM	1. MAJOR DAMAGE TO SPENT FUEL: *NOTE: DAMAGE MECHANISM IS: • Large object damages fuel OR • Water loss below fuel level IN • Containment - RIA 2,3,4,49 HIGH Alarm with gaseous sample results indicating offsite dose comparable to SAE #2 EALS (Enc. 4.1.4) OR • Fuel-Handling Building RIA-6 HIGH Alarm in Spent Fuel Pool OR RIA-41 HIGH Alarm with gaseous sample results indicating offsite dose comparable to SAE #1 EALS, (Enc. 4.1.4)	

INITIAL NOTIFICATION REQUIREMENTS: CONSULT EMERGENCY TELEPHONE DIRECTORY

Notify: 1,2,6, Notify: 1,2,6,7

ENCLOSURE 4.1.10
NATURAL DISASTERS AND OTHER HAZARDS

UNUSUAL EVENT

1. EARTHQUAKE FELT IN PLANT OR DETECTED
2. LAKE KEOWEE LEVEL
   - High > 802 ft.
   - Low < 775 ft.
3. ANY TORNADO WITHIN THE SITE BOUNDARY.
4. WINDS GREATER THAN 73 MPH
5. AIRCRAFT CRASH ONSITE OR UNUSUAL AIRCRAFT ACTIVITY OVER SITE.
6. EXPLOSION WITHIN THE SITE BOUNDARY.
7. TOXIC OR FLAMMABLE GAS RELEASE WITHIN THE SITE BOUNDARY.
8. TURBINE ROTATING COMPONENT FAILURE CAUSING RAPID PLANT SD.

ALERT

1. DBE less than .05g
2. LAKE LEVEL
   - High > 805 ft.
   - Low < 775 ft.
3. TORNADO STRIKING FACILITY
4. WINDS APPROACHING 95 MPH
5. AIRCRAFT CRASH ON FACILITY
6. MISSILE IMPACT ON FACILITY
7. EXPLOSION DAMAGE TO FACILITY AFFECTING PLANT OPERATION
8. UNCONTROLLED ENTRY OF TOXIC OR FLAMMABLE GAS INTO FACILITY AFFECTING SAFE OPERATION OF PLANT
9. TURBINE ROTATING COMPONENT FAILURE CAUSING PENETRATION OF TURBINE CASING.

SITE AREA EMERGENCY

PLANT NOT IN COLD SHUTDOWN:

1. MHE $\geq$ .10g (Class 1 structures founded on bedrock)

   MHE $\geq$ .15g (Structures founded on overburden)
2. LAKE LEVEL
   - High > 809 ft.
   - Low < 775 ft.
3. WINDS GREATER THAN 95 MPH
4. AIRCRAFT CRASH CAUSING DAMAGE OR FIRE IN RB OR CR, AUX. BLDG., FUEL-HANDLING BLDG., TB, INTAKE STRUCTURES, OR SWITCHYARD.
5. DAMAGE FROM MISSILE OR EXPLOSION CAUSING INABILITY TO ESTABLISH:
   - HPI injection
   - FDW flow or EDFW flow

   OR
   - Condenser not available and S/G bypass valves not operable.
6. ENTRY OF CONTROLLED TOXIC OR FLAMMABLE GASES INTO CR, CABLE SPREADING ROOMS, RB, SWITCHGEAR ROOM, AUX. SD PANELS AFFECTING SAFE OPERATION OF PLANT.

GENERAL EMERGENCY

1. ANY MAJOR INTERNAL OR EXTERNAL EVENTS (i.e., FIRES, EARTHQUAKES SUBSTANTIALLY BEYOND DESIGN LEVELS) WHICH COULD CAUSE MASSIVE COMMON DAMAGE TO PLANT SYSTEMS.

INITIAL NOTIFICATION REQUIREMENTS: CONSULT EMERGENCY TELEPHONE DIRECTORY

Notify: 1,2,4,6,7 | Notify: 1,2,6,7 | Notify: 1,2,6,7 | Notify: 1,2,6,7

ENCLOSURE 4.1.11
OTHER ABNORMAL PLANT CONDITIONS

UNUSUAL EVENT	ALERT	SITE AREA EMERGENCY	GENERAL EMERGENCY
1. ECCS INITIATED: • 1 or more ES channels actuated WITH • Flow indicated in A or B injection header (LPI or HPI) on valid RCS Low pressure OR • RB High pressure signal. 2. LOSS OF CONTAINMENT INTEGRITY REQUIRING SD BY TS. • Penetration(s) fail leak test as specified in TS 4.4.1. OR • Limits as established in TS 3.6 exceeded. 3. LOSS OF ES FEATURE OR FIRE PROTECTION SYSTEM FUNCTION REQUIRING SD BY TS. EX: Malfunction, Personnel Error, Procedural Inadequacy. 4. ABNORMAL COOLANT TEMPERATURE AND/OR PRESSURE OR ABNORMAL FUEL TEMPERATURES OUTSIDE TS LIMITS • Exceeding interim brittle fracture curve WITHOUT RC Pumps on OR • Exceeding NDT limit WITH RC pumps on AND • Shift Supervisor's judgement.	1. OTHER PLANT CONDITIONS THAT WARRANT PRECAUTIONARY ACTIVATION OF THE TSC AND PLACING THE CMC AND OTHER KEY PERSONNEL ON STANDBY. 2. EVACUATION OF CR ANTICIPATED OR REQUIRED WITH CONTROL OF SD SYSTEMS ESTABLISHED FROM LOCAL STATIONS. • Evacuations of Control Room 1 & 2 would require relocating the TSC to the Oconee Training Center.	1. OTHER PLANT CONDITIONS EXIST THAT WARRANT ACTIVATION OF THE TSC AND CMC. • Offsite monitoring initiated AND • Siren System activated by counties.	1. OTHER PLANT CONDITIONS EXIST FROM WHATEVER SOURCE THAT MAKE RELEASE OF LARGE AMOUNTS OF RADIOACTIVITY IN A SHORT TIME PERIOD POSSIBLE • Any core melt situation
Notify: 1,2,4,6,7	Notify: 1,2,6,7	Notify: 1,2,6,7	Notify: 1.2,6,7

INITIAL NOTIFICATION REQUIREMENTS: CONSULT EMERGENCY TELEPHONE DIRECTORY

ENCLOSURE 4.1.11
OTHER ABNORMAL PLANT CONDITIONS

UNUSUAL EVENT	ALERT	SITE AREA EMERGENCY	GENERAL EMERGENCY
5. OTHER PLANT CONDITIONS EXIST THAT WARRANT INCREASED AWARENESS ON THE PART OF STATE/LOCAL AUTHORITIES.			
6. OTHER PLANT CONDITIONS EXIST THAT REQUIRE PLANT SD AND INVOLVES OTHER THAN NORMAL CONTROLLED SD.			
7. TRANSPORTATION OF AN EXTERNALLY CONTAMINATED INJURED INDIVIDUAL FROM SITE TO OFFSITE HOSPITAL. • Contamination greater than 150 cpm as determined by Health Physics			
8. TRANSPORTAION OF AN INTERNALLY CONTAMINATED INDIVIDUAL REQUIRING MEDICAL ASSESSMENT/TREATMENT AT AN OFFSITE HOSPITAL.			
9. TRANSPORTATION OF AN IRRADIATED INDIVIDUAL REQUIRING MEDICAL ASSESSMENT/TREATMENT AT AN OFFSITE HOSPITAL.			

INITIAL NOTIFICATION REQUIREMENTS: CONSULT EMERGENCY TELEPHONE DIRECTORY

Notify: 1,2,4,6,7

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Form SPD-1002-1

DUKE POWER COMPANY
PROCEDURE PREPARATION
PROCESS RECORD

(1) ID No: RP/O/B/1000/02
Change(s) 0 to
0 Incorporated

(2) STATION: STATION

(3) PROCEDURE TITLE: NOTIFICATION OF UNUSUAL EVENT

(4) PREPARED BY: Coleman C. Jennings DATE: 5/30/84

(5) REVIEWED BY: P. T. Bell DATE: 5/30/84

Cross-Disciplinary Review By: Edwin J. Liddell N/R: _____

(6) TEMPORARY APPROVAL (IF NECESSARY):

By: _____ (SRO) Date: _____

By: _____ Date: _____

(7) APPROVED BY: M. S. Tuckman Date: 6/1/84

(8) MISCELLANEOUS:

Reviewed/Approved By: _____ Date: _____

Reviewed/Approved By: _____ Date: _____

DUKE POWER COMPANY

OCONEE NUCLEAR STATION

NOTIFICATION OF UNUSUAL EVENTS

1.0 SYMPTOMS

1.1 Conditions exist where events are in progress or have occurred which indicate a potential degradation of the level of safety of the plant.

2.0 IMMEDIATE ACTIONS

2.1 Actions are not required to be followed in any particular sequence.

2.2 The Shift Supervisor/Emergency Coordinator shall:

Date/Initial
Time

_____ 2.2.1 Appoint On-Shift Communicator(s).

_____ 2.2.2 Appoint person to maintain logs.

_____ 2.2.3 Augment support as needed.

2.3 The On-Shift Communicator(s) shall:

NOTE: WARNING MESSAGE FORMS ARE IN THE IMPLEMENTING PROCEDURES CART. EMERGENCY COORDINATOR MUST APPROVE CONTENTS OF WARNING MESSAGE PRIOR TO RELEASE OFFSITE.

_____ 2.3.1 Complete Part I (Initial Notification) of the Warning Message form. Have available the authentication procedure.

2.3.1.1 Use Part I & II of the Warning Message form as applicable. Mark all spaces "N/A" when information is not applicable. Mark "Later" when information is not currently available.

_____ 2.3.2 Notify the Counties/State of South Carolina within 15 minutes of the declaration of emergency. Use the Emergency Telephone Directory.

_____ 2.3.3 Notify the NRC within 1 hour of the declaration of emergency. Open line to the NRC may be required.

_____ 2.3.4 Contact the Unit Operating/Duty Engineer. Operations Engineer shall use information from Enclosure 4.1 to complete his notification requirements.

Date/Initial
Time

3.0 SUBSEQUENT ACTIONS

_____3.1 If the UNUSUAL EVENT situation lasts longer than 1 hour, update Counties/State of South Carolina agencies each hour.

OR

If there is any significant change in the situation

OR

As agreed upon with individual agencies until the emergency is closed out.

_____3.2 Assess the emergency situation:

Remain in an UNUSUAL EVENT

OR

Escalate to a more severe class

OR

Terminate the emergency.

3.3 Close out the UNUSUAL EVENT.

_____3.3.1 On-shift communicator(s) will give a verbal summary closing out the emergency to the Counties/State of South Carolina agencies and the NRC.

_____3.3.2 Shift Supervisor shall complete the UNUSUAL EVENT procedure and forward the procedure with all copies of the Warning Message form to the ONS Emergency Preparedness Coordinator.

_____3.3.3 The Emergency Preparedness Coordinator shall be responsible for the Completed Procedure Process Record of all Emergency Plan implementing procedures initiated by the Control Room.

_____3.3.4 The Emergency Preparedness Coordinator shall prepare a written summary for the Station Manager's signature. This summary will be forwarded to the offsite authorities (County and State) within 24 hours of the time closeout was determined by the Emergency Coordinator.

4.0 ENCLOSURES

4.1 Emergency Information

RP/0/B/1000/02
Enclosure 4.1

DUKE POWER COMPANY
OCONEE NUCLEAR STATION
EMERGENCY INFORMATION

1. This is _____ at Oconee Nuclear Station.
(Name and Title)

2. This ____ is ____ is not a drill. An ____ Unusual Event
____ Alert
____ Site Area Emergency
____ General Emergency

was declared by the Emergency Coordinator at _____ on Unit #____.
(Time)

3. Initiating condition: (Give as close to the emergency plan description as possible together with station parameters used to determine emergency status). _____

4. Corrective measures being taken: _____

5. There ____ have ____ have not been any injuries to plant personnel.

6. Release of radioactivity: ____ is taking place
____ is not taking place

7. Notifications made: NRC __Yes __No State __Yes __No Counties __Yes __No

8. The Crisis Management Team ____ should ____ should not be activated.

9. Corporate Communications & Company Management should be notified.

10. I can be reached at _____ for follow-up information.
(Telephone Number)

11. Additional Comments: _____

12. Superintendent of Operations _____ Date _____ Time _____

Station Manager _____ Date _____ Time _____

N.P. Duty Engineer 704-373-5941 Date _____ Time _____
Beeper #625

CONTROL COPY

Form SPD-1002-1

INFORMATION ONLY

DUKE POWER COMPANY
PROCEDURE PREPARATION
PROCESS RECORD

(1) ID No: RP/O/B/1000/03
Change(s) 0 to
0 Incorporated

(2) STATION: OCONEE

(3) PROCEDURE TITLE: ALERT

(4) PREPARED BY: Coleman C. Jennings DATE: 5/30/84

(5) REVIEWED BY: R.T. Bond DATE: 5/30/84

Cross-Disciplinary Review By: Elvin A. Little N/R: _____

(6) TEMPORARY APPROVAL (IF NECESSARY):

By: _____ (SRO) Date: _____

By: _____ Date: _____

(7) APPROVED BY: M.S. Tuckman Date: 6/1/84

(8) MISCELLANEOUS:

Reviewed/Approved By: _____ Date: _____

Reviewed/Approved By: _____ Date: _____

DUKE POWER COMPANY

OCONEE NUCLEAR STATION

ALERT

1.0 SYMPTOMS

1.1 Events are in process or have occurred which involve an actual or potential substantial degradation of the level of safety of the plant.

2.0 IMMEDIATE ACTIONS

2.1 Actions are not required to be followed in any particular sequence.

2.2 The Shift Supervisor/Emergency Coordinator shall:

Date/Initial
Time

_____ 2.2.1 Appoint On-Shift Communicator(s).

_____ 2.2.2 Appoint person to maintain logs.

_____ 2.2.3 Initiate a Site Assembly in accordance with RP/0/B/1000/09 to set up the Technical Support Center.

_____ 2.2.4 Dispatch onsite monitoring teams to assess radiation and contamination.

2.3 The On-Shift Communicator(s) shall:

NOTE: WARNING MESSAGE FORMS ARE IN THE IMPLEMENTING PROCEDURES CART. EMERGENCY COORDINATOR MUST APPROVE CONTENTS OF WARNING MESSAGE PRIOR TO INFORMATION BEING RELEASED OFFSITE.

_____ 2.3.1 Complete Part I (Initial Notification) of the Warning Message form. Have available the authentication procedure.

2.3.1.1 Use Part I & II of the Warning Message form as applicable. Mark all spaces "N/A" when information is "Not applicable." Mark "Later" when information is not currently available.

_____ 2.3.2 Notify the Counties/State of South Carolina within 15 minutes of the declaration of emergency. Use the Emergency Telephone Directory.

Date/Initial
Time

_____ 2.3.3 Notify the NRC within 1 hour of the declaration of the emergency. Open line to the NRC may be required.

_____ 2.3.4 Contact the Unit Operating/Duty Engineer. Information from Enclosure 4.1 shall be used by the Operations Engineer to complete his notification requirements.

2.3.5 Contact Security Shift Lieutenant. (Enclosure 4.2 provides response actions of Security.)

_____ 2.3.5.1 Code Red (0800-1630 Weekdays Monday through Friday)

_____ 2.3.5.2 Code Blue (After hours, holidays, weekends)

3.0 SUBSEQUENT ACTIONS

NOTE: CONTROL ROOM OR TECHNICAL SUPPORT CENTER

_____ 3.1 If the ALERT lasts longer than 1 hour, update Counties/State of South Carolina agencies each hour

OR

If there is any significant change in the situation

OR

As agreed upon with individual agencies until the emergency is closed out.

_____ 3.2 Technical Support Center Operational. (See Enclosure 4.3)

_____ 3.3 Crisis Management Center Operational.

_____ 3.4 Assess the emergency situation:

Remain in an ALERT

OR

Escalate to a more severe class

OR

Reduce the emergency classification

OR

Terminate the emergency.

Date/Initial
Time

_____ 3.5 The Offsite Communicator(s) in the Technical Support Center will give a verbal summary to reduce or close out the emergency to the Counties/ State of South Carolina agencies and the NRC.

_____ 3.5.1 The Emergency Preparedness Coordinator shall prepare a written summary for the Station Manager's signature. This summary will be forwarded to the offsite authorities within 8 hours of the de-escalation or closeout by the Emergency Coordinator.

_____ 3.6 The Emergency Preparedness Coordinator shall be responsible for completing all Completed Procedure Process Records of Emergency Plan implementing procedures initiated by the Control Room and/or Technical Support Center during the emergency.

4.0 ENCLOSURES

4.1 Emergency Information

4.2 Globe Security Response

4.3 Technical Support Center Turnover Sheet

RP/0/B/1000/03
Enclosure 4.1

DUKE POWER COMPANY
OCONEE NUCLEAR STATION
EMERGENCY INFORMATION

1. This is _____ at Oconee Nuclear Station.
(Name and Title)

2. This ____ is ____ is not a drill. An ____ Unusual Event
____ Alert
____ Site Area Emergency
____ General Emergency

was declared by the Emergency Coordinator at _____ on Unit #____.
(Time)

3. Initiating condition: (Give as close to the emergency plan description as possible together with station parameters used to determine emergency status). _____

_____

_____

_____

4. Corrective measures being taken: _____

_____

_____

_____

5. There ____ have ____ have not been any injuries to plant personnel.

6. Release of radioactivity: ____ is taking place
____ is not taking place

7. Notifications made: NRC __Yes __No State __Yes __No Counties __Yes __No

8. The Crisis Management Team ____ should ____ should not be activated.

9. Corporate Communications & Company Management should be notified.

10. I can be reached at _____ for follow-up information.
(Telephone Number)

11. Additional Comments: _____

_____

_____

_____

1[illegible] Superintendent of Operations _____ Date_____ Time_____

Station Manager _____ Date_____ Time_____

N.P. Duty Engineer _____ Date_____ Time_____
Beeper [redacted]

DUKE POWER COMPANY

OCONEE NUCLEAR STATION

GLOBE SECURITY RESPONSE

_____ AT _____
On-Shift Communicator Telephone Number

TO: _____ AT [redacted]
Security Shift Lieutenant Telephone Number

Give the following information:

1. This is ____ is not ____ a drill. The Technical Support Center is being activated for an emergency relating to Unit # ____.

2. Provide Code Red Response: (0800 - 1630 Weekdays Monday through Friday)

   - Access and Control to all three Control Rooms.
   - Patrol station for Site Assembly and secure the gates.
   - Switch telephones to TSC and OSC.
   - Implement Globe Procedure 81-0100-0-06
   - Provide Manpower for MERT Team

   Provide Code Blue Response: (After hours, weekends, holidays)

   - Recall Duty Personnel per Duty Roster
   - Switch telephones to TSC and OCS
   - Unlock doors to TSC and OSC
   - Patrol station for Site Assembly and secure the gates
   - Access and Control to all three Control Rooms
   - Station Personnel Accountability
   - Implement Globe Procedure 81-0100-0-06
   - Provide Manpower for MERT Team

DUKE POWER COMPANY

OCONEE NUCLEAR STATION

TECHNICAL SUPPORT CENTER TURNOVER SHEET

1. Personnel arriving in the Technical Support Center shall relieve Operations personnel of peripheral duties ordinarily assigned to their section. These persons will be provided direction from the Emergency Coordinator/Shift Supervisor until he is relieved of accident management responsibilities by the Station Manager/ alternate once the Technical Support Center is operational.

DATE/INITIAL TIME	FACE TO FACE WRITTEN TURNOVER IS REQUIRED	NAME
_____	Station Manager	_____
_____	Health Physics Dose Assessment	_____
_____	Performance	_____
_____	Compliance	_____

2. Technical Support Center

   _____ Operational

3. Station Manager shall assume the following accident management responsibilities:

   - Provide for continuous staffing of the Technical Support Center and Operational Support Center
   - Maintain station accountability and dose control
   - Implement approval process for release of information
   - Provide update of emergency status to plant personnel
   - Provide protective action recommendations to County/State authorities
   - Make available news release to TSC and OSC
   - Maintain contact with Crisis Management Center
   - Direct and initiate measures to control and mitigate the emergency

CONTROL COPY

Form SPD-1002-1

INFORMATION ONLY

DUKE POWER COMPANY
PROCEDURE PREPARATION
PROCESS RECORD

(1) ID No: RP/O/B/1000/04
Change(s) 0 to
0 Incorporated

(2) STATION: OCONEE

(3) PROCEDURE TITLE: SITE AREA EMERGENCY

(4) PREPARED BY: Coleman C. Jennings DATE: 5/30/84

(5) REVIEWED BY: R. T. Bond DATE: 5/30/84

Cross-Disciplinary Review By: Edwin A. Little N/R: _____

(6) TEMPORARY APPROVAL (IF NECESSARY):

By: _____ (SRO) Date: _____

By: _____ Date: _____

(7) APPROVED BY: M. S. Tuckman Date: 6/1/84

(8) MISCELLANEOUS:

Reviewed/Approved By: _____ Date: _____

Reviewed/Approved By: _____ Date: _____

DUKE POWER COMPANY

OCONEE NUCLEAR STATION

SITE AREA EMERGENCY

1.0 SYMPTOMS

1.1 Events are in process or have occurred which involve an actual or likely major failure of plant functions needed for protection of the public.

2.0 IMMEDIATE ACTIONS

2.1 Actions are not required to be followed in any particular sequence.

2.2 The Shift Supervisor/Emergency Coordinator shall:

NOTE: PROTECTIVE ACTION RECOMMENDATIONS ARE THE SOLE RESPONSIBILITY OF THE EMERGENCY COORDINATOR AND MAY NOT BE DELEGATED.

Date/Name Time		
_____	2.2.1	Recommend within 15 minutes of declaration of SITE AREA EMERGENCY to Counties/State of South Carolina that the Alerting Sirens be sounded and that the EBS be activated to inform the public of a potential for later protective actions. See RP/0/B/1000/06.
_____	2.2.2	Appoint On-shift communicator(s).
_____	2.2.3	Appoint person to maintain logs.
_____	2.2.4	Initiate a Site Assembly in accordance with RP/0/B/1000/09 to set up the Technical Support Center.
_____	2.2.5	Dispatch onsite monitoring teams to assess radiation and contamination.

2.3 The On-Shift Communicator(s) shall:

NOTE: WARNING MESSAGE FORMS ARE IN THE IMPLEMENTING PROCEDURES CART. EMERGENCY COORDINATOR MUST APPROVE CONTENTS OF WARNING MESSAGES PRIOR TO INFORMATION BEING RELEASED OFFSITE.

Date/Name
Time

_____ 2.3.1 Complete Part I (Initial Notification) of the Warning Message form. Have available the authentication procedure. Emergency Coordinator must make the initial notification since protective recommendations are required.

2.3.1.1 Use Part I & II of the Warning Message form as applicable. Mark all spaces "N/A" when information is not applicable. Mark "Later" when information is not currently available.

_____ 2.3.2 Notify the NRC within 1 hour of the declaration of the emergency. Open line to the NRC may be required.

_____ 2.3.3 Contact unit Operating/Duty Engineer. Information from Enclosure 4.1 shall be used by the Operations Engineer to complete his notification requirements.

2.3.4 Contact Security Shift Lieutenant to respond. (Enclosure 4.2 provides response actions of Security.)

_____ 2.3.4.1 Code Red (0800-1630 Weekdays Monday through Friday)

_____ 2.3.4.2 Code Blue (After hours, weekends, holidays)

3.0 SUBSEQUENT ACTIONS

NOTE: CONTROL ROOM OR TECHNICAL SUPPORT CENTER

_____ 3.1 Update Counties/State of South Carolina agencies each half hour

OR

If there is any significant change in the situation

OR

As agreed upon with individual agencies until the emergency is closed out.

_____ 3.2 Follow-up Protective Action Recommendations to offsite authorities. Use RP/0/B/1000/06 for determination of protective action recommendations.

3.2.1 Offsite dose calculations will be made by Operations or the Health Physics Center depending on which group is available. This information will be used by the Emergency Coordinator to make recommendations to the Counties/ State of South Carolin.

Date/Name
Time

_____3.3 Consider evacuation of non-essential personnel per RP/0/B/1000/10.

_____3.4 Technical Support Center Operational. (See Enclosure 4.3.)

_____3.5 Crisis Management Center Operational.

_____3.6 Assess the emergency situation:

Remain in a SITE AREA EMERGENCY

OR

Escalate to a more severe class

OR

Reduce the emergency classification

OR

Terminate the emergency classification.

_____3.7 The Recovery Manager at the Crisis Management Center shall recommend close out or reduction of the emergency classification by phone or by briefing to offsite authorities at the Crisis Management Center. The Recovery Manager shall provide a written summary to offsite authorities within 8 hours of the class reduction or closeout.

_____3.8 The Emergency Preparedness Coordinator shall be responsible for completing all Completed Procedure Process Records of Emergency Plan implementing procedures initiated by the Control Room and/or Technical Support Center.

4.0 ENCLOSURES

4.1 Emergency Information

4.2 Globe Security Response

4.3 Technical Support Center Turnover Sheet

DUKE POWER COMPANY
OCONEE NUCLEAR STATION
EMERGENCY INFORMATION

1. This is _____ at Oconee Nuclear Station.
(Name and Title)

2. This ____ is ____ is not a drill. An ____ Unusual Event
____ Alert
____ Site Area Emergency
____ General Emergency

was declared by the Emergency Coordinator at _____ on Unit #____.
(Time)

3. Initiating condition: (Give as close to the emergency plan description as possible together with station parameters used to determine emergency status). _____

_____

_____

_____

4. Corrective measures being taken: _____ _____

_____

_____

_____

5. There ____ have ____ have not been any injuries to plant personnel.

6. Release of radioactivity: ____ is taking place
____ is not taking place

7. Notifications made: NRC __Yes __No State __Yes __No Counties __Yes __No

8. The Crisis Management Team ____ should ____ should not be activated.

9. Corporate Communications & Company Management should be notified.

10. I can be reached at _____ for follow-up information.
(Telephone Number)

11. Additional Comments: _____

_____

_____

_____

12. Superintendent of Operations_____ Date_____ Time_____

Station Manager_____ Date_____ Time_____

N.P. Duty Engineer _____ Date_____ Time_____
Beeper [redacted]

DUKE POWER COMPANY

OCONEE NUCLEAR STATION

GLOBE SECURITY RESPONSE

_____ AT _____
On-Shift Communicator Telephone Number

TO: _____ AT _____
Security Shift Lieutenant Telephone Number

Give the following information:

1. This is ____ is not ____ a drill. The Technical Support Center is being activated for an emergency relating to Unit # ____.

2. Provide Code Red Response: (0800 - 1630 Weekdays Monday through Friday)

   - Access and Control to all three Control Rooms.
   - Patrol station for Site Assembly and secure the gates.
   - Switch telephones to TSC and OSC.
   - Implement Globe Procedure 81-0100-C-06
   - Provide Manpower for MERT Team

   Provide Code Blue Response: (After hours, weekends, holidays)

   - Recall Duty Personnel per Duty Roster
   - Switch telephones to TSC and OCS
   - Unlock doors to TSC and OSC
   - Patrol station for Site Assembly and secure the gates
   - Access and Control to all three Control Rooms
   - Station Personnel Accountability
   - Implement Globe Procedure 81-0100-0-06
   - Provide Manpower for MERT Team

DUKE POWER COMPANY

OCONEE NUCLEAR STATION

TECHNICAL SUPPORT CENTER TURNOVER SHEET

1. Personnel arriving in the Technical Support Center shall relieve Operations personnel of peripheral duties ordinarily assigned to their section. These persons will be provided direction from the Emergency Coordinator/Shift Supervisor until he is relieved of accident management responsibilities by the Station Manager/ alternate once the Technical Support Center is operational.

TIME	FACE TO FACE WRITTEN TURNOVER IS REQUIRED	NAME
_____	Station Manager	_____
_____	Health Physics Dose Assessment	_____
_____	Performance	_____
_____	Compliance	_____

2. Technical Support Center

   _____ Operational

3. Station Manager shall assume the following accident management responsibilities:

   - Provide for continuous staffing of the Technical Support Center and Operational Support Center
   - Maintain station accountability and dose control
   - Implement approval process for release of information
   - Provide update of emergency status to plant personnel
   - Provide protective action recommendations to County/State authorities
   - Make available news release to TSC and OSC
   - Maintain contact with Crisis Management Center
   - Direct and initiate measures to control and mitigate the emergency

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Form SPD-1002-1

DUKE POWER COMPANY
PROCEDURE PREPARATION
PROCESS RECORD

(1) ID No: RP/O/B/1000/05
Change(s) 0 to
0 Incorporated

(2) STATION: OCONEE

(3) PROCEDURE TITLE: GENERAL EMERGENCY

(4) PREPARED BY: Coleman C. Jennings DATE: 5/30/84

(5) REVIEWED BY: R. L. Bryant DATE: 5/30/84

Cross-Disciplinary Review By: Ellen A. Liells N/R: _____

(6) TEMPORARY APPROVAL (IF NECESSARY):

By: _____ (SRO) Date: _____

By: _____ Date: _____

(7) APPROVED BY: M S Tuckman Date: 6/1/84

(8) MISCELLANEOUS:

Reviewed/Approved By: _____ Date: _____

Reviewed/Approved By: _____ Date: _____

DUKE POWER COMPANY

OCONEE NUCLEAR STATION

GENERAL EMERGENCY

1.0 SYMPTOMS

1.1 Events are in process or have occurred which involve an actual or imminent substantial core degradation or melting with potential for loss of containment integrity.

2.0 IMMEDIATE ACTIONS

2.1 Actions are not required to be followed in any particular sequence.

2.2 The Shift Supervisor/Emergency Coordinator shall:

NOTE: PROTECTIVE ACTION RECOMMENDATIONS ARE THE SOLE RESPONSIBILITY OF THE EMERGENCY COORDINATOR AND MAY NOT BE DELEGATED.

Date/Initial
Time

_____ 2.2.1 Time of day - 1000 to 1559

- Within 15 minutes of a declaration of a GENERAL EMERGENCY, recommend to County/State authorities that all residents in the 2 mile radius (Central 1, 2, 3) and 5 mile downwind in a 90° sector go indoors, close all windows and doors, turn off ventilation equipment and monitor EBS for information. See RP/0/B/1000/06.

_____ 2.2.2 Time of day - 1600 to 1000

- Within 15 minutes of a declaration of a GENERAL EMERGENCY, recommend to County/State authorities that all residents out to 5 miles should go indoors, close all windows and doors, turn off ventilation equipment and monitor EBS for information. See RP/0/B/1000/06.

_____ 2.2.3 Appoint on-shift communicator(s).

_____ 2.2.4 Appoint person to maintain logs.

_____ 2.2.5 Initiate a Site Assembly in accordance with RP/0/B/1000/09 to set up Technical Support Center.

_____ 2.2.6 Dispatch onsite monitoring teams to assess radiation and contamination.

Date/Initial
Time

2.3 The On-Shift Communicator(s) shall:

NOTE: WARNING MESSAGE FORMS ARE IN THE IMPLEMENTING PROCEDURES CART. EMERGENCY COORDINATOR MUST APPROVE CONTENTS OF ALL WARNING MESSAGES. PRIOR TO RELEASE OFFSITE.

_____2.3.1 Complete Part I (Initial Notification) of the warning Message form. Have available the authentication procedure. Emergency Coordinator must make the initial notification since protective recommendations are required.

2.3.1.1 Use Part I and II of the Warning Message form as applicable. Mark all spaces "N/A" when information is not applicable and mark "later" when information is not currently available.

_____2.3.2 Notify the NRC within 1 hour of the declaration of the emergency. Open line to the NRC may be required.

_____2.3.3 Contact Unit Operating/Duty Engineer. Information from Enclosure 4.1 shall be used by the Operations Engineer to complete his notification requirements.

2.3.4 Contact Security Shift Lieutenant to respond. (See Enclosure 4.2).

_____2.3.4.1 Code Red - (0800-1630 Weekdays Monday through Friday.)

_____2.3.4.2 Code Blue - (After hours, weekends, holidays.)

3.0 SUBSEQUENT ACTIONS

NOTE: CONTROL ROOM OR TECHNICAL SUPPORT CENTER

_____3.1 Update County/State agencies <u>each half hour</u>

<u>OR</u>

If there is any significant change in the situation

<u>OR</u>

As agreed upon with individual agencies until the emergency is closed out.

_____3.2 Follow-up Protective Action Recommendations to offsite agencies. Use RP/0/B/1000/06 for determination of protective action recommendations required.

Date/Initial
Time

3.2.1 Offsite dose calculations will be made by Operations or Health Physics Center personnel depending on which group is available. This information will be used by the Emergency Coordinator to make recommendations to the Counties/State of South Carolina.

_____3.3 Evacuate non-essential personnel per RP/0/B/1000/10.

_____3.4 Dispatch Offsite Monitoring Teams to monitor radiation and contamination.

_____3.5 Technical Support Center Operational. (See Enclosure 4.3).

_____3.6 Crisis Management Center Operational.

_____3.7 Assess the emergency condition:

Remain in the GENERAL EMERGENCY

OR

Reduce the emergency classification

OR

Terminate the emergency classification.

_____3.8 The Recovery Manager at the Crisis Management Center shall close out or recommend reduction of the emergency classification by phone or by briefing to offsite authorities at the Crisis Management Center. The Recovery Management shall provide a written summary to offsite authorities within 8 hours of the class reduction or closeout.

_____3.9 The Emergency Preparedness Coordinator shall be responsible for completing all Completed Procedure Process Records of Emergency Plan implementing procedures initiated by the Control Room and/or Technical Support Center during the emergency.

4.0 ENCLOSURES

4.1 Emergency Information

4.2 Globe Security Response

4.3 Technical Support Center Turnover Sheet

DUKE POWER COMPANY
OCONEE NUCLEAR STATION
EMERGENCY INFORMATION

1. This is _____ at Oconee Nuclear Station.
(Name and Title)

2. This ____ is ____ is not a drill. An ____ Unusual Event
____ Alert
____ Site Area Emergency
____ General Emergency

was declared by the Emergency Coordinator at _____ on Unit #____.
(Time)

3. Initiating condition: (Give as close to the emergency plan description as possible together with station parameters used to determine emergency status). _____

_____

_____

_____

4. Corrective measures being taken: _____

_____

_____ _____

_____

5. There ____ have ____ have not been any injuries to plant personnel.

6. Release of radioactivity: ____ is taking place
____ is not taking place

7. Notifications made: NRC __Yes __No State __Yes __No Counties __Yes __No

8. The Crisis Management Team ____ should ____ should not be activated.

9. Corporate Communications & Company Management should be notified.

10. I can be reached at _____ for follow-up information.
(Telephone Number)

11. Additional Comments: _____

_____

_____

_____

12. Superintendent of Operations_____ Date_____ Time_____

Station Manager_____ Date_____ Time_____

N.P. Duty Engineer _____ Date_____ Time_____
Beeper [redacted]

DUKE POWER COMPANY

OCONEE NUCLEAR STATION

GLOBE SECURITY RESPONSE

_____ AT _____
On-Shift Communicator Telephone Number

TO: _____ AT [redacted]
Security Shift Lieutenant Telephone Number

Give the following information:

1. This is _____ is not _____ a drill. The Technical Support Center is being activated for an emergency relating to Unit # _____.

2. Provide Code Red Response: (0800 - 1630 Weekdays Monday through Friday)

   - Access and Control to all three Control Rooms.
   - Patrol station for Site Assembly and secure the gates.
   - Switch telephones to TSC and OSC.
   - Implement Globe Procedure 81-0100-0-06
   - Provide Manpower for MERT Team

   Provide Code Blue Response: (After hours, weekends, holidays)

   - Recall Duty Personnel per Duty Roster
   - Switch telephones to TSC and OCS
   - Unlock doors to TSC and OSC
   - Patrol station for Site Assembly and secure the gates
   - Access and Control to all three Control Rooms
   - Station Personnel Accountability
   - Implement Globe Procedure 81-0100-0-06
   - Provide Manpower for MERT Team

DUKE POWER COMPANY

OCONEE NUCLEAR STATION

TECHNICAL SUPPORT CENTER TURNOVER SHEET

1. Personnel arriving in the Technical Support Center shall relieve Operations personnel of peripheral duties ordinarily assigned to their section. These persons will be provided direction from the Emergency Coordinator/Shift Supervisor until he is relieved of accident management responsibilities by the Station Manager/ alternate once the Technical Support Center is operational.

TIME	FACE TO FACE WRITTEN TURNOVER IS REQUIRED	NAME
_____	Station Manager	_____
_____	Health Physics Dose Assessment	_____
_____	Performance	_____
_____	Compliance	_____

2. Technical Support Center

   _____Operational

3. Station Manager shall assume the following accident management responsibilities:

   - Provide for continuous staffing of the Technical Support Center and Operational Support Center
   - Maintain station accountability and dose control
   - Implement approval process for release of information
   - Provide update of emergency status to plant personnel
   - Provide protective action recommendations to County/State authorities
   - Make available news release to TSC and OSC
   - Maintain contact with Crisis Management Center
   - Direct and initiate measures to control and mitigate the emergency

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Form SPD-1002-1

DUKE POWER COMPANY
PROCEDURE PREPARATION
PROCESS RECORD

(1) ID No: RP/0/B/1000/06
Change(s) 0 to
0 Incorporated

(2) STATION: OCONEE

(3) PROCEDURE TITLE: PROTECTIVE ACTION RECOMMENDATIONS

(4) PREPARED BY: Coleman C. Jennings DATE: 5/30/84

(5) REVIEWED BY: R. T. B[illegible] DATE: 5/30/84

Cross-Disciplinary Review By: [illegible] N/R: ____

(6) TEMPORARY APPROVAL (IF NECESSARY):

By: ____ (SRO) Date: ____

By: ____ Date: ____

(7) APPROVED BY: M. S. Tuckman Date: 6/1/84

(8) MISCELLANEOUS:

Reviewed/Approved By: ____ Date: ____

Reviewed/Approved By: ____ Date: ____

DUKE POWER COMPANY

OCONEE NUCLEAR STATION

PROTECTIVE ACTION RECOMMENDATIONS

1.0 SYMPTOMS

1.1 Radioactive releases (or potential for release) that produce projected doses in excess of the limits in Enclosure 4.1 requires protective action recommendations.

2.0 IMMEDIATE ACTIONS

2.1 The Emergency Coordinator or Recovery Manager shall consult Enclosures 4.1 and 4.2 to determine the protective action recommendation required for the appropriate emergency classification.

3.0 SUBSEQUENT ACTIONS

3.1 Emergency Response Organizations Not in Operation

NOTE: COUNTY AND STATE EMERGENCY OPERATIONS CENTER FACILITIES ARE NOT ESTABLISHED AND THE ONS AND GENERAL OFFICE EMERGENCY RESPONSE FACILITIES HAVE NOT BEEN FULLY ACTIVATED.

3.1.1 The Emergency Coordinator shall provide predetermined protective action recommendations to Oconee County and Pickens County Emergency Preparedness Agencies and notify the State of South Carolina warning point of the recommended action.

3.1.2 Request actual dose projections and re-evaluate recommendations to counties and state using offsite monitoring measurements (if available), current meteorology, and core/reactor coolant system/ containment status.

3.1.3 Contact Oconee County and Pickens County Emergency Preparedness agencies to update them on the revised recommendations. Notify the State of South Carolina warning point of the recommended action.

3.2 Emergency Response Organizations in Operation:

NOTE: OCONEE AND PICKENS COUNTY EMERGENCY OPERATIONS CENTERS, THE STATE FORWARD EMERGENCY OPERATIONS CENTER, THE TECHNICAL SUPPORT CENTER, CRISIS MANAGEMENT CENTER ARE IN OPERATION.

3.2.1 The Recovery Manager (Crisis Management Center) will make recommendations to the State Forward Emergency Operations Center for the sectors requiring Protective Actions.

3.2.2 The Offsite-Radiological Coordinator's section shall calculate actual dose projections and compare with offsite monitoring measurements, current meteorology, and core/reactor coolant system/containment status.

3.2.3 Based upon Duke Power's recommendations and direction from the Bureau of Radiological Health of the South Carolina Department of Health and Environmental Control, the State (through the Governor's office) will initiate protective action recommendations to the public over the Emergency Broadcast System.

4.0 ENCLOSURE

4.1 Protective Action Guide Flowchart

4.2 Protective Action Guide

PROTECTIVE ACTION GUIDES

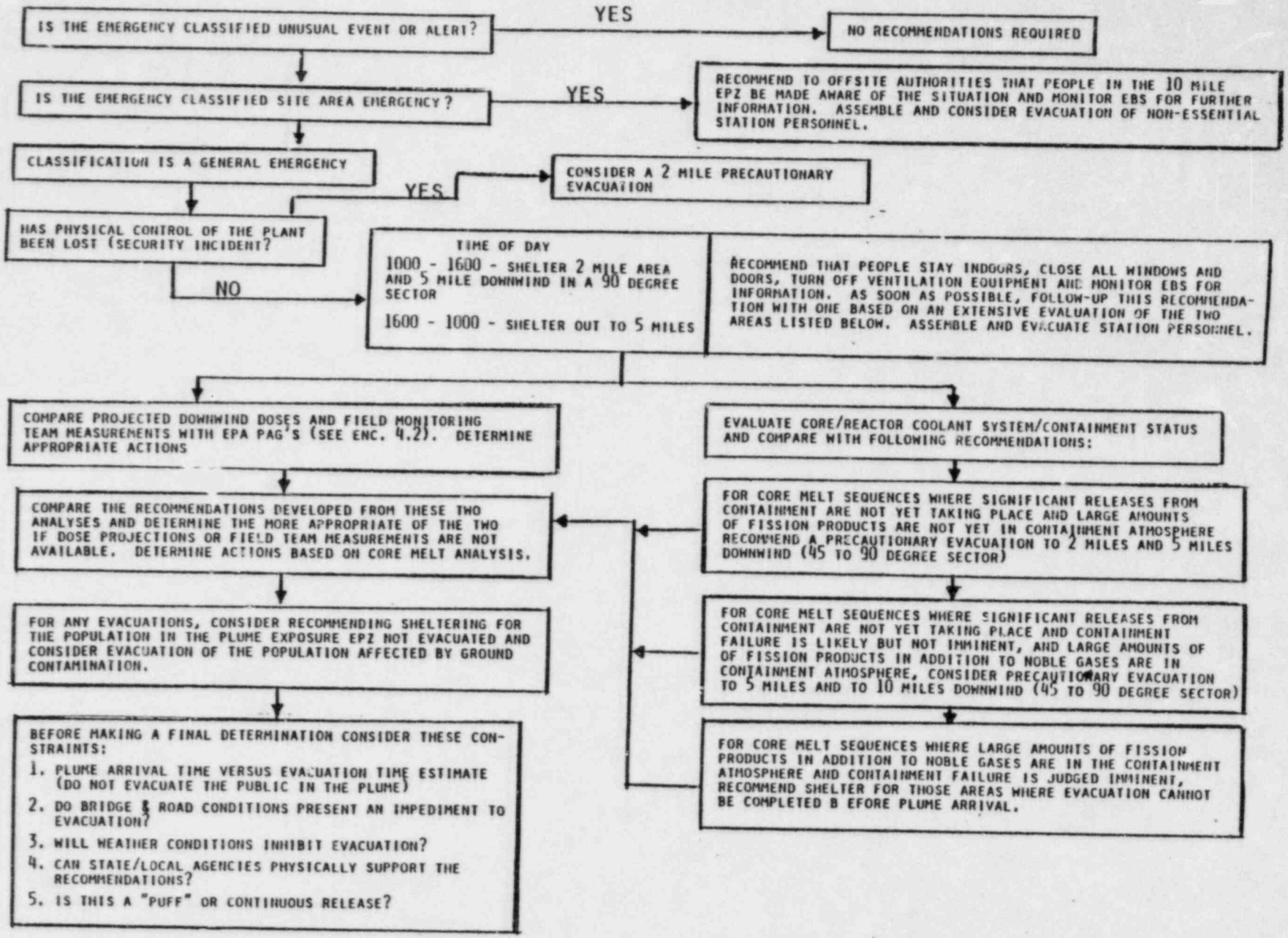
Recommended protective actions to avoid whole body and thyroid dose from exposure to a gaseous plume.

Projected Dose (Rem) to the Population	Recommended Actions[(a)]	Comments
Whole body <1 Thyroid <5	No protective action required. State may issue an advisory to seek shelter and await further instructions or to voluntarily evacuate. Monitor environmental radiation levels.	Previously recommended protective actions may be reconsidered or terminated.
Whole body 1 to <5 Thyroid 5 to <25	Seek shelter and await further instructions. Consider evacuation particularly for children and pregnant women. Monitor environmental radiation levels. Control access.	
Whole body 5 and above Thyroid 25 and above	Conduct mandatory evacuation of populations in the predetermined area. Monitor environmental radiation levels and adjust area for mandatory evacuation based on these levels. Control access.	Seeking shelter would be an alternative if evacuation were not immediately possible.
Projected Dose (Rem) to Emergency Team Workers (Include Duke Power personnel or Outside Services)		
Whole body 5-25* Skin of WB 30-125* Thyroid 125* Extremities 75	Control exposure of emergency team members to these levels except for lifesaving missions. (Appropriate controls for emergency workers include time limitations, respirators, and stable iodine.)	Although respirators and stable iodine should be used where effective to emergency team workers, thyroid dose may not be a limiting factor for lifesaving missions.
	VOLUNTARY BASIS ONLY	
Whole body 25-75* Thyroid 150 Extremities 375	Control exposure of emergency team members performing lifesaving missions to this level. (Control of time of exposure will be most effective.)	

(a) These actions are recommended for planning purposes. Protective action decisions at the time of the incident must take existing conditions into consideration.

*NOTE: Dose up to this limit must be authorized by the Emergency Coordinator.

ENCLOSURE 4.1
PROTECTIVE ACTION RECOMMENDATION FLOWCHART



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Form SPD-1002-1

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DUKE POWER COMPANY
PROCEDURE PREPARATION
PROCESS RECORD

(1) ID No: RP/O/B/1000/09
Change(s) 0 to
C Incorporated

(2) STATION: OCONEE

(3) PROCEDURE TITLE: PROCEDURE FOR SITE ASSEMBLY

(4) PREPARED BY: Coleman C. Jennings DATE: 5/30/84

(5) REVIEWED BY: T. T. Boyd DATE: 5/30/84

Cross-Disciplinary Review By: Elvin A. Tebbs N/R:

(6) TEMPORARY APPROVAL (IF NECESSARY):

By: _____ (SRO) Date: _____

By: _____ Date: _____

(7) APPROVED BY: M. S. Tuckman Date: 6/1/84

(8) MISCELLANEOUS:

Reviewed/Approved By: _____ Date: _____

Reviewed/Approved By: _____ Date: _____

DUKE POWER COMPANY

OCONEE NUCLEAR STATION

PROCEDURE FOR SITE ASSEMBLY

1.0 SYMPTOMS

1.1 A test of response time and procedures employed in completing an accounting of onsite personnel.

1.2 A station incident occurs and:

1.2.1 The Technical Support Center is required to be established.

1.2.2 Portions of the protected area may require evacuation or a station evacuation may be required.

2.0 IMMEDIATE ACTIONS

2.1 Personnel Assembly Signal (warble sound) is made over the Public Address System from Control Room 1&2.

2.2 Announcement is made over the Public Address System. (See Enclosure 4.1)

2.3 The alarm and announcements shall be continued for a duration long enough to ensure all onsite personnel are aware of the Site Assembly and are responding. (At least 6 alarms and announcements over a 15 min. period).

3.0 SUBSEQUENT ACTIONS

3.1 Action Plan for Shift Supervisor (Enclosure 4.2)

3.2 Action Plan for Superintendent of Station Services (Enclosure 4.3)

3.3 Action Plan for Security Shift Lieutenant (Enclosure 4.4)

3.4 Action Plan for Onsite Personnel (Enclosure 4.5)

3.5 When personnel accountability has been completed following a Site Assembly, one of the following will occur.

3.5.1 If the requirement for an assembly no longer exists, a request to return to normal duties will be given by the Emergency Coordinator.

3.5.2 Plant conditions may require evacuation of the station. Consult procedure RP/0/B/1000/10.

4.0 ENCLOSURES

4.1 Public Address announcement

4.2 Action Plan Emergency Coordinator

4.3 Action Plan Superintendent of Station Services

4.4 Action Plan for Security Shift Lieutenant

4.5 Action Plan for Onsite Personnel

4.6 Site Assembly Accountability Form

4.7 Site Assembly Locations

DUKE POWER COMPANY

OCONEE NUCLEAR STATION

ANNOUNCEMENT

"THIS IS A SITE ASSEMBLY. THIS IS A SITE ASSEMBLY." ALL VISITORS ARE TO REPORT TO THE RECEPTIONIST LOBBY. ALL PERMANENTLY BADGED PERSONNEL SHALL REPORT TO THE AREA DESIGNATED ON THE BACK OF YOUR SECURITY BADGE. ALL OTHER PERSONNEL NOT PRESENTLY WEARING SECURITY BADGES SHALL REPORT TO YOUR SUPERVISOR.

NOTE: IF ANY PARTICULAR AREA OF THE PLANT IS FOUND TO BE RADIOLOGICALLY UNSAFE DURING AN EMERGENCY, AND A SITE ASSEMBLY IS HELD, WARNINGS SHOULD BE SOUNDED THROUGH THE PUBLIC ADDRESS SYSTEM ADVISING THE "SAFE" CORRIDORS TO USE.

DUKE POWER COMPANY

OCONEE NUCLEAR STATION

Action Plan for Shift Supervisor

_____4.2.1 Alert Superintendent of Station Services (Weekdays 0800-1630) that a Site Assembly will be initiated.

_____4.2.2 Alert Security Shift Lieutenant that a Site Assembly will be initiated.

_____4.2.3 Direct necessary actions to account for any missing personnel.

4.2.3.1 MERT Team will be utilized for this purpose.

_____4.2.4 Examine the radiation/contamination levels established in RP/0/B/1000/10 to determine the classes of personnel that may need to be evacuated.

_____4.2.5 If the requirements for an assembly no longer exist, return the station to normal duties.

DUKE POWER COMPANY

OCONEE NUCLEAR STATION

Action Plan for Superintendent of Station Services (0800-1630 Weekdays)

____4.3.1 Receive Accountability reports from all Groups. Use Enclosure 4.6 as an aid.

____4.3.2 Report total accountability to Station Manager. Report the name(s) of any missing person(s).

____4.3.3 Coordinate a search and rescue effort if instructed by Station Manager.

4.3.3.1 Utilize the MERT Team for this purpose.

____4.3.4 Direct evacuation if so instructed by Station Manager.

DUKE POWER COMPANY

OCONEE NUCLEAR STATION

Action Plan for Security Shift Lieutenant (Backshift, Holidays, Weekends)

_____4.4.1 Receive Accountability reports from all onsite supervisors after hours, weekends, and holidays. Use Enclosure 4.6 as an aid.

_____4.4.2 Report total accountability to Shift Supervisor. Report the name(s) of any missing person(s).

_____4.4.3 Coordinate a search and rescue effort if directed by Shift Supervisor.

4.4.3.1 Utilize the MERT Team for this purpose.

_____4.4.4 Initiate a patrol of the general station areas within station boundaries, both inside and outside of the restricted area, to assure that personnel in remote and noise restrictive areas are aware of the Site Assembly requirement.

_____4.4.5 Restrict traffic in and out of the station gates during Site Assembly.

NOTE: SHOULD SITE ASSEMBLY BE INITIATED DURING HIGH TRAFFIC INGRESS AND EGRESS, TRAFFIC FLOW WILL NOT BE RESTRICTED.

DUKE POWER COMPANY

OCONEE NUCLEAR STATION

Action Plan for onsite personnel in responding to a Site Assembly alarm.

NOTE: ENCLOSURE 4.7 IS AVAILABLE TO AID IN ACCOUNTING FOR ONSITE PERSONNEL. EACH REPORTING SUPERVISOR IS TO REPORT LOCATION, NAME, TELEPHONE NUMBER, NUMBER OF PEOPLE ASSEMBLED, AND THE NAME(S) OF ANY MISSING PERSON(S).

4.6.1 Each person (except those noted in 4.6.4) shall assemble with their supervisor. Assembly points for personnel onsite at Oconee Nuclear Station are identified in Enclosure 4.8. Additionally, these locations are on the back of the security badge for those personnel inside security.

4.6.2 During normal working hours on Monday through Friday (except holidays) each supervisor shall be responsible for accounting for all personnel reporting to him. Station Superintendents and the Supervisors of various organizations working at Oconee (e.g., SSD, QA) shall make an accountability report to the SUPERINTENDENT OF STATION SERVICES for their areas of responsibility. Security will make an accountability report for visitors. When reports from all areas are received, the Superintendent of Station Services will notify the Station Manager that all persons have been accounted for by their supervisor.

4.6.3 During hours not covered by 4.6.2, an accountability report should be made by the designated responsible person in each functional work group present at the Station to the SECURITY SHIFT LIEUTENANT. Security will report visitors.

4.6.4 Persons working in Radiation Control Areas in protective clothing should leave their work areas and go to the appropriate change room. In the change room, they should contact the appropriate persons as designated by 4.6.2 or 4.6.3 for personnel accountability reporting. Judgement should be used concerning the advisability of changing clothes and reporting to normal assembly areas.

NOTE: IN CASE OF A REACTOR BUILDING EVACUATION ALARM, THE REPORTING REQUIREMENTS IN 4.6.4 ABOVE APPLY.

STATION PERSONNEL ACCOUNTABILITY

RP/0/B/1000/09
Enclosure 4.6

TIME _____ DATE _____

Group	Name Reporting	Phone	Number People
STATION SERVICES:			
Contract Services:			
K-Mac			
Globe Security			
Training & Safety:			
Administrative Services:			
Wonntco			
Visitor's Center:			
Keowee Hydro:			
Station Visitors:			
Managers Group:			
Compliance			
NRC			
TIME: _____	TOTAL STATION SERVICES GROUP		
OPERATIONS:			
Operators On-Shift:			
Engineers/Staff:			
Training Center:			
Fuel-Handling:			
Others:			
TIME: _____	TOTAL OPERATIONS GROUP		
MAINTENANCE			
Planning & Scheduling :			
I & E :			
Mechanical Maintenance:			
Maintenance Services:			
SNS:			
Substation Maintenance:			
B & W Personnel:			
Others:			
TIME: _____	TOTAL MAINTENANCE GROUP		

Group	Name Reporting	Phone	Number People
TECHNICAL SERVICES			
Performance:			
Health Physics:			
Chemistry:			
Projects :			
Others:			
TIME: _____	TOTAL TECHNICAL SERVICES GROUP		
INTEGRATED SCHEDULING			
TIME: _____	TOTAL INTEGRATED SCHEDULING GROUP		
QUALITY ASSURANCE:			
TIME: _____	TOTAL QUALITY ASSURANCE		
STATION SUPPORT DIVISION:			
TIME: _____	TOTAL STATION SUPPORT DIVISION		

STATION PERSONNEL ACCOUNTABILITY RECAP:

STATION SERVICES	
OPERATIONS	
MAINTENANCE	
TECHNICAL SERVICES	
QUALITY ASSURANCE	
STATION SUPPORT DIV.	
INTEGRATED SCHEDULING	

BEGINNING TIME: _____ ENDING TIME: _____ TOTAL ONSITE _____

UNACCOUNTED PERSONNEL GROUP	ACTION TAKEN	PERSON REPORTING	TELEPHONE:

REMARKS:

DUKE POWER COMPANY

OCONEE NUCLEAR STATION

SITE ASSEMBLY LOCATIONS

DUKE OCONEE NUCLEAR STATION PERSONNEL

Section	Assembly Point
Manager's Group:	
Station Manager/Superintendents: and Assigned Clerks	Respective Offices
Compliance	Compliance Office
Station Services:	
Administrative Services	Administrative Offices
Training/Safety	Training Office
Contract Services	Contract Services' Offices
Maintenance:	
I&E Engineers	I&E Engineers' Offices
I&E Shifts A,B,C,D,E	Operational Support Center (Unit #3 I&E Lab)
I&E Supervisors & Technicians	I&E Shops Turbine Building
Mech. Maintenance Shifts A,B,C,D,E	Operational Support Center (Unit #3 I&E Lab)
Mechanical Maintenance Supervisors & Technicians	Maintenance Shop
Mechanical Maintenance Engineers	Mechanical Maintenance Engineers' Offices
Planners	Planning Offices
Materials	Materials Offices
Maintenance Mgt. Support	Planning Offices
Operations: All	Control Rooms/Operating Engineers' Offices (Unit #3)
Integrated Scheduling: All	Outage Office, Turbine Bldg.

Technical Services:	
Projects	Projects Offices
Performance (All)	Performance Engineer's Office
Health Physics:	
ALARA Planning	Station Health Physicist's Office
Projects and Training	Station Health Physicist's Office
Support Functions	Station Health Physicist's Office
Surveillance and Control	Station Health Physicist's Office
HP Shift Personnel (A,B,C,D,E)	Operational Support Center
Chemistry:	
Staff Chemists	Station Chemist's Office
Radwaste	Station Chemist's Office
Power Chemistry	Station Chemist's Office
Back-shift personnel	Operational Support Center
Environmental	Environmental Offices
Radwaste Startup Team	Radwaste Startup Office
Quality Assurance: All	Quality Assurance Offices
Training Services: All Personnel at Training Center	Oconee Training Center

DUKE NON-OCONEE NUCLEAR STATION PERSONNEL
(Permanently Badged Personnel)

Section	Assembly Point
Station Services:	Administration Offices
Operations:	Operating Engineers' Offices
Chemistry:	Station Chemist's Office
Health Physics:	Station Health Physicist's Office
SMS:	SMS Offices
Station Support Division:	SSD Offices
Keowee: All	Keowee Hydro Station
Visitors' Center: All	Visitor Center Office
Quality Assurance: All	QA Offices

DUKE NON-OCONEE NUCLEAR STATION PERSONNEL

Section		Assembly Point
Design Engineering:	All	Projects Office
Maintenance:		Service Building Mezzanine (I&E, Mechanical Maintenance, or Planning Office)

NON-DUKE OCONEE NUCLEAR STATION PERSONNEL

K-Mac:	Those Inside Security	Canteen South End, Turbine Building
	Those Outside Security	Administration Bldg. Canteen
Babcock & Wilcox:		
	Resident Engineer	Control Room
	Add'l B&W Personnel	B&W Offices (Trailer)
Globe Security:		Personnel Access Portal
Health Physics Vendors		Station Health Physicist's Office
Chem-Nuclear:		Station Chemist's Office
NRC:	All	Compliance Office
Wometco:	All	Administration Building Canteen

VISITORS

Inside Security with Escort	Receptionist Lobby
Outside Security	Receptionist Lobby

OTHER PERSONNEL OUTSIDE PROTECTED AREA

All personnel not identified above will report to the Receptionist Lobby.

INFORMATION ONLY CONTROL COPY

Form SPD-1002-1

DUKE POWER COMPANY
PROCEDURE PREPARATION
PROCESS RECORD

(1) ID No: RP/O/B/1000/10
Change(s) 0 to
0 Incorporated

(2) STATION: OCONEE

(3) PROCEDURE TITLE: PROCEDURE FOR EMERGENCY EVACUATION OF STATION PERSONNEL

(4) PREPARED BY: Edna G. Jennings DATE: 5/30/84

(5) REVIEWED BY: R.T. Bond DATE: 5/30/84

Cross-Disciplinary Review By: [illegible] N/R: _____

(6) TEMPORARY APPROVAL (IF NECESSARY):

By: _____ (SRO) Date: _____

By: _____ Date: _____

(7) APPROVED BY: M. S. Tuckman Date: 6/1/84

(8) MISCELLANEOUS:

Reviewed/Approved By: _____ Date: _____

Reviewed/Approved By: _____ Date: _____

DUKE POWER COMPANY

OCONEE NUCLEAR STATION

PROCEDURE FOR EMERGENCY EVACUATION OF STATION PERSONNEL

The purpose of this procedure is to set guidelines for dealing with an emergency evacuation should it become necessary for non-essential personnel to be evacuated during a radiological emergency. Station Evacuation is activated only after personnel have been assembled through a Site Assembly.

1.0 SYMPTOMS

Category 1 (Enclosure 4.1)

1) External Radiation Level > 2 mrems in any one hour

2) Airborne Radioactivity > 1 x mpc for an unrestricted area (10CFR20, Appendix B, Table II)

Category 2 and 3 (Enclosure 4.1)

1) External Radiation level > 2.5 mrem/hr 100 mrems/week, or 1250 mrems in a quarter

2) Airborne Radioactivity > equivalent amount inhaled for 40 hours/ week for 13 weeks at 1 mpc (10CFR20, Section 20.103 and Appendix B, Table 1)

2.0 IMMEDIATE ACTION

2.1 When it is determined that the emergency situation requires station evacuation, the Emergency Coordinator shall:

Date/Initial
Name

____2.1.1 Determine evacuation route using meteorological information available and local area maps.

____2.1.2 Determine offsite assembly location. Health Physics Surveillance and Control personnel should obtain the keys to the appropriate school from Security. Keys are located in the Security-Controlled Key Box in the Unit #3 Shift Supervisor's office.

____2.1.3 Determine re-entry routes to be used for entry into the station.

____2.1.4 Work with available group representatives; make a determination of station support staff required to safely operate the station and deal with an emergency.

Date/Initial
Name

____2.1.5 Prepare instructions to be relayed to onsite personnel.

____2.1.6 Direct Health Physics personnel to implement emergency surveillance and decontamination plans for personnel and vehicle evacuation.

____2.1.7 Provide evacuation instructions to supervisors onsite for distribution to station personnel.

____2.1.8 Direct Station Security to patrol the station general areas to assure evacuation instructions are carried out.

3.0 SUBSEQUENT ACTION

____3.1 Station Security will set up the evacuation exit points from the station.

____3.2 The Appropriate County EOC will be made aware that the station is being evacuated so that law enforcement escort can be provided. Officers will be required to properly secure the school area so that processing may be carried out in an orderly manner. Supervisory personnel evacuated to the remote area will assist in maintaining order and control.

____3.3 Health Physics will monitor and decontaminate personnel and vehicles in accordance with HP/0/B/1009/16, both onsite and offsite.

____3.4 If personal vehicles cannot be used for evacuation, the Superintendent of Station Services shall arrange for bus transportation through the Anderson Retail Office. See Emergency Telephone Directory located in TSC Emergency Procedures Cart.

____3.5 Once transportation has been determined/secured, evacuation will take place.

4.0 ENCLOSURES

4.1 Categories of Personnel

4.2 Emergency Evacuation Routes

DUKE POWER COMPANY

OCONEE NUCLEAR STATION

CATEGORIES OF PERSONNEL

CATEGORY 1

All members of the general public and other persons who are not subject to occupational radiation exposure at Oconee Nuclear Station:

Visitors	Wometco
"A" Workers	Keowee Hydro

CATEGORY 2

Various groups of personnel who are subject to occupational radiation exposure at the station and are considered non-essential to the operation of the station during a classified emergency situation.

SMS	Chem-Nuclear
SSD	Vendors (Other than HP)
QA	Duke Personnel (Other than ONS)
B&W	All others (not listed in 3 below)
Design Engineering	
Oconee Training Center	

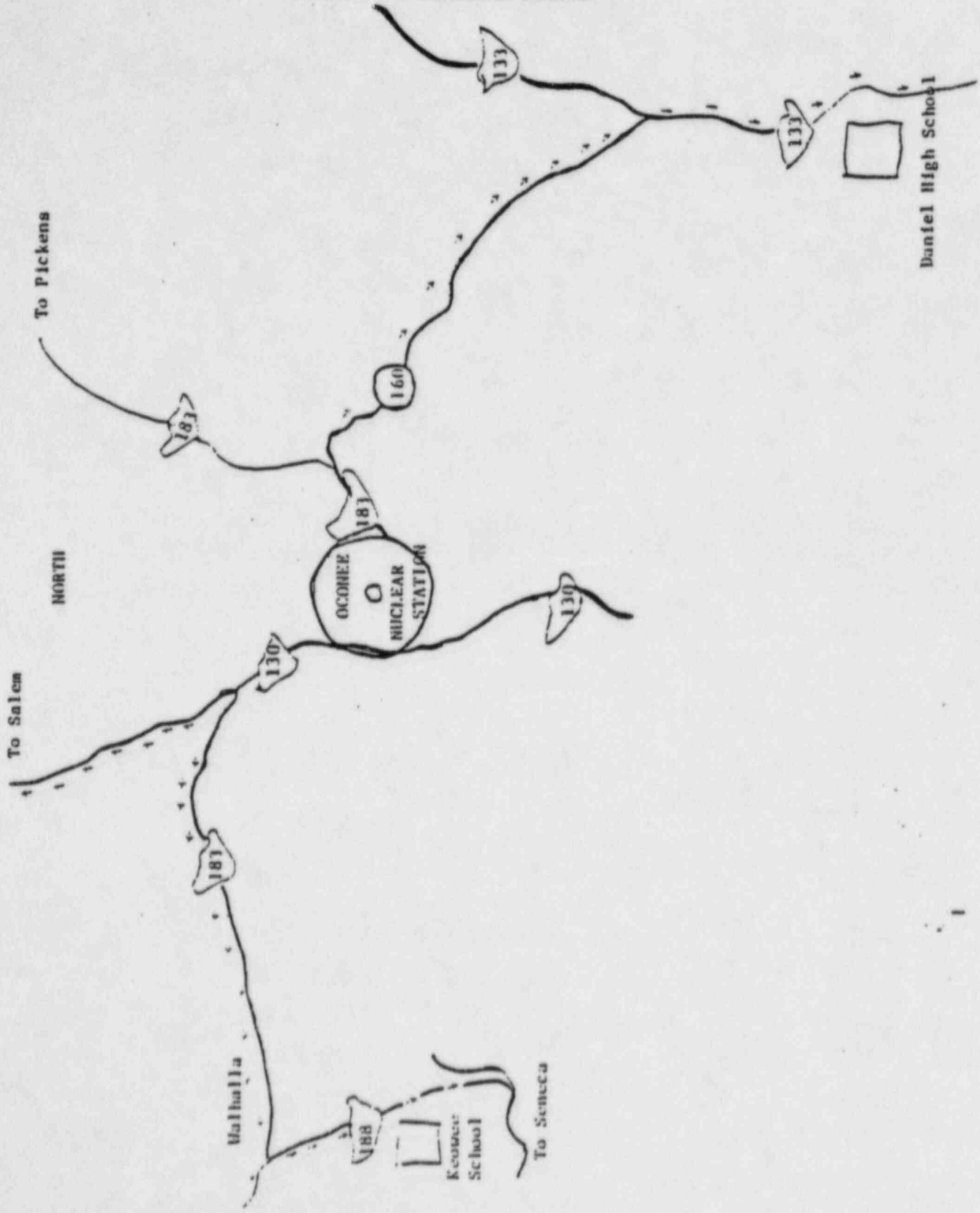
CATEGORY 3

Personnel identified as the Emergency Response Organization.

Operations	Globe Security
Health Physics	Resident B&W Engineer
Health Physics Vendors	Station Services
Compliance	Maintenance
NRC Resident Inspector	Chemistry
K-Mac	Performance
Transmissions	Visitor's Center
	Projects

RP/O/B/1000/10
Enclosure 4.2

OCONEE NUCLEAR STATION
EMERGENCY EVACUATION ROUTES



INFORMATION ONLY

CONTROL COPY

INFORMATION ONLY

Form 34731 (10-81)
(Formerly SPD-1002-1)

DUKE POWER COMPANY
PROCEDURE PREPARATION
PROCESS RECORD

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

(2) STATION: ~~Oconee~~

(3) PROCEDURE TITLE: Operating Procedure For The Post Accident Liquid Sampling (PALS) System

(4) PREPARED BY: Pat Hall DATE: 4/6/84

(5) REVIEWED BY: Lyle Berry DATE: 4/24/84

Cross-Disciplinary Review By: [illegible] 4-24-84 N/R: —

(6) TEMPORARY APPROVAL (IF NECESSARY):

By: _____ (SRO) Date: _____

By: _____ Date: _____

(7) APPROVED BY: J S Barr Date: 4/24/84

(8) MISCELLANEOUS:

Reviewed/Approved By: _____ Date: _____

Reviewed/Approved By: _____ Date: _____

Checked Control Copy_____

Date_____

DUKE POWER COMPANY

OCONEE NUCLEAR STATION

OPERATING PROCEDURE FOR THE

POST ACCIDENT LIQUID SAMPLING (PALS) SYSTEM

1.0 Purpose

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

2.0 Limits and Precautions

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

2.1.1 Post Accident.

2.1.2 Inaccessibility of Primary Sampling Area due to radiation levels.

2.1.3 Request from the Station Chemist or his designee.

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

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

2.4 Radiation exposure to an individual during all phases of sampling should be limited so as not to exceed a quarterly accumulative exposure of 3 rems whole body; 7.5 rems skin of wholebody; or 18 3/4 rems extremities respectively. All personnel will need prior authorization from TSC to knowingly exceed any exposure limit. The exposure received may require an occupational exposure penalty and/or a medical decision as to whether an individual can continue in radiation work.

2.4.1 If necessary to remedy a situation immediately hazardous to life and property, the Planned Emergency Exposure for Duke Power Personnel will not exceed 5 rems wholebody; 30 rems skin of wholebody; or 75 rems extremities.

2.4.2 If necessary to save lives or prevent loss of life and/ or extensive damage to property (voluntary basis only), the Planned Emergency Exposure for Duke Power Personnel will not exceed 25 rems wholebody; 150 rems skin of wholebody; or 375 rems extremities.

2.4.3 For Outside Services Personnel the Planned Emergency Exposure will not exceed 5 rems wholebody; 30 rems skin of wholebody; 75 rems extremities; or 15 rems other single organ.

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

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

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

3.0 Procedure

NOTE: In order to maintain the PALS in operable condition at all times, the requirements on Enclosure 5.2, PALS Semi-annual Calibration Checklist must be done semi-annually and be current prior to Post Accident sampling. Enclosure 5.1, Post Accident Authorization for Operation of PALS, must be completed prior to Post Accident sampling.

3.1 Preparation for Sampling

3.1.1 Valve Alignments

3.1.1.1 Notify Shift Supervisor that operation of the PALS is being initiated by Chemistry. Chemistry will select either Enclosure 5.5 for a RCS sample or Enclosure 5.6 for a RBNS sample, check it against the control copy, and take it to the responsible individual in Operations (designated by the Shift Supervisor) for completion. Request Operations to complete Step 3.1 of the selected enclosure. ____/____

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

RCS Sample: 1RC-179 (C)

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

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

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

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

	Initials/Time
Instrument Air Supply Isolation 1IA-2423	_____/___
Panel Instrument Air Isolation	_____/___
Valve on Nitrogen Supply Bottle (>200 psi tank pressure required; ~30 psi delivery pressure).	_____/___
Panel Nitrogen Isolation	_____/___
Cooling Water Supply Isolation 1DW-282	_____/___
Demin Water Supply Isolation 1DW-281	_____/___
Panel Demin Water Isolation	_____/___

3.1.1.4 The following should be verified as noted prior to periodic testing (not required for accident conditon):

1LWD-1029 Low Point Drain (LPI Room) closed and capped

1RC-177 High Point Vent (next to Sampling Panel) closed and capped

1LP-110 Emergency Sump Line Drain (LPI Room) closed

1LP-111 Emergency Sump Line Drain Tell-tale (LPI Room) Closed and capped

1DW-278 Remote Starter (LPI Room) "ON"

1LWD-1028 Remote Starter (LPI Room) "ON"

1DW-91 Reactor Building Normal Sump Line Flush (LPI Room) Closed

1N-262 Nitrogen Supply Isolation: Closed

3.1.2 Health Physics Notification

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

3.1.3 Additional Requirements

Record specific conductivity of buffer solution from Primary Chemistry Data Log. Pick up glass syringes and sample carrier from Primary Lab (or Radwaste Lab, whichever is more accessible), and take stop watch and panel keys to Control Panel. _____ ____/____

3.2 Panel Preparation

NOTE: If any item on panel is not clearly identified, refer to Enclosures 5.3 and 5.4 (Control Panel Diagrams).

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

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

3.2.3 Place the toggle switch for the radiation monitor to "ON" and turn the scale select to "rem/hr". If the radiation monitor is not functional, HP coverage is sufficient to operate the panel. (If this is a routine test, submit a WR for repair).

3.2.4 Place the temperature probe selector to position 1.

3.2.5 Move the conductivity meter to "Measure" position.

3.2.6 Push in the pH meter standardize knob.

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

3.2.8 If RCS is to be sampled, open sample regulator valve at cooler outlet approximately ½ turn open. If RBNS is to be sampled, open sample regulator valve at cooler outlet approximately 4 turns open. Adjustments may be made in Step 3.4.5, if TC-1 indicates greater than 190°F. ____/____

3.3 Panel Operation (Position 1) Panel Prep

3.3.1 Turn the Operation Selector switch to the PANEL PREP. position.

3.3.2 Momentarily depress the SELECTION POWER ACTIVATE pushbutton.

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

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

3.3.5 Depress the CALIBRATE pushbutton and hold until the conductivity and pH meter readings stabilize.

3.3.6 Record the conductivity reading _____µmhos/cm. The conductivity should correspond with the specific conductivity of the pH standard measured in the lab. If not, contact Station Chemist or Primary Supervisor. (If this is a routine test, initiate a Work Request for repair. For an accident condition, personnel should move to a lower background area during this time, if one is available).

NOTE 1: Conductivity probe has a cell constant of 10 and has 10% inherent error.

NOTE 2: Multiply conductivity meter reading by 1000 to obtain specific conductivity value.

3.3.7 Adjust the pH meter to the known pH of the standard. _____/_____

3.3.8 Depress the PURGE pushbutton for about 30 seconds.

3.3.9 Depress the FLUSH pushbutton until the conductivity and pH meter readings stabilize.

3.3.10 Depress the PURGE pushbutton for about 30 seconds.

3.3.11 Depress the DRAIN pushbutton for about 60 seconds.

3.3.12 Repeat Steps 3.3.9, 3.3.10, 3.3.11 and then continue to Section 3.4.

3.4 Panel Operation (Position 2) Sample Recirc

3.4.1 Request Operations complete Steps 3.2 and 3.3 of the enclosure selected in 3.1.1.1.

3.4.2 Turn the Operation Selector switch to the SAMPLE RECIRC. position.

3.4.3 Record the PALS or HP radiation monitor reading_____ (background). Watch radiation monitor reading for an increase as sample enters the panel.

3.4.4 Momentarily depress the SELECTION POWER ACTIVATE pushbutton.

3.4.5 Observe that the SAMPLE INLET and SAMPLE OUTLET indicating lights are lit. Record the starting time_____.

3.4.6 If TC-1 goes above 190°F, sample is not being sufficiently cooled. Turn selector to "Reset". Press "Reset" button and turn Power key to vertical position. Contact Station Chemist or his designee. (For an accident condition personnel should move to a lower background area during this time, if one is available.) If TC-1 is less than 190°F, record the temperature_____.

3.4.7 If sample recirc. is done during the semi-annual check, a visual inspection of accessible portions of the system should be performed for the purpose of identifying any external leakage during testing. Work requests shall be written promptly to eliminate any leakage found.

3.4.8 Turn the selector knob to "Sample", position 3.

3.5 Panel Operation (Position 3) Sample

3.5.1 Turn the temperature selector to TC-2.

3.5.2 Momentarily depress the SELECTION POWER ACTIVATE pushbutton.

3.5.3 Observe that the SAMPLE INLET and SAMPLE OUTLET indicating lights are lit.

3.5.4 Monitor the temperature gauge and when TC-2 stabilizes, record the temperature_____.

3.5.5 Record the PALS or HP radiation reading_____. Subtract the initial background reading from sample radiation reading and record.

3.5.6 Press the 1) TC-2 Stabilize Activate button; when pressure reading stabilizes, record_____.

3.5.7 Press the 2) Pressure Stabilize Activate button and record time sample flow stops_____.

3.5.8 Request Operations to complete Step 3.4 of the enclosure selected in 3.1.1.1.

3.6 Panel Operation (Position 4) Depressurization

3.6.1 Turn the Operation Selector switch to the DEPRESSURIZATION position.

3.6.2 Press the "Reset" button on the gas flow totalizer to zero the readout. Preset the counter on the totalizer to 99999.

3.6.3 Momentarily depress the SELECTION POWER ACTIVATE pushbutton.

3.6.4 Observe that the DI WATER and SAMPLE OUTLET indicating lights are lit.

3.6.5 Verify the pressure gauge on the instrument panel indicates -25 inches of Mercury. Wait about 60 seconds.

3.6.6 Press the START button on the N_2 Preset Counter and observe the PRESS/VAC gauge. When the gauge needle just begins to move press the STOP button on the N_2 Preset Counter.

3.6.7 Continue to make small N_2 adds, by repeating 3.6.6 until the PRESS./VAC gauge reads about 0-2 inches.

3.6.8 Flip the Preset Counter POWER toggle switch to the OFF position.

3.6.9 If "5" inches is exceeded, as read from the PRESS./VAC gauge, a new sample will need to be taken.

3.7 Panel Operation (Position 5) Liquid Sample

3.7.1 Turn the Operation Selector switch to the LIQUID SAMPLE position.

3.7.2 Momentarily depress the SELECTION POWER ACTIVATE pushbutton.

3.7.3 Observe that the DI WATER and SAMPLE OUTLET indicating lights are lit.

3.7.4 Depress the LIQUID SAMPLE ACTIVATE 1) Log conductivity and hold until the conductivity meter stabilizes. Record the specific conductivity_____.

3.7.5 Press both LIQUID SAMPLE ACTIVATE 1) Log conductivity and 2) Log pH buttons and hold until pH meter stabilizes. Record pH_____.

3.7.6 Press the GAS SAMPLE 1) ACTIVATE button and hold for 1 second.

3.7.7 Momentarily depress the 3) DILUTED GAS SAMPLE GRAB pushbutton.

3.8 Panel Operation (Position 6) Liquid Sample Prep

3.8.1 Turn the Operation Selector switch to the LIQUID SAMPLE PREP position.

3.8.2 Momentarily depress the SELECTION POWER ACTIVATE pushbutton.

3.8.3 Momentarily depress the ACTIVATE TO DESIRED mL VOLUME pushbutton and observe the SAMPLE ALIQUOT register advance one count (0.70 ml).

3.8.4 Press the "Reset" button on the dilution water flow totalizer and preset the meter for desired dilution (in 250 ml increments from 250-3500 mls). Press the "Start" button and let the dilution continue to completion. Record the dilution volume_____.

3.8.5 Press the Activate Mix button and hold for about 15 seconds.

3.9 Panel Operation (Position 7) Liquid Sample

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

3.9.2 Press the SELECTION POWER ACTIVATE button.

3.9.3 Press Activate button. Wait 45 seconds (for levels in dilution cylinder and grab sampler to equalize).

3.9.4 Momentarily depress the DILUTED SAMPLE GRAB pushbutton. Wait 10 seconds.

3.10 Panel Operation (Position 8) Flush

3.10.1 Turn the Operation Selector switch to the FLUSH position.

3.10.2 Press the SELECTION POWER ACTIVATE button.

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

3.10.4 Press the FLUSH ACTIVATE button and monitor pH and conductivity meters until they reach equilibrium of demineralized water (approximately 10 minutes). Observe second flush light is lit.

3.10.5 Press the FLUSH ACTIVATE pushbutton and wait 3 minutes. (Observe the third FLUSH light is lit.)

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

3.11 Panel Operation (Position 9) Drain

3.11.1 Turn the Operation Selector switch to the DRAIN position.

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

3.11.3 Wait for about 2 minutes and again depress the ACTIVATE pushbutton and observe the second DRAIN light is lit.

3.11.4 Wait for about 2 minutes and again depress the ACTIVATE pushbutton and observe the third DRAIN light is lit.

3.11.5 Wait for about 6 minutes and again momentarily depress the ACTIVATE pushbutton and observe the DRAIN COMPLETE light is lit.

3.12 Panel Shutdown and Decontamination

3.12.1 Turn the Sample Selector switch to the OFF position.

3.12.2 Turn the Operation Selector switch to the RESET position.

3.12.3 Momentarily depress the RESET pushbutton.

3.12.4 Turn the System Power keylock to the SUMP PUMP position for about 15 minutes (or until the pump switches itself off).

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

3.12.5.1 If the radiation field at the PASP is less than 3 R/Hr turn the System Power keylock to the OFF position and remove the PALS System key.

3.12.5.2 If the radiation field is greater than 3R/Hr repeat 3.10 thru 3.12.5.

3.12.6 If radiation level remains greater than 3 rem/hr after one repeat of Section 3.10 through 3.12.5, contact Station Chemist or his designee (for an accident condition personnel should move to a lower background area during this time, if one is available) for permission to return to Section 3.1 and take another sample using larger dilution volume. Permission given by_____.

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

3.13 Sampling

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

3.13.2 Collect 3-5.0 ml liquid samples at the liquid grab sampler in lockable glass syringes. Place in plastic bag.

NOTE: Flushing of remaining sample in grab sampler is desirable if radiation levels permit. Return to Position 6 and add 200 mls demin. water to Dilution Cylinder. Continue through Position 7, cycle through Position 8 and 9 completing the second and third drain steps. Go to the grab sampler and drain the liquid out (this liquid is not a sample-discard in PASP Sump or appropriate waste container in lab).

3.13.3 Request Operations to complete Steps 3.5 and 3.6 of the enclosure selected in 3.1.1.1.

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

3.14 Sample Analysis

3.14.1 Gas

3.14.1.1 Analyze one syringe of stripped gas by Chemistry Procedure CP/0/B/2004/14A, Operation of the Fisher Model 25V Gas Partitioner for the Determination of Hydrogen in Gas Samples. Calculate the results by the following method:

$$\%\ H_2 \times \frac{1000\ cc}{0.155\ Kg} \times \frac{1}{100} = cc/Kg\ H_2$$

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

1000 cc = stripped gas bomb volume

0.155 Kg = collected sample size

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

Report result_____cc/kg H_2

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

$$\mu Ci\ in\ 1\ cc \times \frac{1000}{155} = \text{Total activity from dissolved gas in 1 ml RC.}$$

GeLi Spectra Attached _____.

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

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

3.14.2 Liquid

3.14.2.1 Take 1 ml of liquid sample and dilute to 50 ml with Super Q water in a 60 ml poly bottle. Analyze by GeLi Spectral Analysis (HP/0/B/1001/14, Procedure for Nuclear Data 6600 System Operation). Activities will be reported by HP for 1 ml of diluted liquid sample. Calculate activity of liquid portion of reactor coolant as follows:

$$\mu ci/ml = \text{activity in diluted 1 ml} \times \frac{*\text{Total Dilution Volume}}{0.70 \text{ ml}}$$

*Step 3.8.4 + 0.7 mls.

GeLi Spectra Attached _____.

3.14.2.2 Take 5 ml of liquid sample and analyze for boron by CP/0/A/2004/02E, Post Accident Determination of Boron Concentration Using Carminic Acid. Correct results for dilution as follows:

$$\text{ppm } B_{RCS} = \text{ppm measured} \times \frac{*\text{Total Dilution Volume}}{0.70}$$

*Step 3.8.4 + 0.7 mls

Boron Concentration _____ppm.

3.14.2.3 Take 5 mls of liquid sample and analyze for chloride by CP/0/A/2004/03C, Post Accident Determination of Chloride by Specific Ion Electrode Using Beckman 4500 Meter. Correct results for dilution as in 3.14.2.2.

NOTE: Chloride analysis only to be done in an accident situation.

Chloride Concentration _____ppm.

3.14.2.4 Report results of liquid sample analyses in Primary Chemistry Data Log.

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

3.14.2.6 Additional liquid sample dilution may be necessary to bring amount of activity within range. If so, withdraw 1 ml of sample from 60 ml poly bottle (from Section 3.14.2.1) and dilute to 50 ml with Super Q for analysis. Be sure to record the additional dilution information so that isotope activities may be adjusted accordingly.

3.14.2.7 Route completed procedure to Technical Support Center (for routine sampling to Primary Supervisor).

Accepted By:_____

3.15 Waste Disposal

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

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

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

4.0 References

4.1 NUREG-0737, Section II.B.3

4.2 DPC System Health Physics Manual

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

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

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

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

4.7 DPC Alara Manual (1980)

4.8 ONS Emergency Plan

4.9 ONS Chemistry Manual Section 5.1

5.0 Enclosures

5.1 Post Accident Authorization for Operation of PALS

5.2 PALS Semi-Annual Calibration Checklist

5.3 PALS Control Panel Diagram - Left

5.4 PALS Control Panel Diagram - Right

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

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

5.7 Preparation of Thiosulfate Solution for Containment Air Post Accident Sample Panels

Checked Control Copy_____

Date_____

ENCLOSURE 5.1

CP/1/A/2002/04C

POST ACCIDENT AUTHORIZATION FOR OPERATION OF PALS

Technician/Time

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

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

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

   _____Boron

   _____Chloride

   _____Isotopic Analysis for _____Iodines

   _____Cesiums

   _____Noble Gases

   _____Non-Volatile Fission Products

   _____Other (Specify) _____

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

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

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

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

   Sample route designated: _____

   _____

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

Checked Control Copy_____

Date_____

ENCLOSURE 5.2

CP/1/A/2002/04C

PALS SEMI-ANNUAL CALIBRATION CHECKLIST

1. pH 7.4 buffer must be replaced semi-annually. Prepare 4 liters buffer by CP/0/B/2004/09C. Measure specific conductivity and report in Primary Chemistry Data Log.

   Buffer Expiration Date: _____

   Specific Conductivity: _____µmhos/cm

   Technician/Date: _____/_____

2. Verify the 1000 ppm Boron standard currently in use in the Primary Lab will not expire prior to next semi-annual checklist.

   1000 ppm Boron Std Expiration Date: _____

   Technician/Date: _____/_____

   Carminic acid and 10 ppm Boron standard are to be made prior to sampling.

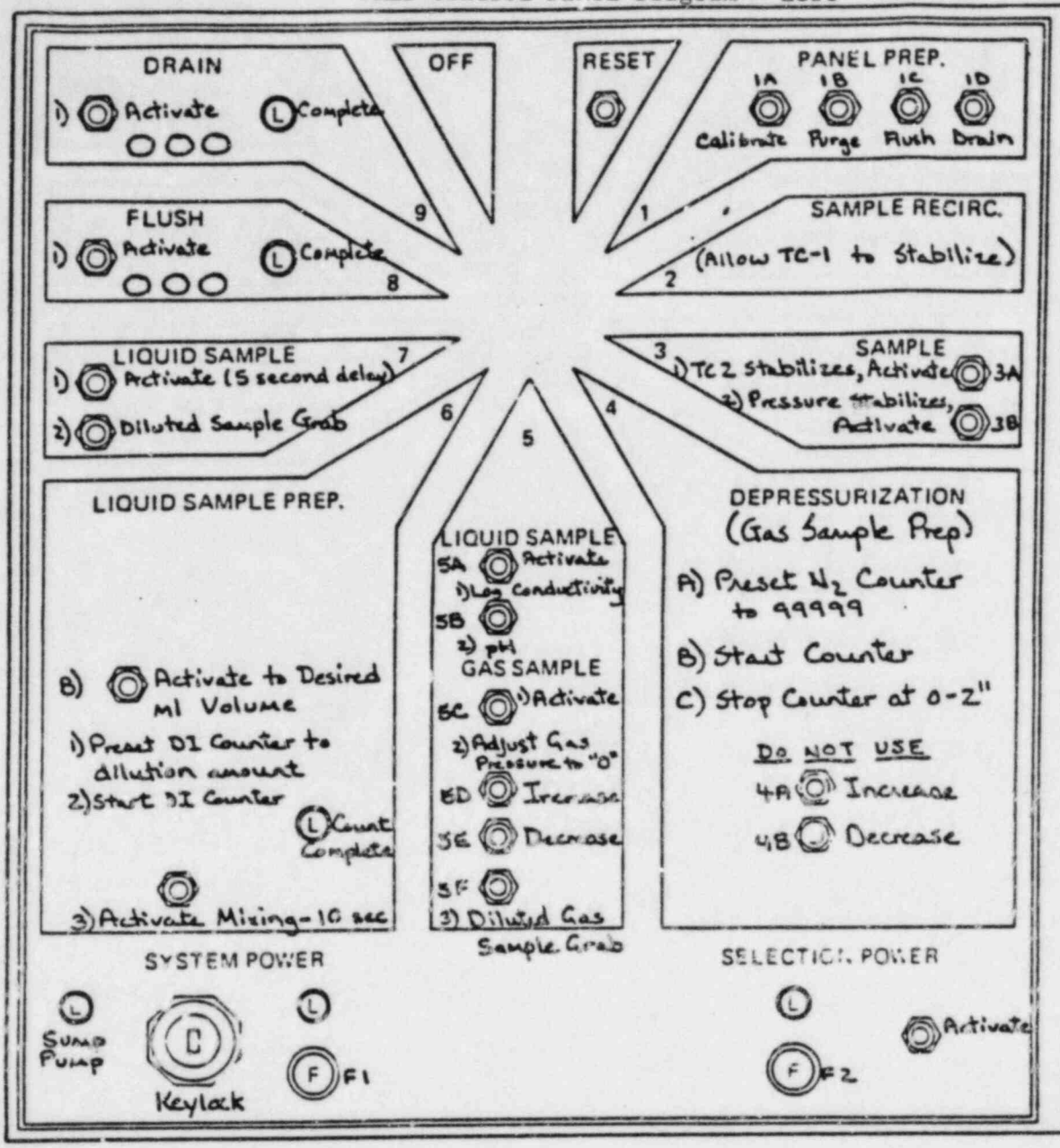
3. pH and conductivity meters must be checked when buffer solution is renewed. Complete PALS operating sections: 3.2.1, 3.2.5, 3.2.6, 3.3.1 through 3.3.11. Turn System Power Key to vertical position to deenergize panel.

   Calibration Date: _____ Technician _____

4. Return enclosure to Primary Supervisor or his designee.

ENCLOSURE 5.3
CP/1/A/2002/04C

PALS Control Panel Diagram - Left

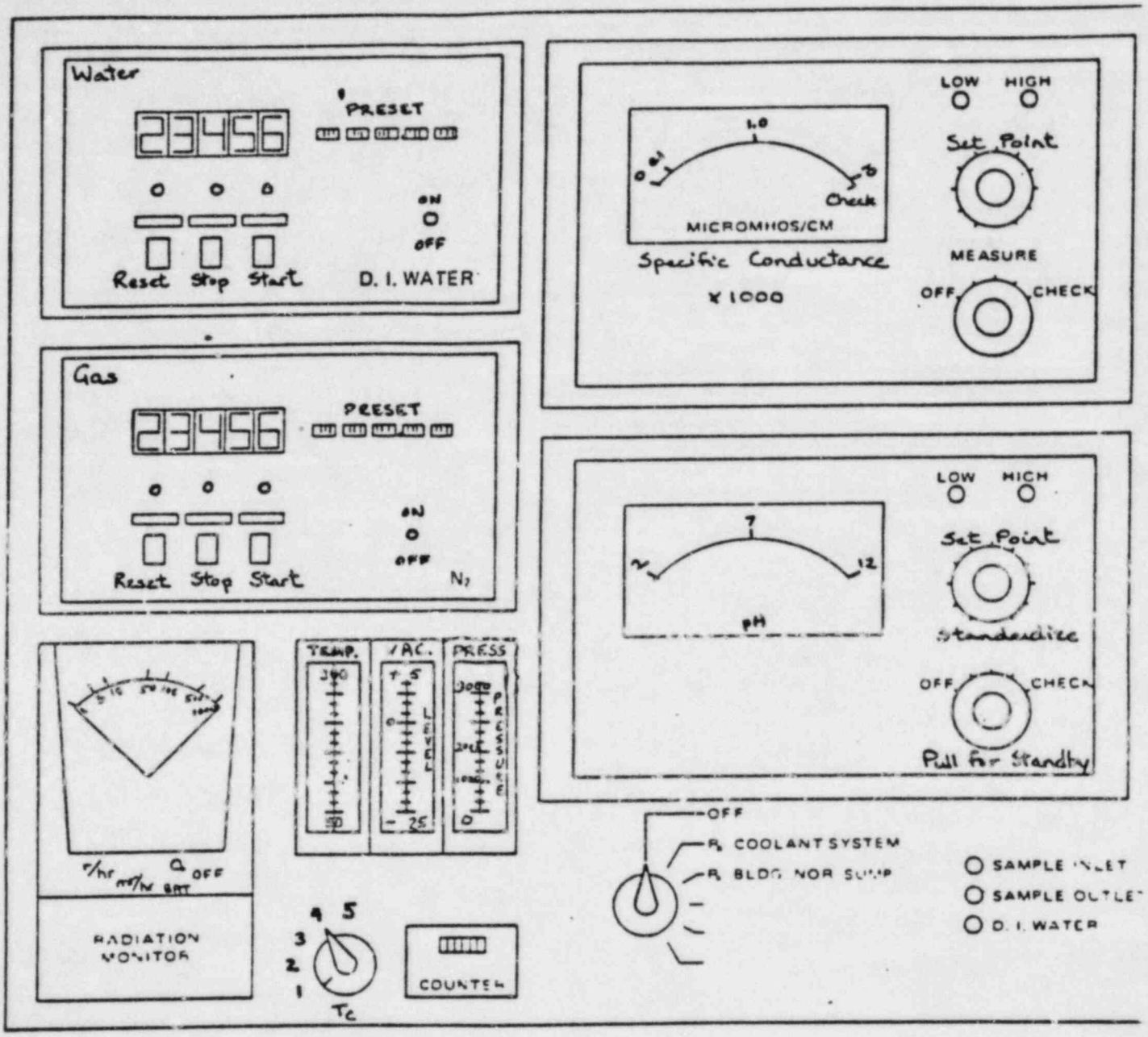


SEE DRAWING NO. L040180D FOR PANEL DETAIL

ENCLOSURE 5.4

CP/1/A/2002/04C

PALS Control Panel Diagram - Right



ENCLOSURE 5.5

CP/1/A/2002/04C

			Date Init./Time	Verification Date Init./Time
3.2.2	1RC-174/1RC-176 (Test Connections) and 1RC-175 (High Point Vent)	inside reactor building - refer to Fill and Vent Procedure (OP/1/A/1103/02) to verify CLOSED Status.	____/____	
3.2.3	Open 1RC-162	inside reactor building-operated from control room.	____/____	____/____
3.2.4	Open 1RC-163	inside reactor building-operated from control room.	____/____	____/____
	NOTE: The following initial conditions must be observed.			
3.2.5	Containment integrity is required.		_____	_____
3.2.6	Designate a responsible person in the Control Room to immediately close the isolation valves (1RC-164 and 1RC-165) if an ES actuation occurs.		_____	
3.2.7	Record that containment isolation valves 1RC-164 and 1RC-165 are open in OP/0/A/1102/20 (Shift Turnover).		_____	
3.2.8	Open 1RC-164	in Unit 1 LPI Room-operated from Control Room.	____/____	____/____
3.2.9	Open 1RC-165	in Unit 1 LPI Room-operated from Control Room.	____/____	____/____
	CAUTION: If ES actuation occurs, immediately close isolation valves for containment isolation.			

ENCLOSURE 5.5

CP/1/A/2002/04C

	Date Init./Time	Verification Date Init./Time

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

NOTE: The following initial conditions must be observed.

3.3.1 Containment integrity is required. _____ _____

3.3.2 Station a responsible person in the vicinity of 1LP-65 to immediately close 1LP-65 if ES Actuation occurs. This person must be in constant communication with the Control Room the entire time 1LP-65 is open.

3.3.3 Record that the valve is open in OP/0/A/1102/20 (Shift Turnover). _____

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

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

3.4.1 CLOSE 1RC-165 in Unit 1 LPI Room-operated from Control Room. ____/____ ____/____

3.4.2 CLOSE 1RC-164 in Unit 1 LPI Room-operated from Control Room. ____/____ ____/____

NOTE: Remove the containment isolation valves (1RC-164 and 1RC-165) from OP/0/A/1102/20 (Shift Turnover).

ENCLOSURE 5.5

CP/1/A/2002/04C

			Date Init./Time	Verification Date Init./Time
3.4.3	CLOSE 1RC-163	inside Reactor Building-operated from Control Room.	____/____	____/____
3.4.4	CLOSE 1RC-162	inside Reactor Building-operated from Control Room.	____/____	____/____

3.5 Chemistry will inform Operations when sampling has been completed. At this time, water put in the Emergency Sump Recirc. Line shall be drained. (At the discretion of the Shift Supervisor).

3.5.1	Open 1LP-110	Drain on Emergency Sump Recirc Line (U1 LPI Room).	
3.5.2	Check high activity monitor rate in Control Room for indication drain has been completed.		
3.5.3	CLOSE 1LP-110	Drain on Emergency Sump Recirc Line (U1 LPI Room).	
3.5.4	CLOSE 1LP-65	Manual valve (located in LPI Room) operated by reach rod from LPI/HPI Hatch Room 118, 119 (behind breaker panels ~ 15' south of 1LP-21).	____/____ ____/____

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

3.6 Return completed enclosure to Chemistry personnel operating PALS. ____/____

Checked Control Copy_____

Date_____

CP/1/A/2002/04C

ENCLOSURE 5.6

OPERATIONS CHECKLIST FOR REACTOR BUILDING NORMAL SUMP VALVE LINEUPS TO POST ACCIDENT SAMPLING SYSTEM

	Date Init./Time	Verification Date Init./Time

1.0 Purpose

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

2.0 Limits and Precautions

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

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

3.0 Procedure

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

ENCLOSURE 5.6

CP/1/A/2002/04C

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

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

NOTE: The following initial conditions must be observed:

3.3.1 Containment Integrity is required. _____ _____

ENCLOSURE 5.6

CP/1/A/2002/04C

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

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

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

ENCLOSURE 5.6

CP/1/A/2002/04C

			Date Init./Time	Verification Date Init./Time
3.4.4	OPEN 1LWD-30	RB Normal Sump Pump (1WD-2A) Suction. Operated by reach rod on north wall in LPI/HPI Hatch Room 118, 119.	____/____	
3.4.5	Remove white tag from breaker on RB Normal Sump Pump 1B. White Tag No. _____		____/____	
3.4.6	Remove tag from breaker on RB Normal Sump Pump 1A. White Tag No. _____		____/____	
3.5	Chemistry will inform Operations when sampling has been completed. At this time, water put in the Emergency Sump Recirc. Line shall be drained. (At the discretion of the Shift Supervisor).			
3.5.1	OPEN 1LP-110	Drain on Emergency Sump Recirc. Line (U1 LPI Room)	____/____	____/____
3.5.2	Check high activity monitor rate in Control Room for indication drain has been completed.		____/____	
3.5.3	CLOSE 1LP-110	Drain on Emergency Sump Recirc. Line. (U1 LPI Room)	____/____	____/____
3.5.4	CLOSE 1LP-65	Manual valve (located in LPI Room) operated by reach rod from LPI/HPI Hatch Room 118, 119 (behind breaker panels ~ 15' south of 1LP-21).	____/____	____/____

ENCLOSURE 5.6

CP/1/A/2002/04C

	Date Init./Time	Verification Date Init./Time

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

3.6 Return completed enclosure to Chemistry Personnel operating PALS. ____/____

CP/1/A/2002/04C

ENCLOSURE 5.7

PREPARATION OF THIOSULFATE SOLUTION FOR

CONTAINMENT AIR POST ACCIDENT SAMPLE PANELS

1) Prepare 2 liters of 2.42×10^{-3} M sodium hydroxide by pipetting 0.25 ml of 50% NaOH into a 2 l flask and making up to volume.

2) Transfer 500 ml ± 10 ml by graduated cylinder into each of 4 500 ml poly bottles. Add 1.0 ml of chloroform to each as a preservative.

3) Weigh out 4 portions of .3003 ± .0012 g of sodium thiosulfate ($NaS_2O_3 \cdot 5H_2O$) and add one portion to each of the four bottles containing NaOH.

4) Label these solutions thiosulfate for containment air sampling and date. (They are stable for 6 months).

5) Keep the solutions in the Primary Chemistry Lab and sign them out to HP when requested in the Primary Sample Log for Unit 1.

INFORMATION ONLY CONTROL COPY

INFORMATION ONLY

Form 34731 (10-81)
(Formerly SPD-1002-1)

DUKE POWER COMPANY
PROCEDURE PREPARATION
PROCESS RECORD

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

(2) STATION: Oconee

(3) PROCEDURE TITLE: Operating Procedure For The Post Accident Liquid Sampling (PALS) System

(4) PREPARED BY: Pat Hall DATE: 4/20/84

(5) REVIEWED BY: Jeff Bryan DATE: 4/24/84

Cross-Disciplinary Review By: Terry Campbell N/R: 4-20-84

(6) TEMPORARY APPROVAL (IF NECESSARY):

By: _____ (SRO) Date: _____

By: _____ Date: _____

(7) APPROVED BY: J S Barr Date: 4/24/84

(8) MISCELLANEOUS:

Reviewed/Approved By: _____ Date: _____

Reviewed/Approved By: _____ Date: _____

Checked Control Copy_____

Date_____

DUKE POWER COMPANY

OCONEE NUCLEAR STATION

OPERATING PROCEDURE FOR THE

POST ACCIDENT LIQUID SAMPLING (PALS) SYSTEM

1.0 Purpose

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

2.0 Limits and Precautions

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

2.1.1 Post Accident.

2.1.2 Inaccessibility of Primary Sampling Area due to radiation levels.

2.1.3 Request from the Station Chemist or his designee.

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

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

2.4 Radiation exposure to an individual during all phases of sampling should be limited so as not to exceed a quarterly accumulative exposure of 3 rems whole body; 7.5 rems skin of wholebody; or 18 3/4 rems extremities respectively. All personnel will need prior authorization from TSC to knowingly exceed any exposure limit. The exposure received may require an occupational exposure penalty and/or a medical decision as to whether an individual can continue in radiation work.

2.4.1 If necessary to remedy a situation immediately hazardous to life and property, the Planned Emergency Exposure for Duke Power Personnel will not exceed 5 rems wholebody; 30 rems skin of wholebody; or 75 rems extremities.

2.4.2 If necessary to save lives or prevent loss of life and/ or extensive damage to property (voluntary basis only), the Planned Emergency Exposure for Duke Power Personnel will not exceed 25 rems wholebody; 150 rems skin of wholebody; or 375 rems extremities.

2.4.3 For Outside Services Personnel the Planned Emergency Exposure will not exceed 5 rems wholebody; 30 rems skin of wholebody; 75 rems extremities; or 15 rems other single organ.

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

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

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

3.0 Procedure

NOTE: In order to maintain the PALS in operable condition at all times, the requirements on Enclosure 5.2, PALS Semi-annual Calibration Checklist must be done semi-annually and be current prior to Post Accident sampling. Enclosure 5.1, Post Accident Authorization for Operation of PALS, must be completed prior to Post Accident sampling.

3.1 Preparation for Sampling

3.1.1 Valve Alignments

3.1.1.1 Notify Shift Supervisor that operation of the PALS is being initiated by Chemistry. Chemistry will select either Enclosure 5.5 for a RCS sample or Enclosure 5.6 for a RBNS sample, check it against the control copy, and take it to the responsible individual in Operations (designated by the Shift Supervisor) for completion. Request Operations to complete Step 3.1 of the selected enclosure. ____/____

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

RCS Sample: 2RC-179 (C)

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

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

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

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

	Initials/Time
Instrument Air Supply Isolation 2IA-2423	_____/___
Panel Instrument Air Isolation	_____/___
Valve on Nitrogen Supply Bottle (>200 psi tank pressure required; ~30 psi delivery pressure).	_____/___
Panel Nitrogen Isolation	_____/___
Cooling Water Supply Isolation 2DW-282	_____/___
Demin Water Supply Isolation 2DW-281	_____/___
Panel Demin Water Isolation	_____/___

3.1.1.4 The following should be verified as noted prior to periodic testing (not required for accident condition):

2LWD-1029 Low Point Drain (LPI Room) closed and capped

2RC-177 High Point Vent (next to Sampling Panel) closed and capped

2LP-110 Emergency Sump Line Drain (LPI Room) closed

2LP-111 Emergency Sump Line Drain Tell-tale (LPI Room) Closed and capped

2DW-278 Remote Starter (HPI Room) "ON"

2LWD-1028 Remote Starter (LPI Room) "ON"

2DW-91 Reactor Building Normal Sump Line Flush (LPI Room) Closed

2RC-178 Low Point Drain (LPI Room) closed and capped

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

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

2DW-324 Isolation Valve between V1 & V2 on header (~30 ft. upstream of 2DW-281) Open

2N-262 Nitrogen Isolation: Closed

3.1.2 Health Physics Notification

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

3.1.3 Additional Requirements

Record specific conductivity of buffer solution from Primary Chemistry Data Log. Pick up glass syringes and sample carrier from Primary Lab (or Radwaste Lab, whichever is more accessible), and take stop watch and panel keys to Control Panel. _____ ____/____

3.2 Panel Preparation

NOTE: If any item on panel is not clearly identified, refer to Enclosures 5.3 and 5.4 (Control Panel Diagrams).

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

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

3.2.3 Place the toggle switch for the radiation monitor to "ON" and turn the scale select to "rem/hr". If the radiation monitor is not functional, HP coverage is sufficient to operate the panel. (If this is a routine test, submit a WR for repair).

3.2.4 Place the temperature probe selector to position 1.

3.2.5 Move the conductivity meter to "Measure" position.

3.2.6 Push in the pH meter standardize knob.

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

3.2.8 If RCS is to be sampled, open sample regulator valve at cooler outlet approximately ½ turn open. If RBNS is to be sampled, open sample regulator valve at cooler outlet approximately 4 turns open. Adjustments may be made in Step 3.4.5, if TC-1 indicates greater than 190°F. ____/____

3.3 Panel Operation (Position 1) Panel Prep

3.3.1 Turn the Operation Selector switch to the PANEL PREP. position.

3.3.2 Momentarily depress the SELECTION POWER ACTIVATE pushbutton.

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

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

3.3.5 Depress the CALIBRATE pushbutton and hold until the conductivity and pH meter readings stabilize.

3.3.6 Record the conductivity reading _____ μmhos/cm. The conductivity should correspond with the specific conductivity of the pH standard measured in the lab. If not, contact Station Chemist or Primary Supervisor. (If this is a routine test, initiate a Work Request for repair. For an accident condition, personnel should move to a lower background area during this time, if one is available).

NOTE 1: Conductivity probe has a cell constant of 10 and has 10% inherent error.

NOTE 2: Multiply conductivity meter reading by 1000 to obtain specific conductivity value.

3.3.7 Adjust the pH meter to the known pH of the standard. ____/____

3.3.8 Depress the PURGE pushbutton for about 30 seconds.

3.3.9 Depress the FLUSH pushbutton until the conductivity and pH meter readings stabilize.

3.3.10 Depress the PURGE pushbutton for about 30 seconds.

3.3.11 Depress the DRAIN pushbutton for about 60 seconds.

3.3.12 Repeat Steps 3.3.9, 3.3.10, 3.3.11 and then continue to Section 3.4.

3.4 Panel Operation (Position 2) Sample Recirc

3.4.1 Request Operations complete Steps 3.2 and 3.3 of the enclosure selected in 3.1.1.1.

3.4.2 Turn the Operation Selector switch to the SAMPLE RECIRC. position.

3.4.3 Record the PALS or HP radiation monitor reading_____ (background). Watch radiation monitor reading for an increase as sample enters the panel.

3.4.4 Momentarily depress the SELECTION POWER ACTIVATE pushbutton.

3.4.5 Observe that the SAMPLE INLET and SAMPLE OUTLET indicating lights are lit. Record the starting time_____.

3.4.6 If TC-1 goes above 190°F, sample is not being sufficiently cooled. Turn selector to "Reset". Press "Reset" button and turn Power key to vertical position. Contact Station Chemist or his designee. (For an accident condition personnel should move to a lower background area during this time, if one is available.) If TC-1 is less than 190°F, record the temperature_____.

3.4.7 If sample recirc. is done during the semi-annual check, a visual inspection of accessible portions of the system should be performed for the purpose of identifying any external leakage during testing. Work requests shall be written promptly to eliminate any leakage found.

3.4.8 Turn the selector knob to "Sample", position 3.

3.5 Panel Operation (Position 3) Sample

3.5.1 Turn the temperature selector to TC-2.

3.5.2 Momentarily depress the SELECTION POWER ACTIVATE pushbutton.

3.5.3 Observe that the SAMPLE INLET and SAMPLE OUTLET indicating lights are lit.

3.5.4 Monitor the temperature gauge and when TC-2 stabilizes, record the temperature_____.

3.5.5 Record the PALS or HP radiation reading_____. Subtract the initial background reading from sample radiation reading and record.

3.5.6 Press the 1) TC-2 Stabilize Activate button; when pressure reading stabilizes, record_____.

3.5.7 Press the 2) Pressure Stabilize Activate button and record time sample flow stops_____.

3.5.8 Request Operations to complete Step 3.4 of the enclosure selected in 3.1.1.1.

3.6 Panel Operation (Position 4) Depressurization

3.6.1 Turn the Operation Selector switch to the DEPRESSURIZATION position.

3.6.2 Press the "Reset" button on the gas flow totalizer to zero the readout. Preset the counter on the totalizer to 99999.

3.6.3 Momentarily depress the SELECTION POWER ACTIVATE pushbutton.

3.6.4 Observe that the DI WATER and SAMPLE OUTLET indicating lights are lit.

3.6.5 Verify the pressure gauge on the instrument panel indicates -25 inches of Mercury. Wait about 60 seconds.

3.6.6 Press the START button on the N_2 Preset Counter and observe the PRESS/VAC gauge. When the gauge needle just begins to move press the STOP button on the N_2 Preset Counter.

3.6.7 Continue to make small N_2 adds, by repeating 3.6.6 until the PRESS./VAC gauge reads about 0-2 inches.

3.6.8 Flip the Preset Counter POWER toggle switch to the OFF position.

3.6.9 If "5" inches is exceeded, as read from the PRESS./VAC gauge, a new sample will need to be taken.

3.7 Panel Operation (Position 5) Liquid Sample

3.7.1 Turn the Operation Selector switch to the LIQUID SAMPLE position.

3.7.2 Momentarily depress the SELECTION POWER ACTIVATE pushbutton.

3.7.3 Observe that the DI WATER and SAMPLE OUTLET indicating lights are lit.

3.7.4 Depress the LIQUID SAMPLE ACTIVATE 1) Log conductivity and hold until the conductivity meter stabilizes. Record the specific conductivity_____.

3.7.5 Press both LIQUID SAMPLE ACTIVATE 1) Log conductivity and 2) Log pH buttons and hold until pH meter stabilizes. Record pH_____.

3.7.6 Press the GAS SAMPLE 1) ACTIVATE button and hold for 1 second.

3.7.7 Momentarily depress the 3) DILUTED GAS SAMPLE GRAB pushbutton.

3.8 Panel Operation (Position 6) Liquid Sample Prep

3.8.1 Turn the Operation Selector switch to the LIQUID SAMPLE PREP position.

3.8.2 Momentarily depress the SELECTION POWER ACTIVATE pushbutton.

3.8.3 Momentarily depress the ACTIVATE TO DESIRED mL VOLUME pushbutton and observe the SAMPLE ALIQUOT register advance one count (1.20 ml).

3.8.4 Press the "Reset" button on the dilution water flow totalizer and preset the meter for desired dilution (in 250 ml increments from 250-3500 mls). Press the "Start" button and let the dilution continue to completion. Record the dilution volume_____.

3.8.5 Press the Activate Mix button and hold for about 15 seconds.

3.9 Panel Operation (Position 7) Liquid Sample

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

3.9.2 Press the SELECTION POWER ACTIVATE button.

3.9.3 Press Activate button. Wait 45 seconds (for levels in dilution cylinder and grab sampler to equalize).

3.9.4 Momentarily depress the DILUTED SAMPLE GRAB pushbutton. Wait 10 seconds.

3.10 Panel Operation (Position 8) Flush

3.10.1 Turn the Operation Selector switch to the FLUSH position.

3.10.2 Press the SELECTION POWER ACTIVATE button.

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

3.10.4 Press the FLUSH ACTIVATE button and monitor pH and conductivity meters until they reach equilibrium of demineralized water (approximately 10 minutes). Observe second flush light is lit.

3.10.5 Press the FLUSH ACTIVATE pushbutton and wait 3 minutes. (Observe the third FLUSH light is lit.)

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

3.11 Panel Operation (Position 9) Drain

3.11.1 Turn the Operation Selector switch to the DRAIN position.

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

3.11.3 Wait for about 2 minutes and again depress the ACTIVATE pushbutton and observe the second DRAIN light is lit.

3.11.4 Wait for about 2 minutes and again depress the ACTIVATE pushbutton and observe the third DRAIN light is lit.

3.11.5 Wait for about 6 minutes and again momentarily depress the ACTIVATE pushbutton and observe the DRAIN COMPLETE light is lit.

3.12 Panel Shutdown and Decontamination

3.12.1 Turn the Sample Selector switch to the OFF position.

3.12.2 Turn the Operation Selector switch to the RESET position.

3.12.3 Momentarily depress the RESET pushbutton.

3.12.4 Turn the System Power keylock to the SUMP PUMP position for about 15 minutes (or until the pump switches itself off).

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

3.12.5.1 If the radiation field at the PASP is less than 3 R/Hr turn the System Power keylock to the OFF position and remove the PALS System key.

3.12.5.2 If the radiation field is greater than 3R/Hr repeat 3.10 thru 3.12.5.

3.12.6 If radiation level remains greater than 3 rem/hr after one repeat of Section 3.10 through 3.12.5, contact Station Chemist or his designee (for an accident condition personnel should move to a lower background area during this time, if one is available) for permission to return to Section 3.1 and take another sample using larger dilution volume. Permission given by_____.

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

3.13 Sampling

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

3.13.2 Collect 3-5.0 ml liquid samples at the liquid grab sampler in lockable glass syringes. Place in plastic bag.

NOTE: Flushing of remaining sample in grab sampler is desirable if radiation levels permit. Return to Position 6 and add 200 mls demin. water to Dilution Cylinder. Continue through Position 7, cycle through Position 8 and 9 completing the second and third drain steps. Go to the grab sampler and drain the liquid out (this liquid is not a sample-discard in PASP Sump or appropriate waste container in lab).

3.13.3 Request Operations to complete Steps 3.5 and 3.6 of the enclosure selected in 3.1.1.1.

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

3.14 Sample Analysis

3.14.1 Gas

3.14.1.1 Analyze one syringe of stripped gas by Chemistry Procedure CP/0/B/2004/14A, Operation of the Fisher Model 25V Gas Partitioner for the Determination of Hydrogen in Gas Samples. Calculate the results by the following method:

$$\%\ H_2 \times \frac{1000\ cc}{0.155\ Kg} \times \frac{1}{100} = cc/Kg\ H_2$$

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

1000 cc = stripped gas bomb volume

0.155 Kg = collected sample size

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

Report result_____cc/kg H_2

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

μC_i in 1 cc $\times \frac{1000}{155}$ = Total activity from dissolved gas in 1 ml RC.

GeLi Spectra Attached _____.

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

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

3.14.2 Liquid

3.14.2.1 Take 1 ml of liquid sample and dilute to 50 ml with Super Q water in a 60 ml poly bottle. Analyze by GeLi Spectral Analysis (HP/0/B/1001/14, Procedure for Nuclear Data 6600 System Operation). Activities will be reported by HP for 1 ml of diluted liquid sample. Calculate activity of liquid portion of reactor coolant as follows:

$$\mu ci/ml = \text{activity in diluted 1 ml} \times \frac{\text{*Total Dilution Volume}}{1.20 \text{ ml}}$$

*Step 3.8.4 + 1.2 mls.

GeLi Spectra Attached _____.

3.14.2.2 Take 5 ml of liquid sample and analyze for boron by CP/0/A/2004/02E, Post Accident Determination of Boron Concentration Using Carminic Acid. Correct results for dilution as follows:

$$\text{ppm } B_{RCS} = \text{ppm measured} \times \frac{\text{*Total Dilution Volume}}{1.20}$$

*Step 3.8.4 + 1.2 mls

Boron Concentration _____ppm.

3.14.2.3 Take 5 mls of liquid sample and analyze for chloride by CP/0/A/2004/03C, Post Accident Determination of Chloride by Specific Ion Electrode Using Beckman 4500 Meter. Correct results for dilution as in 3.14.2.2.

NOTE: Chloride analysis only to be done in an accident situation.

Chloride Concentration _____ppm.

3.14.2.4 Report results of liquid sample analyses in Primary Chemistry Data Log.

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

3.14.2.6 Additional liquid sample dilution may be necessary to bring amount of activity within range. If so, withdraw 1 ml of sample from 60 ml poly bottle (from Section 3.14.2.1) and dilute to 50 ml with Super Q for analysis. Be sure to record the additional dilution information so that isotope activities may be adjusted accordingly.

3.14.2.7 Route completed procedure to Technical Support Center (for routine sampling to Primary Supervisor).

Accepted By:_____

3.15 Waste Disposal

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

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

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

4.0 References

4.1 NUREG-0737, Section II.B.3

4.2 DPC System Health Physics Manual

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

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

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

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

4.7 DPC Alara Manual (1980)

4.8 ONS Emergency Plan

4.9 ONS Chemistry Manual Section 5.1

5.0 Enclosures

5.1 Post Accident Authorization for Operation of PALS

5.2 PALS Semi-Annual Calibration Checklist

5.3 PALS Control Panel Diagram - Left

5.4 PALS Control Panel Diagram - Right

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

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

Checked Control Copy_____

Date_____

ENCLOSURE 5.1

CP/2/A/2002/04C

POST ACCIDENT AUTHORIZATION FOR OPERATION OF PALS

Technician/Time

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

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

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

   _____Boron

   _____Chloride

   _____Isotopic Analysis for _____Iodines

   _____Cesiums

   _____Noble Gases

   _____Non-Volatile Fission Products

   _____Other (Specify) _____

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

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

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

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

   Sample route designated: _____

   _____

7. Evaluate the use of portable shielding, remote handling equipment, video equipment, etc., to minimize the expo-

sure to personnel in the lab for the required analyses._____/___

Checked Control Copy_____

Date_____

ENCLOSURE 5.2

CP/2/A/2002/04C

PALS SEMI-ANNUAL CALIBRATION CHECKLIST

1. pH 7.4 buffer must be replaced semi-annually. Prepare 4 liters buffer by CP/0/B/2004/09C. Measure specific conductivity and report in Primary Chemistry Data Log.

   Buffer Expiration Date: _____

   Specific Conductivity: _____µmhos/cm

   Technician/Date: _____/_____

2. Verify the 1000 ppm Boron standard currently in use in the Primary Lab will not expire prior to next semi-annual checklist.

   1000 ppm Boron Std Expiration Date: _____

   Technician/Date: _____/_____

   Carminic acid and 10 ppm Boron standard are to be made prior to sampling.

3. pH and conductivity meters must be checked when buffer solution is renewed. Complete PALS operating sections: 3.2.1, 3.2.5, 3.2.6, 3.3.1 through 3.3.11. Turn System Power Key to vertical position to deenergize panel.

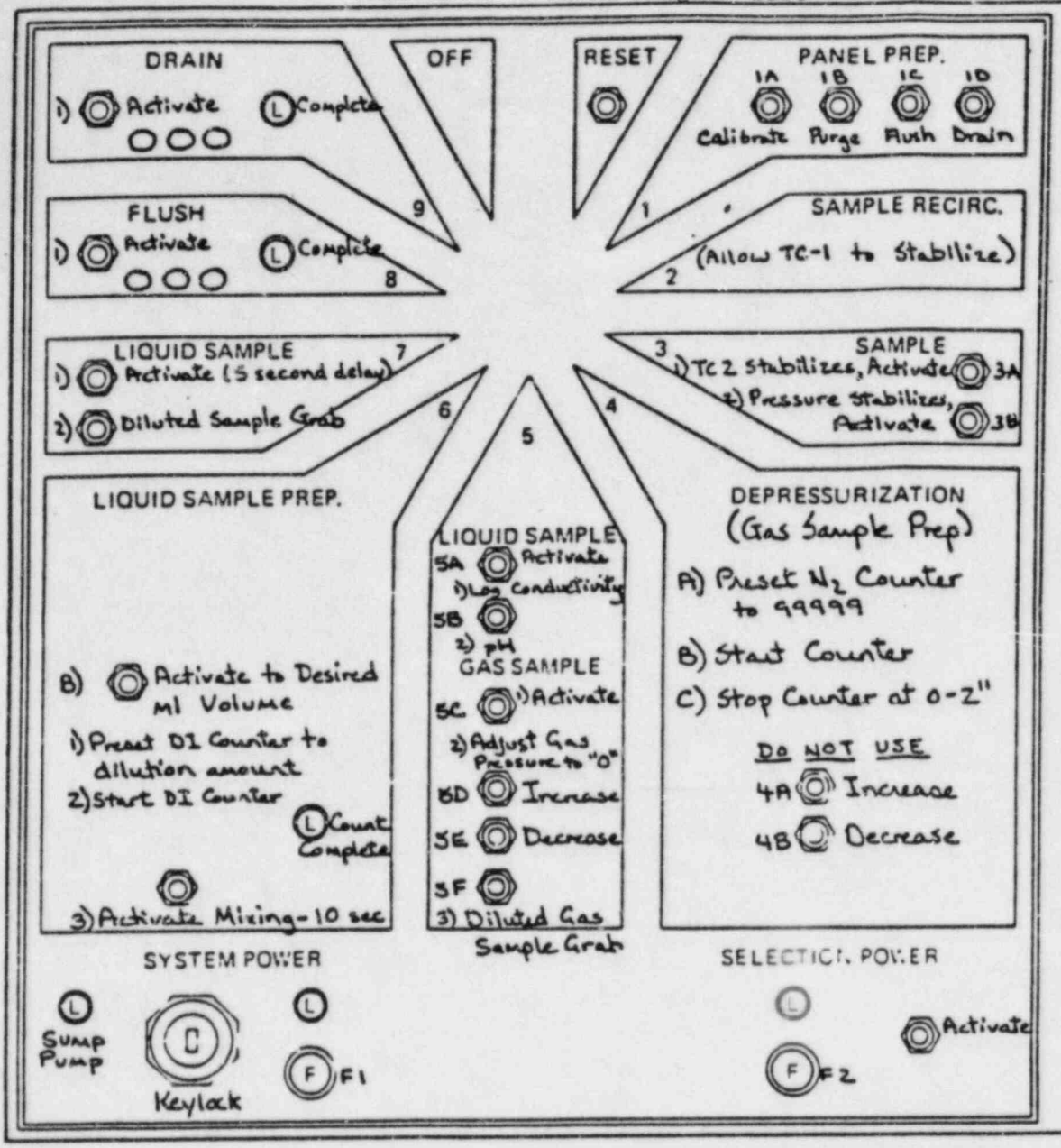
   Calibration Date: _____ Technician _____

4. Return enclosure to Primary Supervisor or his designee.

Enclosure 5.3

CP/2/A/2002/04C

PALS Control Panel Diagram-Left

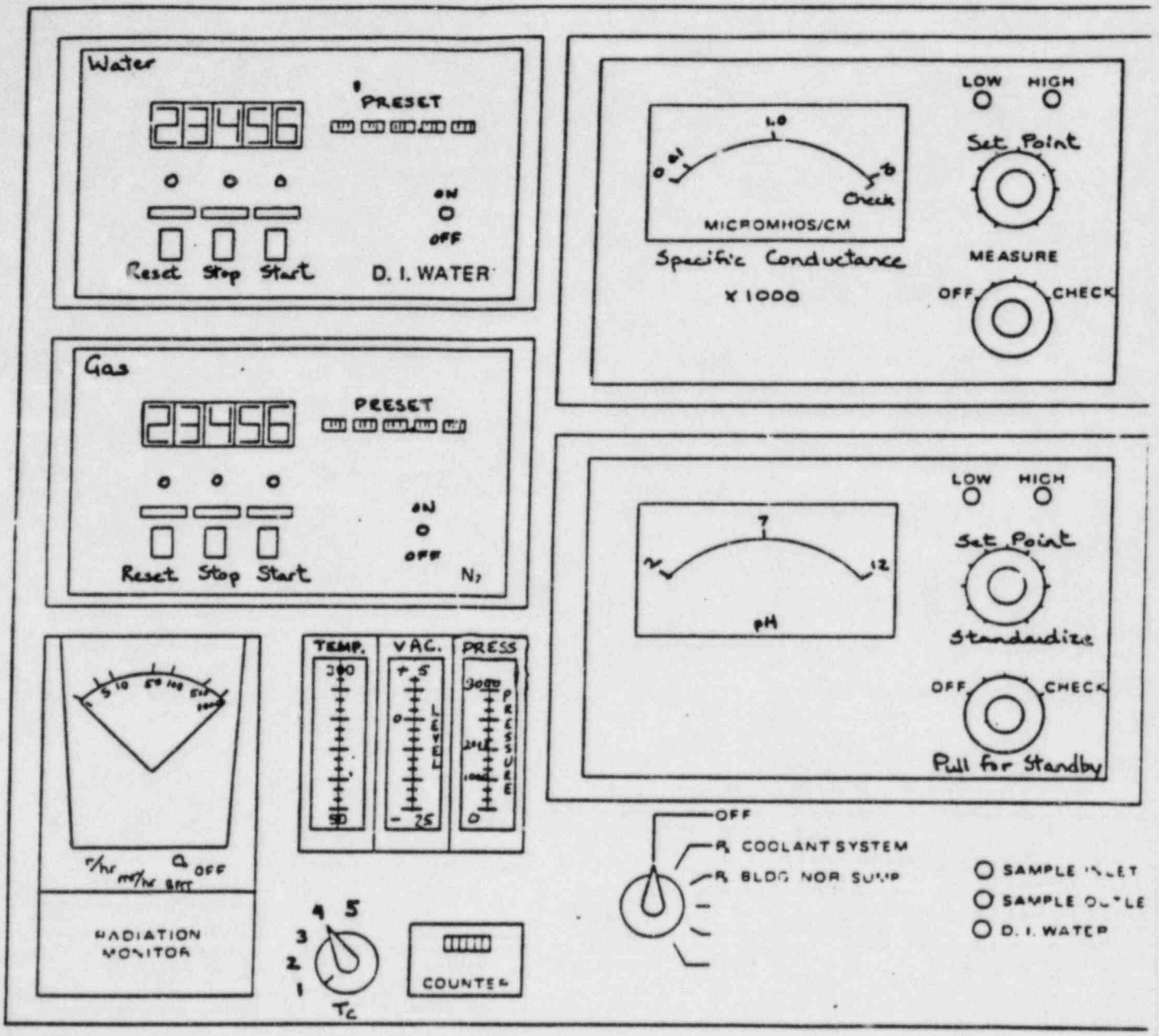


SEE DRAWING NO. L040180D FOR PANEL DETAIL

Enclosure 5.4

CP/2/A/2002/04C

PALS Control Panel Diagram-Right



Checked Control Copy_____

Date_____

CP/2/A/2002/04C

ENCLOSURE 5.5

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

1.0 Purpose

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

2.0 Limits and Precautions

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

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

3.0 Procedure

		Date Init./Time	Verification Date Init./Time
3.1	Ensure the following breakers are closed:		
3.1.1	1L2 Bkr. #37 Sampling/Control Panels Power Supply (located next to U2 sampling panel)	____/____	
3.1.2	MCC1XL Bkr. for 2DW-278 (RCS sample line flush) and 2LWD-1028 (RBNS Sample Line)	____/____	
3.1.3	Close breakers KVIA, B, C (Power supply to 2RC-162, 2RC-163, 2RC-164, and 2RC-165).	____/____	
3.2	To obtain a reactor coolant sample, the valves listed in this section should be aligned as follows:		
3.2.1	2RC-84 Inside reactor building - refer to Fill and Vent Procedure (OP/2/A/1103/02)		

to verify OPEN status. _____/_____

ENCLOSURE 5.5

CP/2/A/2002/04C

			Date Init./Time	Verification Date Init./Time
3.2.2	2RC-174/2RC-176 (Test Connections) and 2RC-175 (High Point Vent)	inside reactor building - refer to Fill and Vent Procedure (OP/2/A/1103/02) to verify CLOSED Status.	____/____	
3.2.3	Open 2RC-162	inside reactor building-operated from control room.	____/____	____/____
3.2.4	Open 2RC-163	inside reactor building-operated from control room.	____/____	____/____
	NOTE: The following initial conditions must be observed.			
3.2.5	If containment integrity is required, then Steps 3.2.6 and 3.2.7 must be completed.		_____	_____
3.2.6	Designate a responsible person in the Control Room to immediately close the isolation valves (2RC-164 and 2RC-165) if an ES actuation occurs.		_____	
3.2.7	Record that containment isolation valves 2RC-164 and 2RC-165 are open in OP/0/A/1102/20 (Shift Turnover).		_____	
3.2.8	Open 2RC-164	in Unit 2 LPI Room-operated from Control Room.	____/____	____/____
3.2.9	Open 2RC-165	in Unit 2 LPI Room-operated from Control Room.	____/____	____/____
	CAUTION: If ES actuation occurs, immediately close isolation valves for containment isolation.			

ENCLOSURE 5.5

CP/2/A/2002/04C

		Date Init./Time	Verification Date Init./Time
3.3	To allow recirculation of sample, align 2LP-65, return line valve to the RB Emergency Sump:		
NOTE:	The following initial conditions must be observed.		
3.3.1	If Containment integrity is required, then Steps 3.3.2 and 3.3.3 must be completed.	_____	_____
3.3.2	Station a responsible person in the vicinity of 2LP-65 to immediately close 2LP-65 if ES Actuation occurs. This person must be in constant communication with the Control Room the entire time 2LP-65 is open.		
3.3.3	Record that the valve is open in OP/0/A/1102/20 (Shift Turnover).	_____	
3.3.4	Open 2LP-65 manual valve (located in Unit 2 LPI Room) to be operated by reach rod from LPI/HPI Hatch Room 118, 119 (on west wall directly behind 2LP-22).	____/____	____/____
3.4	Chemistry will inform Operations when they have obtained the RCS sample in the panel and the following valves should then be realigned as follows:		
3.4.1	CLOSE 2RC-165 in Unit 2 LPI Room-operated from Control Room.	____/____	____/____
3.4.2	CLOSE 2RC-164 in Unit 2 LPI Room-operated from Control Room.	____/____	____/____
	NOTE: Remove the containment isolation valves (2RC-164 and 2RC-165) from OP/0/A/1102/20 (Shift Turnover).		

ENCLOSURE 5.5

CP/2/A/2002/04C

			Date Init./Time	Verification Date Init./Time
3.4.3	CLOSE 2RC-163	inside Reactor Building-operated from Control Room.	____/____	____/____
3.4.4	CLOSE 2RC-162	inside Reactor Building-operated from Control Room.	____/____	____/____

3.5 Chemistry will inform Operations when sampling has been completed. At this time, water put in the Emergency Sump Recirc. Line shall be drained. (At the discretion of the Shift Supervisor).

3.5.1	Open 2LP-110	Drain on Emergency Sump Recirc Line (U2 LPI Room).		
3.5.2	Check high activity monitor rate in Control Room for indication drain has been completed.			
3.5.3	CLOSE 2LP-110	Drain on Emergency Sump Recirc Line (U2 LPI Room).		
3.5.4	CLOSE 2LP-65	Manual valve (located in LPI Room) operated by reach rod from LPI/HPI Hatch Room 118, 119 (on west wall directly behind 2LP-22).	____/____	____/____

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

3.6 Return completed enclosure to Chemistry personnel operating PALS. ____/____

Checked Control Copy_____

Date_____

CP/2/A/2002/04C

ENCLOSURE 5.6

OPERATIONS CHECKLIST FOR REACTOR BUILDING NORMAL SUMP VALVE LINEUPS TO POST ACCIDENT SAMPLING SYSTEM

	Date Init./Time	Verification Date Init./Time

1.0 Purpose

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

2.0 Limits and Precautions

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

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

3.0 Procedure

		Date Init./Time	Verification Date Init./Time
3.1	Ensure the following breakers are closed:		
3.1.1	1L2 Bkr. #37 Sampling/Control Panels Power Supply (located next to U2 sampling panel)	____/____	
3.1.2	MCC2XL Bkr. #5A RB Normal Sump Sample Pump Power Supply.	____/____	
3.1.3	MCC1XL Bkr. for 2DW-278 (RCS Sample line flush) and 2LWD-1028 (RBNS Sample Line).	____/____	
3.2	To obtain a reactor building normal sump sample, the following valves should be aligned as indicated:		

ENCLOSURE 5.6

CP/2/A/2002/04C

			Date Init./Time	Verification Date Init./Time
3.2.1	White tag open breaker on RB Normal Sump Pump 2A. White Tag No._____ (Located on MCC2XL).		____/____	
3.2.2	White tag open breaker on RB Normal Sump Pump 2B. White Tag No._____ (Located on MCC-2XN)		____/____	
3.2.3	CLOSE 2LWD-30	RB Normal Sump Pump 2A Suction. Operated by reach rod on east wall of valve gallery room in LPI/HPI Hatch Room 118, 119.	____/____	
3.2.4	CLOSE 2LWD-33	RB Normal Sump Pump 2B Suction. Operated by reach rod on east wall of valve gallery room in LPI/HPI Hatch Room 118, 119.	____/____	
3.2.5	OPEN 2LWD-1	Reactor building normal sump line. This is an ES valve operated from the Control Room.	____/____	____/____
3.2.6	OPEN 2LWD-2	Reactor building normal sump line. This is an ES valve operated from the Control Room.	____/____	____/____

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

NOTE: The following initial conditions must be observed:

3.3.1 If containment Integrity is required, then Steps 3.3.2 and 3.3.3 must be completed _____ _____

ENCLOSURE 5.6

CP/2/A/2002/04C

			Date Init./Time	Verification Date Init./Time
3.3.2	Station a responsible person in the vicinity of 2LP-65 to immediately close 2LP-65 if ES Actuation occurs. This person must be in constant communication with the Control Room the entire time 2LP-65 is open.		_____	
3.3.3	Record that the valve is open in OP/0/A/1102/20 (Shift Turnover).		_____	
3.3.4	OPEN 2LP-65	Manual valve (located in Unit 2 LPI Room) to be operated by reach rod from LPI/HPI Hatch Room 118, 119 (on west wall directly behind 2LP-22).	____/____	____/____

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

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

ENCLOSURE 5.6

CP/2/A/2002/04C

			Date Init./Time	Verification Date Init./Time
3.4.4	OPEN 2LWD-30	RB Normal Sump Pump (2WD-2A) Suction. Operated by reach rod on east wall of valve gallery room in LPI/HPI Hatch Room 118, 119.	____/____	
3.4.5	Remove white tag from breaker on RB Normal Sump Pump 2B. White Tag No. _____		____/____	
3.4.6	Remove tag from breaker on RB Normal Sump Pump 2A. White Tag No. _____		____/____	
3.5	Chemistry will inform Operations when sampling has been completed. At this time, water put in the Emergency Sump Recirc. Line shall be drained. (At the discretion of the Shift Supervisor).			
3.5.1	OPEN 2LP-110	Drain on Emergency Sump Recirc. Line (U2 LPI Room)	____/____	____/____
3.5.2	Check high activity monitor rate in Control Room for indication drain has been completed.		____/____	
3.5.3	CLOSE 2LP-110	Drain on Emergency Sump Recirc. Line. (U2 LPI Room)	____/____	____/____
3.5.4	CLOSE 2LP-65	Manual valve (located in LPI Room) operated by reach rod from LPI/HPI Hatch Room 118, 119 (on west wall directly behind 2LP-22).	____/____	____/____

ENCLOSURE 5.6

CP/2/A/2002/04C

	Date init./Time	Verification Date Init./Time

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

3.6 Return completed enclosure to Chemistry Personnel operating PALS. _____/_____

INFORMATION ONLY

Form SPD-1002-1 INFORMATION ONLY

DUKE POWER COMPANY
PROCEDURE PREPARATION
PROCESS RECORD

(1) ID No: CP/O/B/4003/01
Change(s) n/a to
____ Incorporated

(2) STATION: OCONEE

(3) PROCEDURE TITLE: Procedure for Environmental Surveillance Following a Large Unplanned Release of Gaseous Radioactivity

(4) PREPARED BY: M. R. K. Mough DATE: 04/17/84

(5) REVIEWED BY: Jimmy J. Lewis DATE: 4/18/84

Cross-Disciplinary Review By: ____ N/R: JA

(6) TEMPORARY APPROVAL (IF NECESSARY):

By: ____ (SRO) Date: ____

By: ____ Date: ____

(7) APPROVED BY: J S Barr Date: 4/18/84

(8) MISCELLANEOUS:

Reviewed/~~Approved By~~: John W. Cain Date: 18 APR 84

Reviewed/~~Approved~~ By: Ralph Berg IC Date: 4/18/84

DUKE POWER COMPANY

OCONEE NUCLEAR STATION

EMERGENCY PLAN/CRISIS MANAGEMENT PLAN

PROCEDURE FOR ENVIRONMENTAL SURVEILLANCE FOLLOWING A LARGE

UNPLANNED RELEASE OF GASEOUS RADIOACTIVITY

1.0 Purpose

To provide a procedure for identifying gaseous plumes and obtaining field data indicative of the radiation exposure to the general public following an unplanned release of gaseous activity in excess of the limits established by Section 20.403(b)(2) of 10CFR20.

2.0 Limits and Precautions

2.1 The Field Monitoring Coordinator (FMC) or Environmental Surveillance Coordinator shall report to the Station Health Physicist (Technical Support Center) once the Emergency Plan has been implemented.

2.2 The FMC shall report to the Off-Site Radiological Coordinator (System Health Physicist or designee) once the Crisis Management Center has been established.

2.3 The FMC or designee shall call the Field Monitoring Supervisor(s) and team members to report to the Environmental Lab once the Emergency Plan has been implemented. The names and telephone numbers of these individuals are listed in Enclosure 5.1.

2.4 The field monitoring teams shall use particulate masks and protective clothing whenever activity (measured with the Eberline E-120 or PIC 6A) significantly exceeds normal background or when directed by the FMC.

2.5 If the team members expect to be exposed to ^{131}I in excess of 10 MPC (9×10^{-8} μC/ml), or if directed by the FMC each team member shall ingest a 130 milligram tablet of potassium iodide.

2.6 Environmental sampling during emergency conditions shall not replace, but rather supplement normal environmental monitoring.

2.7 The Nuclear Data ND-6 multichannel analyzers shall be calibrated and source checked monthly (CP/0/B/4003/05). The ND-6 shall also be source checked prior to field use.

2.8 The Eberline Geiger Counters (E-120 with HP-270 detector), PIC 6As, and Portable Air Samplers (RADeCO H-809 F) shall be calibrated quarterly (CP/0/B/4003/06).

2.9 An inventory of the emergency kits shall be conducted quarterly to ensure that all items needed are readily available (CP/0/B/4003/06).

2.10 Personnel shall adhere to all company safety rules regarding driving of vehicles or boats.

2.11 Annual training in the use of this procedure and the associated equipment and instrumentation shall be conducted. Upon completion of the training, documentation of training will be accomplished by completing a Training Content Summary Form, which will be forwarded to the Training and Safety Section.

3.0 Procedure

3.1 Upon request for off-site environmental monitoring by the Station Health Physicist and/or the Off-Site Radiological Coordinator, the FMC shall report to the Technical Support Center (TSC). The Field Monitoring Supervisor(s) and members of the six (6) field teams, including one (1) Mobile ND-6 team, shall report to the Environmental Lab to obtain the emergency kits and to initiate surveillance requirements.

3.2 One mobile ND-6 team (Alpha), three land field teams, (Bravo, Charlie, Delta) and one boat team (Echo) consisting of 2 technicians each and one helicopter team (Foxtrot) consisting of 1 technician shall be formed as follows:

Team Call Sign	Transportation *
"Alpha"	Environmental Vehicle #8191 (1980 Ford Bronco)
"Bravo"	Admin. Services Vehicle #6888 (1978 Ford Bronco)
"Charlie"	Admin. Services Vehicle #4205 (1974 Chevy Blazer)
"Delta"	Maintenance Vehicle #7770 (1979 Ford Pickup-Blue)
"Echo"	Maintenance Vehicle #8134 (1980 Ford Pickup-White)
"Foxtrot"	Administrative Vehicle #7103 (1978 Ford Station Wagon-White)
	Administrative Vehicle #7104 (1978 Ford Station Wagon-Blue)

*Pool of transportation - vehicles not limited to specific teams.

3.3 The field teams upon obtaining their emergency kits and emergency vehicles shall before leaving the site:

3.3.1 Verify radio communications with the Technical Support Center or Crisis Management Center Base Station using proper radio procedures (Procedure CP/O/B/4003/03).

3.3.2 Ensure the Portable Power Generators are operational and fully fueled.

3.3.3 Battery and source (Cs-137) check Eberline E-120 survey instrument, PIC 6A, and ND-6 for proper operation.

3.3.4 Ensure vehicle and spare gas can (for portable generator) are fueled to maximum capacity.

3.4 Action Plan

3.4.1 The Field Monitoring Coordinator's group (Enclosure 5.1) shall consist of the FMC, two alternates, three supervisors, six radio operators and twenty field monitoring team members (including two of the four radio operators).

3.4.1.1 The radio operator(s) shall set up the communications equipment in the TSC and maintain communications with the Field Teams using proper radio procedures (Procedure CP/0/B/4003/03).

3.4.2 Coordinator Action

3.4.2.1 The FMC shall be located in the Technical Support Center (TSC) and report to the Station Health Physicist once the TSC is established. Once the Crisis Management Center is established the FMC will report to the Off-Site Radiological Coordinator.

3.4.2.2 Plume direction and sector(s) to be monitored shall be determined by the FMC using CP/0/B/4003/02.

3.4.2.3 The FMC shall direct the efforts of the Field Teams in obtaining pertinent field measurements and implement monitoring strategies and sample collection requirements.

3.4.2.4 The FMC shall advise the Dose Assessment Coordinator of results of field measurements.

3.4.2.5 The FMC shall assure adequate staffing and resources for the Field Teams.

3.4.2.6 The FMC shall assimilate all the data accumulated during the emergency event to facilitate report preparations.

3.4.3 Supervisor Action

3.4.3.1 The Field Monitoring Supervisor shall assist the FMC and be prepared to serve as the FMC in his absence.

3.4.3.2 The Field Monitoring Supervisor shall obtain meteorological information from the Station Health Physicist in the Technical Support Center or the Unit 1 Control Room. When the Crisis Management Center is established meteorological information shall be obtained from the Off-Site

Radiological Coordinator. Meteorological conditions shall be reviewed approximately every 15 minutes for possible changes that would affect the plume direction and the sector(s) to be monitored (CP/0/B/4003/02).

3.4.3.3 The Supervisor shall dispatch Field Teams to predetermined survey points within the designated (downwind) sector(s). Predetermined sampling locations are located by using Enclosure 5.2 and the map in each kit.

NOTE: The predetermined sampling locations are reference points only. Teams should cruise back and forth across sectors to pin-point the radioactive plume using the Eberline E-120 (primary) or PIC 6A. Once the plume is located then ^{131}I activity should be determined.

3.4.3.4 The supervisor shall direct the teams as required to expedite analysis of air samples for ^{131}I.

3.4.3.5 Field Teams E and F may or may not be dis-patched immediately. Team E, the boat team, will be used to monitor plume activity over Lake Keowee. Team F is the helicopter team and will monitor the plume from the air if determined feasible by the Offsite Radiological Coordinator. Enclosure 5.3 outlines the procedure for obtaining the use of the helicopter.

3.4.3.6 The Supervisor or Radio Operator shall record all team data as received on Enclosure 5.4 such as:

3.4.3.6.1 Location and status of team.

3.4.3.6.2 Location and time of sample.

3.4.3.6.3 Dose Rates in mR/hr [Eberline E-120 (primary) or PIC 6A].

3.4.3.6.4 Air Sampling Results in μCi/ml of ^{131}I (ND-6)

3.4.3.6.5 Additional Samples Collected (Smears, Water Samples, etc.)

3.4.3.7 Illustrate and maintain up-to-date locations of teams on the 10 mile radius maps.

3.4.3.8 Instruct teams to collect and replace TLD's and the CP-100 Charcoal Cartridges and particulate filters from air samplers located in the environment as part of the normal environmental monitoring

program (Procedures CP/0/B/4005/13 and CP/0/B/4005/05, respectively). Collect only those air samples and TLD's which are necessary for plume detection. Locations of TLD's and Air Samplers are listed in Enclosure 5.5.

3.4.4 Team Action

3.4.4.1 One Field Team shall be designated as the Mobile ND-6 Team. This team will have a ND-6 and be responsible for analyzing air samples from all teams for ^{131}I. A second ND-6 shall be designated for the boat team or another land team based on conditions and need.

3.4.4.2 Upon verification that all equipment is operating satisfactorily, the Field Teams shall proceed as directed their predetermined survey points (Enclosure 5.2) within the sector(s) designated by the Field Monitoring Coordinator or Supervisor.

3.4.4.3 The Field Teams shall maintain open communications with the Field Monitoring Coordinator or Supervisor, providing sample results as required at each of the sampling locations.

3.4.4.4 As directed by the FMC or Supervisor the teams shall travel back and forth between predesignated sample locations:

3.4.4.4.1 Using the Eberline E-120 with HP-270 detector or PIC 6A, perform a general area Beta-Gamma survey to determine noble gas concentrations in mR/hr. Record date, time, location and dose rate (mR/hr) on Field Monitoring Data Sheet (Enclosure 5.6) and report this information to the FMC.

3.4.4.4.2 Teams may be directed to take an air sample ($\geq 10^6$ ml) using the RADeCO Portable Air Sampler equipped with a Silver Zeolite Cartridge and particulate filter. Use Enclosure 5.7 to ascertain sample time [based on the calibrated flow rate (CFM) of the Air Sampler] for obtaining a minimum sample volume ($\geq 10^6$ ml). Use the stopwatch to ensure correct number of minutes for an adequate sample. Record Date/Time/

location of sample, sample run time (min.) and calibration sticker air flow (cfm) on Enclosure 5.8, Column "A", "B", and "C", respectively. Calculate the sample volume in milli-liters (must be $\geq 10^6$ ml) as follows:

Sample Volume (ml) = Calibrated Flow Rate (CFM) x Sample Run Time (min) x 2.83×10^4 ml/ft^3

Record Sample Volume (ml) on Enclosure 5.8, Column "H".

3.4.4.4.3 Place the silver zeolite cartridge in a poly sample bag and label the bag.

3.4.4.4.4 At the direction of the Field Monitoring Supervisor meet the Mobile ND-6 Team and have the sample counted as per procedure No. CP/0/B/4003/04. Record CPM on Enclosure 5.8, Column "E".

3.4.4.4.5 Calculate ^{131}I Activity (µCi/ml) as directed in Enclosure 5.8 and record under Column "I".

3.4.4.4.6 Report results of ^{131}I measurement (Column "I", Enclosure 5.8) to the FMC in µCi/ml.

3.4.4.4.7 Place the particulate filter from the air sampler in a separate poly bag, label and retain for later analysis.

3.4.4.4.8 (Optional) Take smears at locations as directed by the FMC, place them in separate poly bags, label and retain for later analysis.

3.4.4.4.9 (Optional) Collect water samples in cubitainers at locations and times designated by the FMC. Label the cubitainers and retain for later analysis.

3.4.4.4.10 (Optional) Place TLDs at locations and times designated by the FMC.

3.4.4.4.11 (Optional) Collect air samples and TLDs that are located in the environment as part of the normal environmental

monitoring program as directed by the FMC. Record locations and collection times. Locations are listed in Enclosure 5.5.

3.4.4.4.12 Return all samples to the Environmental Lab or Crisis Management Center as directed by the FMC. Samples shall be counted onsite by Health Physics or transported to the Environmental Lab, Huntersville, N.C. for counting. The Crisis Management Center Administration and Logistics Group shall be responsible for transporting the samples expeditiously to the Environmental Lab if required.

3.4.4.4.13 Turn in all data sheets (Enclosures 5.6 and 5.8) to FMC or designee.

3.4.4.4.14 The teams shall be supplemented, relieved, or secured as directed by the FMC.

4.0 References

4.1 Procedure CP/O/B/4003/02, The Determination of Plume Direction and Sector(s) to be Monitored Following a Large Unplanned Release of Gaseous Radioactivity.

4.2 Procedure CP/O/B/4003/03, Emergency Radio System Operations, Maintenance and Communications.

4.3 Procedure CP/O/B/4003/04, Operation of The ND-6, Portable Multichannel Analyzer

4.4 Procedure CP/O/B/4003/05, Energy Calibration and Efficiency Determination For the ND-6

4.5 Procedure CP/O/B/4003/06, Inventory, Calibrations and Operational Verification of Emergency Equipment.

5.0 Enclosures

5.1 Field Monitoring Organization.

5.2 Predetermined Sampling Locations by Sector and Distance from ONS

5.3 Procurement of Helicopter(s) for Emergency Environmental Surveillance.

5.4 Radio Operator's Log

5.5 Helicopter Survey Results

5.6 Air Sampler and TLD Locations for Normal Environmental Monitoring Prog-am.

5.7 Field Monitoring Data Sheet for Dose Rate Measurements.

5.8 Sample Time Required For Minimum Sample Volume.

5.9 Field Monitoring Team Work Sheet for Determining ^{131}I Activity.

ENCLOSURE 5.1
FIELD MONITORING ORGANIZATION

IELD MONITORING COORDINATOR (FMC) AND RADIO OPERATORS (RO)

Primary FMC: J. W. Crain - Office: [redacted] Home: [redacted]

Alternate(s): J. R. Leonard - Office: [redacted]; Home: [redacted]
C. V. Wray - Office: [redacted] Home: [redacted]

TSC RO: Field Monitoring Team Member, Part A 1-7 listed below.

TSC Alternate:

CMC Primary RO: J. Painter - Office: [redacted]

CMC Primary RO: S. A. Gewehr - Office: [redacted]

CMC Primary RO: R. Ouellette - Office: [redacted]

CMC Alternate: G.M. Harrison - Office: [redacted]

CMC Alternate: R. L. Rivard - Office: [redacted]

CMC Alternate: S. E. LeRoy - Office: [redacted]

FIELD MONITORING SUPERVISOR

J. D. Bivins Office: [redacted]

FIELD MONITORING TEAM MEMBERS

A. Chemistry (ONS)

1. *Bobby Lee - Ext. [redacted]
2. Gina Roach - Ext. [redacted]
3. Keith Beddingfield [redacted]
4. *Gary Sain - Ext. [redacted]
5. *Bobby Childress - [redacted]
6. *Lynette Fant - Ext [redacted]
7. *Judy Head - Ext. [redacted]
8. Rick Morris - Ext [redacted]
9. *Sandra Luedeman - [redacted]
10. Gay Walter - Ext. [redacted]

B. Health Physics (ONS)

1. Steve Alexander - Ext [redacted]
2. Roger Slocum - Ext. [redacted]
3. Randy Smith - Ext [redacted]
4. *Tom Smith - Ext. [redacted]
5. Janet Hutchins - Ext [redacted]
6. *Don Davis - Ext. [redacted]
7. *Paul Tichenor - Ext [redacted]
8. Barry Stewart - Ext. [redacted]
9. *Steve Kirkland - Ext [redacted]
10. Robert Taylor - Ext. [redacted]
11. Darrell Lewis - Ext. [redacted]

*Can be on site within 30 minutes

ENCLOSURE 5.2
PREDETERMINED SAMPLING LOCATIONS BY SECTOR AND DISTANCE FROM ONS

Sampling Sector	Sampling Location	Responsible Team	Radius from ONS (Mi)	Description of Sampling Locations
N	A-1	E	1	Lake Keowee - Midlake due west of Warpath Access Area
N	A-2	B or E	3	Gap Hill Landing
N	A-3	E	3	West Shoreline of Lake Keowee from Gap Hill Landing
N	A-4	E	5	East Shoreline of Lake Keowee - Due East from Crow Creek Island
N	A-5	E	5	Midlake at Crow Creek Island
N	A-6	C or E	5	Old Town Landing
N	A-7	D	10	Keowee Toxaway State Park
N	A-8	D or E	9	Hwy 11 Bridge over Lake Keowee
NNE	B-1	A or E	1	Warpath Access Area
NNE	B-2	B	3	Junction of Hwy 157 (Gap Hill Rd) and 500 KV Transmission Line
NNE	B-3	B	3	Lake Hill Acres Campground - Hwy 157 (Gap Hill Rd)
NNE	B-4	C	5	Junction of Hwy 133 & 327
NNE	B-5	C	5	Hwy 327, Keowee Church
NNE	B-6	D	9	Junction of Hwy 133 & 49 (Shady Grove Church)
NE	C-1	A	1	Hwy 183, 1 mile N of Lake Hartwell at Steel Gate (West Side of Road)
NE	C-2	B	3	Junction of Hwy 183 & 157 (Gap Hill Rd)
NE	C-3	C	4	Love & Care Nursing Home (Love & Care Rd)
NE	C-4	C	5	Junction of Hwy 133 and Hunting Hollow Rd
NE	C-5	D	10	Martin Grove Church, Junction of Hwy 172 & 32
NE	C-6	D	10	Junction of Hwy 32 & 33
ENE	D-1	A	1	Hwy 183 N of Keowee Hydro Station Tailrace Bridge @ Keowee Cabins
ENE	D-2	B	3	Junction of Hwy 157 (Gin Shoals Rd.) and Shadydale Circle
ENE	D-3	C	5	Junction of Hwy 137 and Belle Shoals Rd

ENCLOSURE 5.2 (Cont.)
PREDETERMINED SAMPLING LOCATIONS BY SECTOR AND DISTANCE FROM ONS

Sampling Sector	Sampling Location	Responsible Team	Radius from ONS (Mi)	Description of Sampling Locations
ENE	D-4	C	5	Hwy 137, 1.5 miles east of Hwy 183 at first road junction
ENE	D-5	D	10	Junction of Hwy 267 & 12 Mile Creek
ENE	D-6	D	10	Junction of Hwy 273 & 12 Mile Creek
ENE	D-7	D	10	Junction of Hwy 183 & 287
E	E-1	A	1	Old Pickens Grocery, Junction of Hwy 182 & 160
E	E-2	B	3	Bridge @ Junction of Hwy 291 (Old Seneca Hwy) & Six Mile Creek
E	E-3	B	3	Entrance to Foxfire Estates off Hwy 291 1 mile N of Hwy 160
E	E-4	C	5	Junction of S.C. 133 & County 137 @ Six Mile Post Office
E	E-5	C	5	Junction of Hwy 133 & 337 (Maw Bridge Rd)
E	E-6	C	5	Junction of Hwy 337 & Camp Creek Rd
E	E-7	D	10	Holly Springs Church on Hwy 222
E	E-8	D	10	Junction of Hwy 158 & 137
E	E-9	D	10	Junction of Hwy 93 & 171
ESE	F-1	A	1	Hwy 183 Bridge across Lake Hartwell
ESE	F-2	B	3	Junction of Hwy 160 & Furman L. Smith Rd
ESE	F-3	B	3	Junction of Furman L. Smith Rd & Hwy 101 (Knoll View Road)
ESE	F-4	C	5	Junction of Hwy 277 & 337 (Maw Bridge Rd)
ESE	F-5	D	10	Junction of Hwy 165 & 44 (Central, S.C.)
ESE	F-6	D	10	Midway Church, Junction of Hwy 395 & 91
ESE	F-7	D	10	Junction of Hwy 93 & 51 (Norris, S.C.)
SE	G-1	A	1	Hwy 183 @ Old Pickens Church
SE	G-2	B	3	Hwy 291 @ entrance to Toby Hills Subdivision
SE	G-3	C	5	Pleasant Hill Church @ Junction of Hwy 160 & 133
SE	G-4	C	5	Daniel High School @ Junction of Hwy 133 & 15

ENCLOSURE 5.2 (Cont.)
PREDETERMINED SAMPLING LOCATIONS BY SECTOR AND DISTANCE FROM ONS

Sampling Sector	Sampling Location	Responsible Team	Radius from ONS (Mi)	Description of Sampling Locations
SE	G-5	D	7	Junction of Hwy 15 & 102 (Central, S.C.)
SE	G-6	D	10	Junction of Hwy 123 & 18
SE	G-7	D	10	Junction of Hwy 123 & 30
SSE	H-1	A	1	Junction of Hwy 183 & 6
SSE	H-2	B	3	Hwy 291 two miles S of Hwy 160
SSE	H-3	B	5	Hwy 291 & 27 @ Isaquena Park Entrance
SSE	H-4	B	5	Hwy 27, Lawrence-Ramsey Bridge Access Area
SSE	H-5	C	9	Junction of Hwy 123 & 133 (Clemson, S.C.)
SSE	H-6	C	9	Junction of Hwy 123 & 93 (Clemson, S.C.)
SSE	H-7	C	9	Junction of Hwy 93 & 320 @ Littlejohn Colliseum
SSE	H-8	C	10	Bridge across Lake Hartwell 1 mile E of Hwy 149 & 115 Junction
S	I-1	A	1	0.5 Miles SW of Junction 130 & 6 @ Beaver Pond Marker
S	I-2	A	3	Hwy 130 @ Holder's Landing
S	I-3	B	5	Junction of Hwy 27 & N Bayshore Dr.
S	I-4	B	5	Junction of Hwy 27 & 359 (Hanover Hills)
S	I-5	B	5	Corinth Baptist Church, Hwy 1 (Old Clemson Hwy)
S	I-6	C	10	Junction of Hwy 37 & 210
S	I-7	C	10	Clemson, Oconee Airport, Hwy 37
SSW	J-1	A	1	Junction of Hwy 183 & 130
SSW	J-2	A	3	Junction of Hwy 130 & 38
SSW	J-3	E	3	Lake Keowee, East Shoreline
SSW	J-4	B	5	Hwy 130 @ South end of Newry Dam
SSW	J-5	E	5	Lake Keowee, Midlake west of Newry Dam
SSW	J-6	B	8	Junction of Hwy 130 & 123
SSW	J-7	C	9	Utica Elementary School, Seneca, S.C.
SSW	J-8	C	8	Seneca Water Plant

ENCLOSURE 5.2 (Cont.)
PREDETERMINED SAMPLING LOCATIONS BY SECTOR AND DISTANCE FROM ONS

Sampling Sector	Sampling Location	Responsible Team	Radius from ONS (Mi)	Description of Sampling Locations
SW	K-1	A	1	Old Hwy 183, 1/4 mile W of Hwy 130
SW	K-2	E	3	Lake Keowee, Midlake beneath Norcross Ga. 500 KV Transmission Line
SW	K-3	B	5	Fairview Church, Hwy 340
SW	K-4	B	5	Crooked Creek Bridge across Lake Keowee on Hwy 188
SW	K-5	C	9	Oconee Memorial Hospital @ Hwy 123 & 28
SW	K-6	C	9	Head-Lee Nursery, Hwy 28
WSW	L-1	E	1	Lake Keowee, Cove immediately north of skimmer wall
WSW	L-2	E or A	3	End of Hwy 605 @ Lake Keowee
WSW	L-3	B	5	Junction of Hwy 46 & 175
WSW	L-4	B	5	2 Mi S of Hwy 46 & 175 Junction
WSW	L-5	C	10	Junction of Hwy 35 & 28 (West Union)
WSW	L-6	C	10	Junction of Hwy 11 & 28 (West Union)
W	M-1	E	1	Due West of ONS on Lake Keowee
W	M-2	A	3	Junction of Hwy 12 & 576
W	M-3	B	5	Junction of Hwy 223 & Crooked Creek
W	M-4	B	6	Junction of Hwy 183 & 40 (Patterson's Grocery)
W	M-5	C	8	Junction of Hwy 11 & 131
W	M-6	C	8	Junction of Hwy 11 & 183
WNW	N-1	E	1	Midlake, due west of Connecting Canal Bridge in Lake Keowee
WNW	N-2	A	3	Junction of Hwy 183 & 201
WNW	N-3	A	3	Junction of Hwy 201 & 92
WNW	N-4	B	5	Junction of Hwy 40 & 46
WNW	N-5	B	5	Little River Bridge on Hwy 132
WNW	N-6	C	9	Pickett Post @ Hwy 11
WNW	N-7	C	9	Junction of Hwy 11 and 94

ENCLOSURE 5.2 (Cont.)
PREDETERMINED SAMPLING LOCATIONS BY SECTOR AND DISTANCE FROM ONS

Sampling Sector	Sampling Location	Responsible Team	Radius from ONS (Mi)	Description of Sampling Locations
NW	O-1	A	1	Junction of Hwy 130 & 183 at Keowee Key Sign
NW	O-2	A or E	3	Stamp Creek Landing on Hwy 92
NW	O-3	B	5	Junction of Hwy 132 & unmarked Rd.
NW	O-4	B	5	Junction of Hwy 130 & 200
NW	O-5	C	10	Tamassee DAR School off Hwy 11
NW	O-6	C	10	Junction of Hwy 11 & 57
NNW	P-1	E	1	West shoreline of cove immediately north of connecting canal on Lake Keowee
NNW	P-2	A	3	Stamp Creek Church @ Junction of Hwy 128 & 130
NNW	P-3	B	5	Junction of Hwy 200 & Stamp Creek Bridge
NNW	P-4	B	5	Church of God @ Junction of Hwy 200 & 128
NNW	P-5	C	10	Junction of Hwy 11 & 171
NNW	P-6	C	10	Junction of Hwy 11 & 127

ENCLOSURE 5.3

PROCUREMENT OF HELICOPTERS FOR EMERGENCY ENVIRONMENTAL SURVEILLANCE

Inland Airways, Greenville, S. C., is under contract to Duke Power Company to furnish one helicopter upon request and an additional helicopter within six hours following notification. Once a helicopter is requested, there is a maximum elapsed time of three hours for the helicopter to arrive at Oconee or other dispatched locations.

Helicopter service is limited to daylight hours and adequate flying weather. The helicopters will hold three people, the pilot and two passengers. To perform surveys, instrumentation may limit the passenger space.

To obtain helicopter(s) for emergency service contact:

	Office	Home
1. L. W. Johnson*		
2. L. M. Whisonant*		
3. B. A. Turpin*		
4. D. M. Staggs*		

*These contacts are in Duke Power Company Transmission Dept., Line Division

ENCLOSURE 5.4
RADIO OPERATORS LOG
FIELD MONITORING SURVEY DATA

Page _____ of _____

Station _____

Date _____

FMC _____

Radio Operator _____

FM Team	Status		Location Of Survey/Sample				Time	Dose Rate (mR/hr.)	Air Samples I-131 (μCi/ml)	Miscellaneous Samples		
	Enroute	Arrival	Zone	Mile	Sample #	Description				Smear (c/m)	Veg.	Other/Comments

ENCLOSURE 5.5
AIRBORNE RADIATION MONITORING DATA SHEET
HELICOPTER SURVEY RESULTS

LATION _____ PAGE ____ OF ____

*FMC _____ DATE _____

PILOT _____ HELICOPTER I.D. _____

MET. DATA: WIND SPEED _____MPH; WIND DIRECTION: FROM _____°; AZIMUTH _____° to _____°

URVEY INSTRUMENTS: TYPE _____; I.D. NUMBER _____

TYPE _____; I.D. NUMBER _____

*ROUTE - AIRBORNE CHECK POINT (APC)
APC LEG FROM _____ TO _____

DESCRIPTION: FROM _____
TO _____

URVEY CRITERIA: INTERVAL _____SEC.; AIR SPEED _____MPH
ALTITUDE _____FT.

START TIME _____ (All Readings in mR/Hr.)

1		16		31	
2		17		32	
3		18		33	
4		19		34	
5		20		35	
6		21		36	
7		22		37	
8		23		38	
9		24		39	
10		25		40	
11		26		41	
12		27		42	
13		28		43	
14		29		44	
15		30		45	

*ROUTE - AIRBORNE CHECK POINT (APC)
APC LEG FROM _____ TO _____

DESCRIPTION: FROM _____
TO _____

SURVEY CRITERIA: INTERVAL _____SEC.; AIR SPEED _____ MPH
ALTITUDE _____FT.

START TIME _____ (All Readings in mR/Hr.)

1		16		31	
2		17		32	
3		18		33	
4		19		34	
5		20		35	
6		21		36	
7		22		37	
8		23		38	
9		24		39	
10		25		40	
11		26		41	
12		27		42	
13		28		43	
14		29		44	
15		30		45	

*DATA PROVIDED BY FMC

ENCLOSURE 5.6
TLD AND AIR SAMPLER LOCATIONS FOR NORMAL ENVIRONMENTAL MONITORING PROGRAM TLD LOCATIONS

020	Site Boundary Fence (0.2 miles N)
021	Site Boundary Fence (0.2 miles NNE)
022	Site Boundary Fence (0.5 miles NE)
023	Site Boundary Fence (0.9 miles ENE)
024	Site Boundary Fence (0.8 miles E)
025	Site Boundary Fence (0.6 miles ESE)
026	Site Boundary Fence (0.3 miles SE)
027	Site Boundary Fence (0.3 miles SSE)
028	Site Boundary Fence (0.5 miles S)
029	Site Boundary Fence (0.6 miles SSW)
030	Site Boundary Fence (0.4 miles SW)
031	Site Boundary Fence (0.2 miles WSW)
032	Site Boundary Fence (0.2 miles W)
033	Site Boundary Fence (0.2 miles WNW)
034	Site Boundary Fence (0.2 miles NW)
035	Site Boundary Fence (0.1 miles NNW)
036	Mile Creek Landing (4.0 miles N)
037	Keowee Church, Hwy. 327 (4.5 miles NNE)
038	Mauldin's Grocery, Junction Hwy. 183 and 133 (4.0 miles NE)
039	Hwy. 133, ~ 1 mile east of Hwy. 183 and 133 junction (4.0 miles ENE)
040	Microwave Tower, Six Mile (4.5 miles E)
041	Junction Hwy. 101 and 133 ~ 1.5 miles S of Microwave Tower (4.0 miles ESE)
042	Lawrence Chapel Church, Hwy. 133 (5.0 miles SE)
043	Hwy. 291 at Entrance to Isaqueena Park (4.0 miles SSE)
044	Hwy. 130 at Little River Dam (4.0 miles S)
045	Terminus of Hwy. 588 into Lake Keowee (5.0 miles SSW)
046	Hwy. 188 at Crooked Creek Bridge (4.5 miles SW)
047	New Hope Church - Hwy. 188 (4.0 miles WSW)
048	Junction Hwy. 175 and 188 ~ ½ mile N of Keowee School (4.0 miles W)
049	Junction Hwy. 201 and 92 (4.0 miles WNW)
050	Stamp Creek Landing - End of Hwy. 92 (4.0 miles NW)
051	Hwy. 128 ~ 1 mile N of Hwy. 130 (4.5 miles NNW)
052	Duke Power Branch Office - Pickens (12.0 miles ENE)

ENCLOSURE 5.6 (Cont.)
TLD AND AIR SAMPLER LOCATIONS FOR NORMAL ENVIRONMENTAL MONITORING PROGRAM

TLD LOCATIONS

053 Duke Power Branch Office - Liberty (11.0 miles E)
054 Midway Church - Hwy. 395 - Central (9.5 miles ESE)
055 Clemson Meteorology Plot (9.5 miles SSE)
056 Utica School - Seneca (8.5 miles SSW)
057 Oconee Memorial Hospital - Seneca (9.0 miles SW)
058 Branch Road Substation - Walhalla (Control) (10.0 miles WSW)
059 Tamassee DAR School (9.0 miles NW)

AIR SAMPLER LOCATIONS

060 Greenville Water Intake Access Road - (2.5 miles NNE)
061 Old Hwy. 183 (1.5 miles SSW)
072 Hwy. 130 (1.7 miles S)
073 Tamassee DAR School (9.0 miles NNW)
074 Keowee Key Sewage Treatment Plant - Hwy. 130 (1.7 miles NNW)

ENCLOSURE 5.7

FIELD MONITORING DATA SHEET FOR DOSE RATE MEASUREMENTS

Date _________ Team Members/Call Sign ____/____ Eberline E-120 No. ________

PIC 6A No. ________

Sample No.	Sample Time	Sample Location	Dose Rate (mR/hr)

ENCLOSURE 5.8

SAMPLE TIME REQUIRED FOR MINIMUM SAMPLE VOLUME

FLOW RATE (CFM)	MINIMUM REQUIRED SAMPLING TIME IN MINUTES
.5	71
1.0	36
1.5	24
2.0	18
2.5	15
3.0	12
3.5	11
4.0	9
4.5	8

NOTE: When estimating time required to get a minimum volume of $1x10^6$ml if flow rate for the air sampler in use is not on table, go to next Lower flow rate.

Example: Air Sampler flow rate = 3.6. Minimum time = 11 minutes

ENCLOSURE 5.9
FIELD MONITORING TEAM WORK SHEET FOR DETERMINING ^{131}I ACTIVITY

Team Members/Call Sign* ____/____ Date ________ RADeCO Air Sampler No. ________ ND-6 No. ________

DETERMINATION OF AIR SAMPLE VOLUME(ml) — **DETERMINATION OF ^{131}I Activity**

Column A Sample[3] No./Time/Location	Column B Air Sampler Run Time (min)		Column C Cal. Flow Rate (CFM)		Column D $\frac{2.83 \times 10^4 \text{ ml}}{ft^3}$	Column E ND-6 CPM		Column F Eff. of ND-6		Column G $\frac{4.728 \times 10^{-7}}{1}$		Column H Air Sample Volume (ml)		Column I ^{131}I Activity * µCi/ml*
__/__/____	____	x	____	x	2.83×10^4	____	÷	____	x	4.728×10^{-7}	÷	____	=	____
__/__/____	____	x	____	x	2.83×10^4	____	÷	____	x	4.728×10^{-7}	÷	____	=	____
__/__/____	____	x	____	x	2.83×10^4	____	÷	____	x	4.728×10^{-7}	÷	____	=	____
__/__/____	____	x	____	x	2.83×10^4	____	÷	____	x	4.728×10^{-7}	÷	____	=	____
__/__/____	____	x	____	x	2.83×10^4	____	÷	____	x	4.728×10^{-7}	÷	____	=	____
__/__/____	____	x	____	x	2.83×10^4	____	÷	____	x	4.728×10^{-7}	÷	____	=	____
__/__/____	____	x	____	x	2.83×10^4	____	÷	____	x	4.728×10^{-7}	÷	____	=	____
__/__/____	____	x	____	x	2.83×10^4	____	÷	____	x	4.728×10^{-7}	÷	____	=	____
__/__/____	____	x	____	x	2.83×10^4	____	÷	____	x	4.728×10^{-7}	÷	____	=	____
__/__/____	____	x	____	x	2.83×10^4	____	÷	____	x	4.728×10^{-7}	÷	____	=	____
__/__/____	____	x	____	x	2.83×10^4	____	÷	____	x	4.728×10^{-7}	÷	____	=	____

Column B) Length of time the air sampler ran in minutes, see Enclosure 5.7 for sample time for minimum sample volume.

Column C) Calibrated flow rate for GY-130 filter cartridge written on the calibration sticker (DO NOT USE THE METER FLOW RATE).

Column D) 2.83×10^4 ml/ft^3 = Conversion factor, ft^3 to ml.

Column E) ND-6 cpm = [net counts under ^{131}I curve] ÷ 5 (number of minutes samples are counted with ND-6).

Column F) ND-6 Efficiency = the efficiency value from the curve at 364 KeV posted on the inside lid of the ND-6 abundance of the ^{131}I gamma).

Column G) 4.728×10^{-7} = Accounts for both the ^{131}I filtering efficiency of the silver zeolite cartridge (.95) and the conversion factor for converting dpm to µCi (4.505×10^{-7} µCi/dpm).

Column H) The product of (B x C x D), must be $\geq 1 \times 10^6$ ml to be an adequate sample as per Enclosure 5.7.

*Items reported to the FMC by radio. (Column A and Column I).

INFORMATION ONLY

Form 34731 (10-81)
(Formerly SPD-1002-1)

DUKE POWER COMPANY
PROCEDURE PREPARATION
PROCESS RECORD

(1) ID No: IP/0/B/1601/3
Change(s) 8 to
8 Incorporated

(2) STATION: Oconee

(3) PROCEDURE TITLE: Environmental Equipment Checks

(4) PREPARED BY: John Tomlinson DATE: 5/14/84

(5) REVIEWED BY: W Lee DATE: 5/22/84
N/R

Cross-Disciplinary Review By: _____ N/R: N/R

(6) TEMPORARY APPROVAL (IF NECESSARY):

By: _____ (SRO) Date: _____

By: _____ Date: _____

(7) APPROVED BY: [illegible] Date: 5/23/84

(8) MISCELLANEOUS:

Reviewed/Approved By: _____ Date: _____

Reviewed/Approved By: _____ Date: _____

Checked Control Copy_____

Date_____

CP/1/A/2002/04C

ENCLOSURE 5.5

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

1.0 Purpose

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

2.0 Limits and Precautions

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

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

3.0 Procedure

			Date Init./Time	Verification Date Init./Time
3.1	Ensure the following breakers are closed:			
3.1.1	1L2 Bkr. #39 Sampling/Control Panels Power Supply (located next to U2 sampling panel)		____/____	
3.1.2	MCC1XL Bkr. for 1DW-278 (RCS sample line flush) and 1LWD-1028 (RBNS Sample Line)		____/____	
3.2	To obtain a reactor coolant sample, the valves listed in this section should be aligned as follows:			
3.2.1	1RC-84	Inside reactor building - refer to Fill and Vent Procedure (OP/1/A/1103/02) to verify OPEN status.	____/____	

DUKE POWER COMPANY

OCONEE NUCLEAR STATION

ENVIRONMENTAL EQUIPMENT CHECKS

1.0 Purpose

1.1 To provide a weekly procedure for documenting and maintaining the Meteorological Monitoring System.

2.0 References

2.1 Duke Dwg. 0-714-D, 0-829-A, 0-829, 0-714-Q

2.2 OEE-118-37, 38

2.3 OM-359-0041, -359-0042

2.4 Env. Eng. Memo dated 2/10/83 to Sta. I&E Engineer

3.0 Test Equipment Required

3.1 None

4.0 Prerequisites

____4.1 Verify that all changes in the Control Copy are incorporated in the Working Copy.

____4.2 Supv. Prior to or during the job, the Supervisor shall review, mark N/A, and initial any step or section that is not applicable. Sections or steps that can be omitted as specified in the procedure do not need the Supervisor's review.

____4.3 This procedure must be retyped within 30 days of any approved change.

____4.4 A copy of this procedure must be sent to the Emergency Preparedness Coordinator any time a change is made.

____4.5 Verify that all chart readings appear reasonable, based upon knowledge of the current and previous weather conditions, prior to removing from service.

5.0 Limits and Precautions

5.1 Observe proper safety precautions while working with components that have voltage present.

6.0 Unit (Station) Status

6.1 N/A

7.0 General Description

7.1 The Meteorological Monitoring System monitors and records continuous data for upper and lower wind speed and direction, precipitation, dew point temperature, ambient air temperature and temperature differential. Site #1 (Upper) is located at the microwave tower bldg. Site #2 (Lower) is located adjacent to the river below Keowee Hydro discharge. This data is transmitted to the environmental recorders located on the Unit #1 Control Room Vertical Board (1VB1). Additionally, all 8 data points are included on each Unit computer. Also, the Precipitation Monitoring Unit is located at Site #2.

1SA-18, D-5 "Meteorological System Trouble" will alarm under the following conditions: (Site #1 only)

1) Loss of A.C. Power
2) Low Battery Voltage
3) Reverse Transfer Failure
4) Lower Aspirator - "NO AIR FLOW"
5) Upper Aspirator - "NO AIR FLOW"

8.0 Major Components

8.1 Four Esterline Angus Series 'A' Analog Recorders

8.2 Two Teledyne Geotech Series 21 Wind Speed Monitoring Systems

8.3 Two Teledyne Geotech Series 21 Wind Direction Monitoring Systems

8.4 One Teledyne Geotech Platinum (RTD) T/ΔT Monitoring System

8.5 One Teledyne Geotech Series 21 Precipitation Monitoring System

8.6 One General Eastern Dew-Point Temperature System

8.7 One L&N Speedomax 250 Industrial Recorder

9.0 Equipment Specifications

9.1

Parameter	Range	Accuracy
Wind Speed	0.6 to 60.0 mph	± 0.6 mph (Threshold tolerance ± 0.2 mph)
Wind Direction	0-540°	± 5.4°
Precipitation	0- 1 inch	± 0.06 inch
Diff. Temp.	-4°C to +8°C	

Parameter	Range	Accuracy
Dew Point Temp.	-30°C to +30°C	
Amb. Air Temp.	-20°C to +40°C	

9.2 Computer Points (By Unit)

UNIT 1	UNIT 2	UNIT 3	Description
A1016	A1840	A1386	W/D MW. TW 0-540°
A1017	A1841	A0952	W/D RV. Site 0-540°
A1018	A1842	A0953	W/S MW. TW 0-60 mph
A1019	A1843	A1758	W/S RV. Site 0-60 mph
A1020	A1844	A0794	ΔT -4°C to +8°C
A1021	A1845	A0795	Dew Point Temp -30°C to +30°C
A1022	A1846	A0796	Precip. 0-1 inch
A1023	A1847	A0903	Ambient Air Temp -20°C to +40°C

10.0 Procedure Instructions

NOTE: Use Control Room clock for all time recordings.

10.1 ONS Site #1 Wind Speed, Direction, Delta Temperature, and Ambient Air Temperature

___,IV___ 10.1.1 Turn power supply module on the Monitoring System located at the Microwave/Meteorological Building to the OFF position.

10.1.2 Obtain readings for the following computer points and record on Enclosure 11.3.b.

UNIT #1	UNIT #2	UNIT #3
A1016	A1840	A1386
A1018	A1842	A0953
A1020	A1844	A0794
A1023	A1847	A0903

10.1.3 Advance Site #1 wind charts approximately 6", stamp the charts with the respective identifying stamps, record the 'Off' time and date, and initial each chart.

10.1.4 While lightly tapping the chart near the pen, slowly advance the chart approximately 1" to record a Recorder Zero (R_z) trace. Circle and label the trace "R_z - Found". Record the actual reading on Enclosure 11.3.a.

10.1.5 Repeat Step 10.1.4 for the other Site #1 chart.

10.1.6 On the L&N Recorder, obtain a test print for point #1 (Air Temp.) and point #2 (ΔT). Circle the test print and label point #1 "T_p-R_z", and point #2 "ΔT_p-R_z".

___,IV___ 10.1.7 Turn power supply module ON, and position the mode selection switches to "HI" on both Wind Speed and Direction modules, and the Air Temp module, allowing a momentary pause for recorder stabilization.

10.1.8 Obtain computer readings as in Step 10.1.2, and record on Enclosure 11.3.b.

10.1.9 Slowly advance both wind charts approximately 1" to record a full scale test trace. Circle the trace and label accordingly.

Ex. Wind Direction - "F.S. Found"

Wind Speed - "60.0 mph - Found"

10.1.10 Record data on Enclosure 11.3.a.

10.1.11 On the L&N Recorder, obtain a test print for point #1 and #2, circle the test prints and label accordingly.

Ex. Air Temp. - "T_p - FS - Found"

Delta Temp. - "ΔT_p - FS - Found"

10.1.12 Position the mode selection switches to "LO", and allow a momentary pause for recorder stabilization.

10.1.13 Obtain computer readings as in Step 10.1.2, and record on Enclosure 11.3.b.

10.1.14 Slowly advance both wind charts approximately 1" to obtain a threshold test trace. Circle and label the trace "T_z - Found", and record on Enclosure 11.3.a.

10.1.15 On the L&N Recorder, obtain a test print for points #1 and #2, circle the test prints and label accordingly.

Ex. Air Temp. - "T_p - T_z - Found"

Delta Temp. - "ΔT_p - T_z - Found"

10.1.16 Check the pen balance on the Site #1 Wind Recorders.

10.1.17 Tap the chart lightly at the edge of the pen and observe the pen balance. Adjust the small weights back to make the pen lighter. Ensure that the pen is seated properly in the forks of the mount. The pen should bounce slightly up from the chart and then rest on the chart just heavy enough to establish a good trace.

NOTE: Pen balance is critical in achieving the accuracy required for full scale and linearity of trace.

___,IV___ 10.1.18 Position the mode selection switches to "OP".

10.1.19 Initial Pen Balance Check on Enclosure 11.3.d.

10.1.20 Add ink to well as required.

10.2 Dew-Point Balance Stabilization Check and Aspirator Monitor Condition Verification

10.2.1 Record the condition of the 'Power' and 'Auto' lights of the monitor on Enclosure 11.3.d.

10.2.2 Press the blue 'Pacer' button on the monitor. The reflectance meter will deflect to the far right for approximately 30 seconds while the mirror surface cools. The meter should then deflect to the far left for approximately 90 seconds while the mirror surface heats. For the final 2 minutes of the Pacer cycle, the meter should gradually move toward center, indicating the evaporation of condensation on the mirror. Upon completion of the standardization cycle (4 min.), the Pacer light should automatically turn off and normal monitoring should resume. (Meter should settle at approximately 3 divisions to the left of center).

10.2.3 If the Pacer cycle does not end after approximately 4 minutes, or begins to repeat the cycle, clean the sensor's mirror as follows:

___,IV___ A. Turn power to the Control Monitor OFF.

B. Obtain cleaning kit from the Monitoring System Cabinet.

C. At the lower tower level, lightly apply cleaning solution to the mirror.

D. Remove solution from mirror by lightly buffing with applicator.

___,IV___ E. Return power to monitor.

F. Initial check on Enclosure 11.3.d.

10.2.4 Repeat Pacer cycle (10.2.2 - 10.2.3) if mirror was cleaned.

10.2.5 Initial Dew-Point Balance check on Enclosure 11.3.d.

NOTE: The Dew Point Monitor automatically initiates a Dew-Point Balance stabilization check (Pacer cycle) every 12 hours. If a problem occurs during this check, the blue "Pacer" light will begin blinking and Dew-Point monitoring will be suspended until corrections are made.

10.2.6 Observe the status of the L.E.D.s on the Aspirator Module. LED #1 is the lower level aspirator. LED #2 is the upper level aspirator. LED #3 and #4 are not used. IF an "ON" condition exists, replace and/or repair the aspirator as required.

10.2.7 Record Aspirator LED condition on Enclosure 11.3.d.

10.3 ONS Site #2 Wind Speed, Direction, and Precipitation

___,IV___ 10.3.1 At the lower (River) site, turn the power supply module to the OFF position.

10.3.2 Obtain readings for the following computer points and record on Enclosure 11.3.c.

UNIT #1	UNIT #2	UNIT #3
A1017	A1841	A0952
A1019	A1843	A1758
A1022	A1846	A0796

10.3.3 Slowly advance Site #2 wind charts approximately 6", stamp the charts and record the 'Off' time and date, and initial each chart.

10.3.4 Advance both wind charts to obtain a Recorder Zero (R_z) trace of approximately 1". Circle and label the trace "R_z - Found", and record on Encl. 11.3.a.

___,IV___ 10.3.5 Turn power supply module ON, and position the mode selection switches to 'Lo' on both Wind Modules, and on the Precipitation Module.

10.3.6 Obtain computer readings as in Step 10.3.2 and record on Enclosure 11.3.c.

10.3.7 Slowly advance both wind charts approximately 1" to obtain a threshold test trace. Circle and label both traces "T_z - Found", and record readings on Enclosure 11.3.a.

10.3.8 On the L&N Recorder, obtain a test print for point #4, circle the print, and label "T_z - Found". Record on Enclosure 11.3.a.

10.3.9 Position the mode selection switches to "Hi" on the Wind Modules and on the Precipitation Module.

10.3.10 Obtain computer readings as in Step 10.3.2 and record on Enclosure 11.3.c.

10.3.11 Slowly advance both wind charts approximately 1" to obtain a full scale test trace. Circle and label both traces accordingly.

Ex. Wind Direction - "F.S. Found"
Wind Speed - "60.0 mph - Found"

10.3.12 On the L&N Recorder, obtain a test print for point #4, circle the print, and label "F.S.-Found", and record on Enclosure 11.3.a.

10.3.13 Check the Pen Balance on Site #2 Wind Recorders per Steps 10.1.17 and record on Enclosure 11.3.d.

___,IV___ 10.3.14 Return mode selection switch to "OP", and fill ink wells as necessary on the Wind Speed and Direction Recorders.

___,IV___ 10.3.15 Reset the Precipitation Monitor by moving the toggle switch to the "SLO" position, and then returning to the "OP" position.

NOTE: If any of the readings taken in Step 10.1 through 10.3 were not within specifications, and the cause is not easily recognizable, initiate a "Black Box" equipment replacement of malfunctioning components as required in accordance with Reference 2.4. Notification of "Black Box" substitution to the Environmental Engineer is required per the above reference. Any adjustments and/or replacements should be noted in the "REMARKS" section, forwarding a copy to the Environmental Engineer.

10.4 As Left String Checks

10.4.1 Repeat Sections 10.0 through 10.3 as necessary, circling and labeling each trace with "LEFT", and record the readings on Enclosure 11.3.a.

NOTE: Site #1 and #2 Wind Speed and Direction R_z - Left readings should not be taken until charts have been replaced.

10.5 Chart Replacement - Wind Speed and Direction Recorder

10.5.1 Replace the wind speed and direction charts for Sites #1 and #2.

10.5.2 Check Recorder Zero (R_z) on the wind recorders per Step 10.1.4. (Recorder Zero adjustment is located on the inside bottom of the recorder case.)

10.5.3 Circle and label the traces "R_z - Left", and record the readings on Encl. 11.3.a.

10.5.4 Stamp all charts (Time on, Date, initial) and set time.

10.6 Chart Replacement and Time Set - Leeds & Northrup (250)

10.6.1 Replace chart.

10.6.2 Set the thumb wheel switches on the time clock circuit card to the next approaching full minute time.

10.6.3 Adjust chart to agree with time clock thumbwheel switch setting and press time setting switch.

10.6.4 Stamp chart, record time, date, and initial.

___,IV___ 10.6.5 Ensure that all mode switches are in the "OP" position, and all power supply switches are ON.

10.6.6 Observe the operation of all charts, and ensure that all readings appear reasonable, based on current weather conditions.

10.6.7 Forward the Data Package to:

Physical Sciences Building, Attn: Chart Scan
Rt. #4, Box 531
Huntersville, NC 28078

NOTE: Data Package should include Sites #1 and #2 Wind Speed and Direction Charts (4) and Weekly L&N Recorder Chart (1), plus a copy of Enclosures 11.3.a through 11.3.d.

11.0 Enclosures

11.1 Procedure Performance Sheet

11.2 N/A

11.3.a through d Data Sheets

ENCLOSURE 11.1

IP/O/B/1601/3

PROCEDURE PERFORMANCE SHEET

Date Begun _____

Date Complete _____

W.R. # _____

PERFORMED BY _____ _____

_____ _____

REMARKS: _____

_____

_____

_____

_____

ENCLOSURE 11.3.a

IP/0/B/1601/3

WEEKLY DATA COLLECTION

Meteorological Monitoring System

MODE	TEST	PARAMETER	REQUIRED	FOUND	ERROR	☆ LEFT	ERROR
OFF	R_z	Site #1 W.S.	0.0 ± 0.2 mph				
		W.D.	0° ± 5°				
		Site #2 W.S.	0.0 ± 0.2 mph				
		W.D.	0° ± 5°				
HI	F.S.	Site #1 W.S.	60 ± 0.6 mph				
		W.D.	540° ± 5°				
		Site #2 W.S.	60 ± 0.6 mph				
		W.D.	540° ± 5°				
		Precip.	1.0" ± 0.06"				
LO	T_z.	Site #1 W.S.	0.6 ± 0.2 mph				
		W.D.	0° ± 5°				
		Site #2 W.S.	0.6 ± 0.2 mph				
		W.D.	0° ± 5°				
		Precip.	0.0" ± 0.06"				

Include copy in Data Pack to Chart Scan Environmental Group. ☆"R_z-Left" reading is obtained after chart replacement.

PERFORMED BY _____ DATE _____

ENCLOSURE 11.3.b

IP/0/B/1601/3

WEEKLY DATA COLLECTION

Meteorological Monitoring System

Site #1 - Computer

			MODE			
	PT.ID	DESC.	OFF	HI	LO	NORMAL
Unit #1	A1016	Wind Direct.				
	A1018	Wind Speed				
	A1020	Δ Temp.				
	A1023	Air Temp.				
Unit #2	A1840	Wind Direct.				
	A1842	Wind Speed				
	A1844	Δ Temp.				
	A1847	Air Temp.				
Unit #3	A1386	Wind Direct.				
	A0953	Wind Speed				
	A0794	Δ Temp.				
	A0903	Air Temp.				

PERFORMED BY _____ DATE _____

ENCLOSURE 11.3.c

IP/0/B/1601/3

WEEKLY DATA COLLECTION

Meteorological Monitoring System

Site #2 - Computer

			MODE			
	PT.ID	DESC.	OFF	HI	LO	NORMAL
Unit #1	A1017	Wind Direct.				
	A1019	Wind Speed				
	A1022	Precip.				
Unit #2	A1841	Wind Direct.				
	A1843	Wind Speed				
	A1846	Precip.				
Unit #3	A0952	Wind Direct.				
	A1758	Wind Speed				
	A0796	Precip.				

PERFORMED BY _____ DATE _____

ENCLOSURE 11.3.d

IP/0/B/1601/3

WEEKLY DATA COLLECTION

Meteorological Monitoring System

Pen Balance Check Site #1 W.S. _____ Init. W.D. _____ Init.

Site #2 W.S. _____ Init. W.D. _____ Init.

Dewpoint Monitor Lights

	FOUND	LEFT
#1 Power	ON/OFF	ON/OFF
#2 Auto	ON/OFF	ON/OFF

Dew Point Balance Check _____ Init. Mirror Cleaned _____ Init.

Aspirator Module Lights

	FOUND	LEFT
#1	ON/OFF	ON/OFF
#2	ON/OFF	ON/OFF

PERFORMED BY _____ DATE _____

INFORMATION ONLY

CONTROL COPY

Form 34731 (10-81)
(Formerly SPD-1002-1)

DUKE POWER COMPANY
PROCEDURE PREPARATION
PROCESS RECORD

(1) ID No: HP/O/B/1009/11
Change(s) 4 to
N/A Incorporated

(2) STATION: Oconee

(3) PROCEDURE TITLE: Projection Of Offsite Dose From The Uncontrolled Release Of Radioactive Materials Through A Unit Vent

(4) PREPARED BY: Craig L. Wallin DATE: 06/01/84

(5) REVIEWED BY: Charlie Yongue DATE: 6-1-84

Cross-Disciplinary Review By: _____ N/R: N

(6) TEMPORARY APPROVAL (IF NECESSARY):

By: _____ (SRO) Date: _____

By: _____ Date: _____

(7) APPROVED BY: T. S. Barr/RSK Date: 6-5-84

(8) MISCELLANEOUS:

Reviewed/Approved By: _____ Date: _____

Reviewed/Approved By: _____ Date: _____

DUKE POWER COMPANY

OCONEE NUCLEAR STATION

PROJECTION OF OFFSITE DOSE FROM THE UNCONTROLLED RELEASE OF RADIOACTIVE MATERIALS THROUGH A UNIT VENT

1.0 Purpose

This procedure describes the method for calculating the potential offsite dose following an uncontrolled release of radioactive materials through the unit vent.

2.0 References

2.1 EPA-520/1-75-001, Manual of Protective Action Guides and Protective Actions for Nuclear Incidents

2.2 PT/0/A/230/01, Radiation Monitor Check

2.3 Reg. Guide 1.109

2.4 HP/0/B/1009/13, Procedure for Implementation and Verification for the Availability of a Back-Up Source of Meteorological Data

2.5 HP/0/B/1009/10, Procedure for Quantifying Gaseous Releases Through Steam Relief Valves Under Post-Accident Conditions

3.0 Limits and Precautions

3.1 Use actual sample data when possible. Radiation monitor readings are susceptible to several sources of error. When radiation monitor readings are used for downwind concentrations, note this in the report of offsite dose assessment.

3.2 Environmental data should be collected and analyzed to verify these calculations. This procedure considers all releases to be ground level releases.

3.3 Use the Class A model computer program when possible. It is faster, applies a more accurate conversion factor when changing count rate to concentration, and it generates a more concise report. It will also integrate dose from the initial release and makes two-hour projections from the time of latest data entry. Use the manual calculations for times when Class A model is unavailable.

3.4 This procedure applies to releases made from Oconee Nuclear Station only. Many of the values contained in this procedure are site specific.

3.5 Enclosure 5.4 should be done in conjunction with the Field Monitoring Coordinator.

3.6 Vent releases can occur through more than one unit at a time. Check unit vent monitors on all 3 units during a vent release.

3.7 When using this procedure in conjunction with HP/0/B/1009/10, "Procedure for Quantifying Gaseous Releases through Steam Relief Valves and Post-Accident Conditions", ensure that the correct time is used in Steps 4.3.3 and 4.3.4.

3.8 Meteorology data needed to calculate offsite dose should be obtained as required by Enclosure 5.1. Data not available from the primary source should be obtained from the back up source. The order of preference for each data point is listed each place meteorological data is required. All meteorology data obtained from the tower or river must be a 15 minute average. National Weather Service (NWS) data is a standard observation and is not a 15 minute average.

3.8.1 Every 15 minutes the wind direction and wind speed will be rechecked in accordance with Enclosure 5.1 to ensure additional sectors have not been affected. Once a sector has been determined to be affected it cannot be removed from the list of affected sectors.

3.8.2 The following are conversion formulas for the meterological data obtained from the National Weather Service.

mph = 1.15 (Knots)

°F = (9/5 °C) + 32

4.0 Procedure

4.1 Obtain the following meteorological information from one of the designated sources and record it on Enclosure 5.1. The sources of data are listed in order of preference on Enclosure 5.1.

4.1.1 Time of reactor trip.

4.1.2 Wind speed in MPH.

4.1.3 Direction from which the wind is blowing in degrees from North.

4.1.4 Temperature gradient (ΔT°C).

4.1.5 Time meteorology data taken.

4.2 Obtain results of vent sample analysis or vent radiation monitor readings and vent flow rate in cfm and record on Enclosure 5.1 for each affected unit.

4.2.1 Date/time of sample.

4.2.2 Gross gas concentration.

4.2.3 Iodine equivalent concentration (or data for calculation).

NOTE: The iodine monitor response is time dependent. Allow sufficient time to elapse between readings in order to obtain adequate change in monitor response.

4.2.4 Gamma E-bar value in mev/dis (or data for calculation).

4.3 Project the impact of the release on the downwind population by using the manual calculations outlined below.

4.3.1 Determine the X/Q values for each point of interest downwind.

NOTE: If no points have been requested, use the 1, 2, 5 and 10 mile values.

4.3.1.1 Locate the relative two hour concentration value (CH) for each point from Enclosure 5.3 and record onto Enclosure 5.2.

4.3.1.2 Convert these values to X/Q by,

$$X/Q = \frac{CH(MPH\text{-}Sec/M^3)}{\text{Wind Speed (MPH)}} = sec/m^3$$

Record results on Enclosure 5.2.

4.3.2 Calculate the downwind concentrations for gas and iodine at 1, 2, 5 and 10 mile points by completing Steps 4.3.2.1 and 4.3.2.2.

4.3.2.1 $Conc_T$ = Unit 1 ($Conc_V \cdot F_V$) + Unit 2 ($Conc_V \cdot F_V$) + Unit 3 ($Conc_V \cdot F_V$)

where,

$Conc_T$ = total concentration in unit vents ($\mu Ci/ml \cdot cfm$)

$Conc_V$ = vent discharge concentration ($\mu Ci/ml$)

F_V = vent discharge flow rate (CFM)

4.3.2.2 $Conc_{DW} = Conc_T \cdot X/Q \cdot U_{DWC}$

where,

$Conc_{DW}$ = downwind concentration ($\mu Ci/ml$)

$Conc_T$ = total concentration in unit vents ($\mu Ci/ml \cdot cfm$)

X/Q = dispersion factor in sec/m^3

U_{DWC} = unit conversions derived from ($2.832E\text{-}2 m^3/ft^3$), (0.017 min/sec) = 4.7E-4

Enclosure 5.2 provides work space for this calculation.

4.3.3 Determine the potential whole body gamma dose downwind using the gas concentrations calculated above and the equation,

$$D_{WB} = U_G \cdot \bar{E} \cdot Conc_{DW} \cdot Time$$

where,

D_{WB} = whole body gamma dose due to submersion in a cloud of radioactive gas (rem)

U_G = unit conversion derived from,

(2.22E6/dis/μCi min), (cc/1.293E-3g),

(60 min/hr.), (1.602E-6 erg/mev),

(g · rem/100 ergs),

$$(1.13\ P_t/P_a) \cdot 1/2 = 9.00E2\ \frac{\text{dis-rem-cc}}{\mu\text{Ci-hr-Mev}}$$

$Conc_{DW}$ = downwind concentration (μCi/ml)

Time = projected duration of exposure (hrs); use 2 hours unless calculating a release from a steam relief valve.

$\bar{E}$ = average gamma energy per disintegration (Mev/dis)

NOTE: If $\bar{E}$ cannot be obtained from the sample results, the following values can be used:

Hours from Trip	$\bar{E}$ (Mev/dis)
0-12	0.40
12-48	0.20
48-∞	0.10

Record results on Enclosure 5.2.

4.3.4 Determine the potential thyroid dose downwind using the iodine concentrations calculated above and the equation,

$$D_{THY} = U_I \cdot Conc_{DW} \cdot Time$$

where,

D_{THY} = thyroid dose due to uptake of radioactive iodine (rem)

U_I = constants derived from a child's breathing rate (1.17E2 cc/sec.), I-131 dose conversion factor (4.39 E-3 mrem/pCi), and conversion of pCi to $\mu Ci(10^6)$, mrem to rem (10^{-3}), and hrs. to sec (3600 sec/hr) = 1.86 E6 $\frac{cc \cdot Rem}{\mu ci \cdot hr}$

$Conc_{DW}$ = downwind concentration of iodine ($\mu Ci/ml$)

Time = projected exposure time (hrs); use 2 hours unless calculating a release from a steam relief valve.

Record results on Enclosure 5.2.

4.4 Calculate an adult's thyroid dose by dividing the child's dose by two (2). Record results on Offsite Dose Report form.

4.5 Determine the potentially affected area using the method outlined in Enclosure 5.4. Record sectors on Offsite Dose Report form.

4.6 Complete Offsite Dose Report form with information from Enclosure 5.1 and submit it to the Offsite Radiological Coodinator or his designee. Include any comments and information pertinent to the evaluation of offsite hazards.

NOTE: Maintain a file of all worksheets and printouts used in dose calculations.

5.0 Enclosures

5.1 Vent Release Data Sheet

5.2 Manual Calculation Worksheet

5.3 Table of Two Hour Relative Concentration Factors

5.4 Evaluation of Plume Location

ENCLOSURE 5.1
HP/0/B/1009/11
VENT RELEASE DATA SHEET

Date/time _____/_____

Unit _____ Date/time of Rx trip _____/_____

METEOROLOGICAL DATA
(All data is 15 min average except NWS)

- 1000 to 1600 hrs
  - Wind direction sources 1) tower 2) river 3) NWS
  - ΔT°C sources 1) tower 2) Assume - 0.22°C
  - Wind speed sources 1) tower 2) river 3) NWS
- 1600 hrs to 1000 hrs
  - Riverwind 210° - 70°
    - Wind direction sources 1) tower 2) Assume 0-360°
    - ΔT°C sources 1) tower 2) Assume + 0.56°C
    - Wind speed 1) tower 2) Assume 1 mph
  - Riverwind * 70° - 210° or not available
    - Wind direction source 1) 0-360°
    - ΔT°C source 1) + 0.56°C
    - Wind speed 1) 1 mph

* Based on experiment

- 15 min. period ending time

_____ _____ _____ _____

- Wind direction

_____ _____ _____ _____

- ΔT°C

_____ _____ _____ _____

- Wind speed

_____ _____ _____ _____

ENCLOSURE 5.1
HP/0/B/1009/11

VENT CONCENTRATION

1) GAS - $Conc_v$

Identify source used for each unit.
1) Vent Sample
2) RIA 56 = mR/hr/3.13E1 = µCi/ml
3) RIA 45 = cpm/1E7 = µCi/ml
   RIA 46 = cpm/2.5E2 = µCi/ml

	Unit 1	Unit 2	Unit 3
$conc_v$	_____µCi/ml	_____µCi/ml	_____µCi/ml
$\bar{E}$	_____MeV/dis	_____MeV/dis	_____MeV/dis

2) IODINE (I-131 equivalent) - $Conc_v$

Identify source used for each unit.
1) Vent Sample
2) RIA 44 = Δcpm · 1E-9/ΔT = µCi/ml

	Unit 1	Unit 2	Unit 3
$conc_v$	_____µCi/ml	_____µCi/ml	_____µCi/ml

SPECIAL FORMULAS

$$\bar{E} = \frac{[\Sigma E_i \cdot A_i]}{A_t}$$

OR

0 - 12 hrs	use .4
12 - 48 hrs	use .2
> 48 hrs	use .1

$$I_{131} \text{ Equivalent} = I_E = \frac{\Sigma A_i \cdot HL_i}{HL_{I\text{-}131}}$$

ENCLOSURE 5.2
HP/0/B/1009/11
MANUAL CALCULATION WORKSHEET

1) Discharge Concentration ($Conc_V$):

Gas = _____ µCi/ml U-1; _____ µCi/ml U-2; _____ µCi/ml U-3

Iodine = _____ µCi/ml U-1; _____ µCi/ml U-2; _____ µCi/ml U-3

2) Vent Discharge Flow Rate:

F_V = _____ CFM U-1; _____ CFM U-2; _____ CFM U-3

3) Wind Speed

_____ MPH (Enclosure 5.1)

4) Total Concentration: $Conc_T = U\text{-}1\ (Conc_V \cdot F_V) + U\text{-}2\ (Conc_V \cdot F_V) + U\text{-}3\ (Conc_V \cdot F_V)$

Gas = _____ µCi/ml · cfm

Iodine = _____ µCi/ml · cfm

5) Two Hour Relative Conc. Factors X/Q = CH/wind speed

CH @ _____ Mi = _____; X/Q = _____ Sec/m^3

CH @ _____ Mi = _____; X/Q = _____ Sec/m^3

CH @ _____ Mi = _____; X/Q = _____ Sec/m^3

CH @ _____ Mi = _____; X/Q = _____ Sec/m^3

6) Downwind Concenctrations: $Conc_{DW} = Conc_T \cdot X/Q \cdot (4.7E\text{-}4)$

A) Gas

$Conc_{DW}$ = _____ µCi/ml @ _____ Mi

$Conc_{DW}$ = _____ µCi/ml @ _____ Mi

$Conc_{DW}$ = _____ µCi/ml @ _____ Mi

$Conc_{DW}$ = _____ µCi/ml @ _____ Mi

ENCLOSURE 5.2
HP/0/B/1009/11
MANUAL CALCULATION WORKSHEET

B) Iodine: $Conc_{DW} = Conc_{T} \cdot X/Q \cdot 4.7E\text{-}4$

$Conc_{DW}$ = _____ µCi/ml @ _____ Mi

$Conc_{DW}$ = _____ µCi/ml @ _____ Mi

$Conc_{DW}$ = _____ µCi/ml @ _____ Mi

$Conc_{DW}$ = _____ µCi/ml @ _____ Mi

7) Potential Whole Body Gamma Dose: $D_{WB} = (9.00\ E2) \cdot Conc_{DW} \cdot \bar{E} \cdot Time$

$\bar{E}$ = _____ Mev/dis Time = _____ hours*

D_{WB} _____ Rem @ _____ Mi

D_{WB} _____ Rem @ _____ Mi

D_{WB} _____ Rem @ _____ Mi

D_{WB} _____ Rem @ _____ Mi

8) Potential Thyroid Dose: $D_{THY} = (1.86E6) \cdot Conc_{DW} \cdot Time$

Time = _____ hours*

D_{THY} _____ Rem @ _____ Mi

D_{THY} _____ Rem @ _____ Mi

D_{THY} _____ Rem @ _____ Mi

D_{THY} _____ Rem @ _____ Mi

*Ensure correct time is used for steam relief valve release.

Enclosure 5.3

Table of Two-Hour Relative Concentration Factors

Temperature Difference ΔT°C (°F)	Distance (Miles)									
	1	2	3	4	5	6	7	8	9	10
<-0.7 (<-1.3)	1.5E-6	9.4E-7	5.4E-7	4.0E-7	3.4E-7	2.9E-7	2.5E-7	2.2E-7	2.0E-7	1.8E-7
-0.69 to -0.56 (-1.2 to -1.0)	5.8E-5	1.6E-5	8.1E-6	4.9E-6	3.4E-6	2.5E-6	1.9E-6	1.5E-6	1.2E-6	1.0E-6
-0.55 to -0.22 (-0.9 to -0.4)	1.5E-4	5.6E-5	3.1E-5	2.1E-5	1.5E-5	1.2E-5	7.6E-6	7.8E-6	6.7E-6	5.8E-6
-0.21 to +0.50 (-0.3 to +0.9)	2.9E-4	1.2E-4	6.7E-5	4.9E-5	3.4E-5	2.7E-5	2.2E-5	1.9E-5	1.6E-5	1.4E-5
>+0.51 (>+1.0)	6.4E-4	3.1E-4	1.8E-4	1.3E-4	9.5E-5	7.3E-5	6.1E-5	5.0E-5	4.3E-5	3.6E-5

Enclosure 5.3
HP/0/B/1009/11
Table of Two Hour Relative Concentration Factors

ENCLOSURE 5.4
HP/0/B/1009/11
EVALUATION OF PLUME LOCATION

1. Acquire the following information from Enclosure 5.1 and record on Offsite Dose Report form.

   a) Meteorological Data - identify source for each point.

   b) thyroid and whole body doses

2. Protective action guides submitted to the Offsite Radiological Coordinator are to be made based on the calculated dose on Enclosure 5.2 and the following information.

   a) For doses:

      > 5 Rem Whole Body or,

      >25 Rem Thyroid

      Recommend Evacuation of Population in Affected Area.

   b) For doses:

      1-5 Rem Whole Body or,

      5-25 Rem Thyroid

      Recommend evacuation of children and pregnant women, and sheltering of remainder of personnel in the affected area.

   c) For doses:

      < 1 Rem Whole Body or,

      < 5 Rem Thyroid

      Recommend no action.

3. Determine Stability Class by completing step a below and record on Offsite Dose Report form.

ENCLOSURE 5:4
HP/0/B/1009/11
EVALUATION OF PLUME LOCATION

a)

ΔT	Stability Class
< -0.7	A
-0.69 to -0.56	C
-0.55 to -0.22	D
-0.21 to +0.55	E
> +0.51	F

4. To determine the sectors affected, complete one of the options under A or B. Record the sectors affected on Offsite Dose Report form.

A) Daytime (1000-1600 hrs)

1) wind speed ≥ 5 mph for tower or river wind direction, use Table 1.
2) wind speed ≥ 5 mph for NWS wind direction, use Table 2.
3) wind speed < 5 mph for tower or river wind direction, assume sectors A1, B1, C1, D1, E1, and F1 are affected. Then use Table 1 to determine additional sectors affected.
4) wind speed < 5 mph NWS wind direction, assume all sectors affected (A1 through F1, A2 through F2).

TABLE 1

Wind Direction	Sectors Affected
14°-27°	C1, C2, D1, D2, E1, E2
27°-42°	C1, D1, D2, E1, E2
42°-66°	D1, D2, E1, E2
66°-85°	D1, D2, E1, E2, F2
85°-104°	D1, D2, E1, E2, F1, F2
104°-129°	E1, E2, F1, F2
129°-156°	A1, A2, E1, E2, F1, F2
156°-175°	A1, A2, E1, F1, F2
175°-181°	A1, A2, F1, F2
181°-219°	A1, A2, B1, B2, F1, F2
219°-255°	A1, A2, B1, B2
255°-271°	A1, A2, B1, B2, C1, C2
271°-297°	B1, B2, C1, C2
297°-312°	B1, B2, C1, C2, D2
312°-345°	B1, B2, C1, C2, D1, D2
345°-14°	C1, C2, D1, D2

ENCLOSURE 5.4
HP/0/B/1009/11
EVALUATION OF PLUME LOCATION

EVALUATION OF PLUME LOCATION

TABLE 2

Wind Direction	Sectors Affected
1°-39°	B1, B2, C1, C2, E1, E2, F1, F2
39°-75°	A1 through F1, A2 through F2
75°-91°	A1, A2, C1, C2, D1, D2, E1, E2, F1, F2
91°-117°	A1 through F1, A2 through F2
117°-132°	A1, A2, B1, B2, C1, D1, D2, E1, E2, F1, F2
132°-165°	A1, A2, B1, B2, D1, D2, E1, E2, F1, F2
165°-194°	A1 through F1, A2 through F2
194°-207°	A1, A2, B1, B2, C1, C2, E1, E2, F1, F2
207°-222°	A1, A2, B1, B2, C1, C2, D2, E1, E2, F1, F2
222°-246°	A1 through F1, A2 through F2
246°-265°	A1, A2, B1, B2, C1, C2, D1, D2, E1, F1, F2
265°-284°	A1, A2, B1, B2, C1, C2, D1, D2, F1, F2
284°-309°	A1 through F1, A2 through F2
309°-336°	A1, A2, B1, B2, C1, C2, D1, D2, E1, E2
336°-355°	A1, A2, B1, B2, C1, C2, D1, D2, E1, E2, F2
355°-1°	A1 through F1, A2 through F2

4. B) Nighttime (1600-1000 hrs)

(If river wind direction is unavailable, assume 70°-210°.)

1) If river wind direction is between 210°-70°, use Option A (Daytime).

2) If river wind direction is between 70°-210°, assume all sectors affected (A1 through F1, A2 through F2).

INFORMATION ONLY

CONTROL COPY

Form 34731 (10-81)
(Formerly SPD-1002-1)

DUKE POWER COMPANY
PROCEDURE PREPARATION
PROCESS RECORD

(1) ID No: HP/O/B/1009/14
Change(s) 3 to
N/A Incorporated

(2) STATION: Oconee

(3) PROCEDURE TITLE: Projection Of Off-Site Dose From Releases Other Than Through The Unit Vent

(4) PREPARED BY: [signature] DATE: 06/01/84

(5) REVIEWED BY: [signature] DATE: 6-1-84

Cross-Disciplinary Review By: ✓ N/R: ✓

(6) TEMPORARY APPROVAL (IF NECESSARY):

By: _____ (SRO) Date: _____

By: _____ Date: _____

(7) APPROVED BY: [signature] Date: 6-5-84

(8) MISCELLANEOUS:

Reviewed/Approved By: _____ Date: _____

Reviewed/Approved By: _____ Date: _____

DUKE POWER COMPANY

OCONEE NUCLEAR STATION

PROJECTION OF OFF-SITE DOSE FROM RELEASES OTHER THAN THROUGH THE UNIT VENT

1.0 Purpose

This procedure should be used for projecting dose commitment from a noble gas or iodine release, other than a unit vent release, during an emergency.

2.0 References

2.1 Reg Guide 1.109

2.2 Reg Guide 1.4

2.3 HP/0/B/1009/13, Procedure for Implementation and Verification for the Availability of a Backup Source of Meteorological Data.

2.4 EPA-520/1-75-001, Manual of Protective Action Guides and Protective Actions for Nuclear Incidents

3.0 Limits and Precautions

3.1 It is assumed that a small percentage of the total containment inventory of iodine is released. The iodine whole body dose from a release is very small compared to the iodine thyroid dose. Thus, iodine whole body dose is not considered here.

3.2 This procedure applies to releases made from Oconee Nuclear Station only. Many of the values contained in this procedure are site specific.

3.3 This procedure considers all releases to be ground level releases.

3.4 Enclosure 5.5 should be done in conjunction with the Field Monitoring Coordinator.

3.5 Meteorology data needed to calculate offsite dose should be obtained as required by Enclosure 5.1. Data not available from the primary source should be obtained from the back up source. The order of preference for each data point is listed each place meteorological data is required. All meteorology data obtained from the tower or river must be a 15 minute average. National Weather service (NWS) data is a standard observation and is not a 15 minute average.

3.5.1 Every 15 minutes wind direction and wind speed will be rechecked in accordance with Enclosure 5.1 to ensure additional sectors have not been affected. Once a sector has been determined to be affected, it cannot be removed from the list of affected sectors.

3.5.2 The following are conversion formulas for the meteorological data obtained from the National Weather Service.

mph = 1.15 (knots)

°F = (9/5°C) + 32

4.0 Procedure

4.1 Acquire the following information and record on Enclosure 5.1.

NOTE: The sources of meteorological data are listed in order of preference on Enclosure 5.1.

4.1.1 Reactor Unit, date and time of reactor trip.

4.1.2 Wind speed (mph).

4.1.3 Wind direction in degrees from North (North = 0°).

4.1.4 Temperature gradient (ΔT°F).

4.1.5 Radiation Monitor reading (R/hr) calculated per Enclosure 5.2.

4.1.6 Present date and time.

4.1.7 Time meteorology data determined.

4.2 Determine the Containment Building leakage rate (LR) and record it on Enclosure 5.1.

4.2.1 LR is the total leak rate for the containment which is:

a) a "best guess" assumption,

b) assumed to be the design leak rate (see note below), or

c) the measured leak rate where suitable means are available.

Record the leak rate onto Enclosure 5.1.

NOTE: The design leakage rate (LR_{DLR}) is determined by,

$$LR_{DLR} = \text{Containment Volume} \cdot \text{Design Leak Constant}$$

$$= (5.38 \times 10^{10}\ \text{ml}) \cdot \left(\frac{0.0025}{\text{day}}\right) \cdot \frac{\text{day}}{24\ \text{hr}}$$

$$= 5.6 \times 10^{6}\ \text{ml/hr}$$

4.3 Determine the X/Q values for each point of interest downwind.

If no points have been requested, use the 1, 2, 5 and 10 mile values.

4.3.1 Locate the relative two-hour downwind concentration value (CH) for each point from Enclosure 5.3 and record onto Enclosure 5.1.

4.3.2 Convert these values to X/Q by,

$$X/Q = \frac{CH\ (\text{MPH-Sec/m}^3)}{\text{Wind Speed (MPH)}} = \text{Sec/m}^3$$

Record X/Q values onto Enclosure 5.1.

4.4 Determine the potential whole body dose from submersion in a cloud of noble gas.

4.4.1 Calculate the whole body two (2) hour dose commitment,

$$D_{WB} = DR_M \cdot DC \cdot LR \cdot X/Q \cdot U_{NG}$$

Where,

D_{WB} = Whole body two (2) hour dose commitment

DR_M = Monitor dose rate

DC = Average Decay constant for noble gases =

$$1.5448\text{E-}2\ \frac{\mu\text{Ci} \cdot \text{MeV} \cdot \text{hr}^2}{\text{ml} \cdot \text{d} \cdot \text{R}}$$

LR = containment leakage rate in ml/hr

X/Q = dispersion factor in sec/m^3

$$U_{NG} = \frac{(3.74\text{E}4\text{d/sec} \cdot \mu\text{Ci})(1.6\text{E-}6\text{ergs/MeV})}{2\ (100\ \text{ergs/g-rad})(1.2\text{E-}3\text{g/cm}^3)(1\text{E}6\text{cm}^3/\text{m}^3)} =$$

$$2.5\text{E-}7\ \frac{\text{d} \cdot 3 \cdot \text{rad}}{\text{sec} \cdot \mu\text{Ci} \cdot \text{MeV}}$$

Record results on Enclosure 5.1

4.5 Determine the potential thyroid dose from uptake of radioiodine.

4.5.1 Locate the time plus one (1) hour after trip on Enclosure 5.4 and record the corresponding Decay Constant on Enclosure 5.1

4.5.2 Calculate a child's thyroid two (2) hour dose commitment using time plus one (1) hour,

$$DR_T = DR_M \cdot DC \cdot LR \cdot X/Q \cdot UI$$

Where,

DR_T = thyroid two (2) hour dose commitment

DR_M = monitor dose rate (see Encl. 5.2)

DC = Decay Constant in $\frac{\mu Ci \cdot mrem \cdot hr^2}{ml \cdot pCi \cdot R}$ for time plus one (1) hour (see Enclosure 5.4)

LR = Leak rate in ml/hr

X/Q = dispersion in sec/m^3

UI = breathing rate for child

$$(1.17E\text{-}4 m^3/sec)(1E3 \frac{pCi\text{-}rem}{\mu Ci\text{-}mrem}) = 1.17E\text{-}1$$

Record results on Enclosure 5.1

4.6 Calculate an adult's thyroid dose by dividing the child's dose by two (2). Report results on Offsite Dose Report form.

4.7 Determine the potentially affected area using Enclosure 5.5. Record sectors on Offsite Dose Report form.

4.8 Complete Offsite Dose Report form with information from Enclosure 5.1 and submit it to the Offsite Radiological Coordinator or his designee. Include any comments pertinent to the evaluation of offsite hazards.

5.0 Enclosures

5.1 Projected Offsite Dose Released from Containment

5.2 Survey Instrument Correlation

5.3 Two Hour Relative Concentration Factors

5.4 Iodine and Noble Decay Constant (DC)

5.5 Evaluation of Plume Location

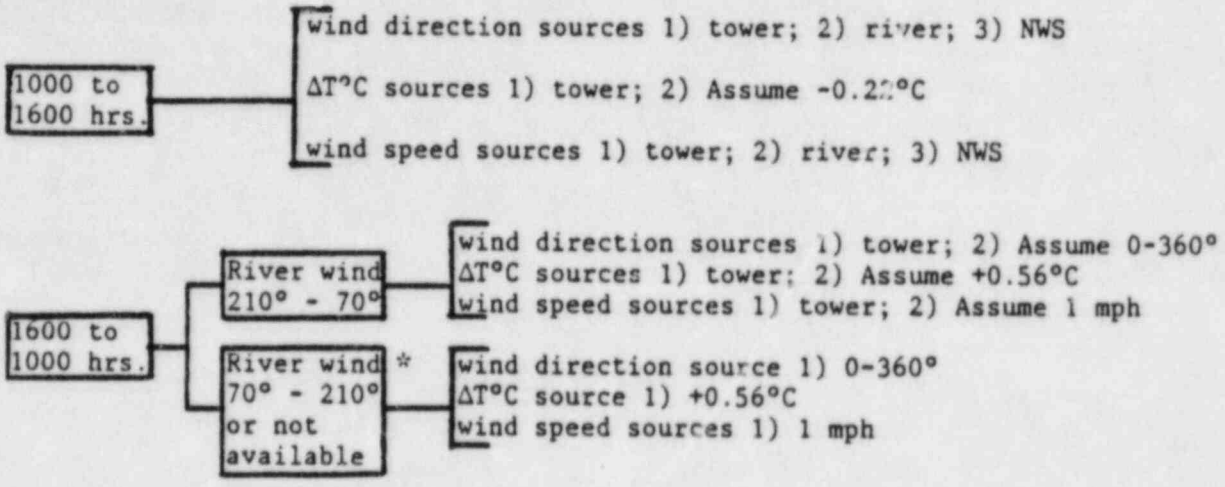
ENCLOSURE 5.1
HP/0/B/1009/14
PROJECTED OFFSITE DOSE RELEASED FROM CONTAINMENT

Unit _____ Date/Time Now _____/_____

Date/Time of reactor trip _____/_____

METEOROLOGICAL DATA

(All data is 15 min average except NWS)



*Based on experiment

-15 min period ending time

_____ _____ _____ _____

-wind direction

_____ _____ _____ _____

-ΔT°C

_____ _____ _____ _____

-wind speed

_____ _____ _____ _____

ENCLOSURE 5.1
HP/0/B/1009/14

DOSE CALCULATION

1) Determine DR_m by completing either step a or b.

   a) Containment High range monitor - RIA # 57 and 58

      DR_m = _____ R/hr

   b) Survey instrument # _____

      1) reading _____R/hr

      2) correlation value _____ (Enclosure 5.2)

      3) DR_m = _____ R/hr

   c) Date/Time of sample _____/_____ .

2) LR _____ ml/hr (Design basis LR = 5.6E6 ml/hr)

3) CH @ _____ mi. = _____, X/Q = _____ sec/m^3

   CH @ _____ mi. = _____, X/Q = _____ sec/m^3

   CH @ _____ mi. = _____, X/Q = _____ sec/m^3

   CH @ _____ mi. = _____, X/Q = _____ sec/m^3

4. Whole Body 2 hr. dose projection from noble gases:

   by $D_{WB} = DR_M \cdot LR \cdot X/Q \cdot 3.862E\text{-}9$,

Miles Out	D_{WB} 2 hr Dose Commitment
_____	_____
_____	_____
_____	_____
_____	_____

ENCLOSURE 5.1
HP/0/B/1009/14

5. Thyroid 2 hr. dose projection from iodine:

DC (for t + 1 hr) _____

by $DR_T = DR_M \cdot DC \cdot LR \cdot X/Q \cdot (1.17E-1)$,

Miles Out	DR_T 2 hr Dose Commitment

ENCLOSURE 5.2

HP/0/B/1009/14

SURVEY INSTRUMENT CORRELATION

This enclosure should only be used when the high range containment monitors are inoperable. Use the following equation as the alternate dose rate determination method.

$DR_{monitor} = DR_{survey} \cdot$ Correlation Value

where:

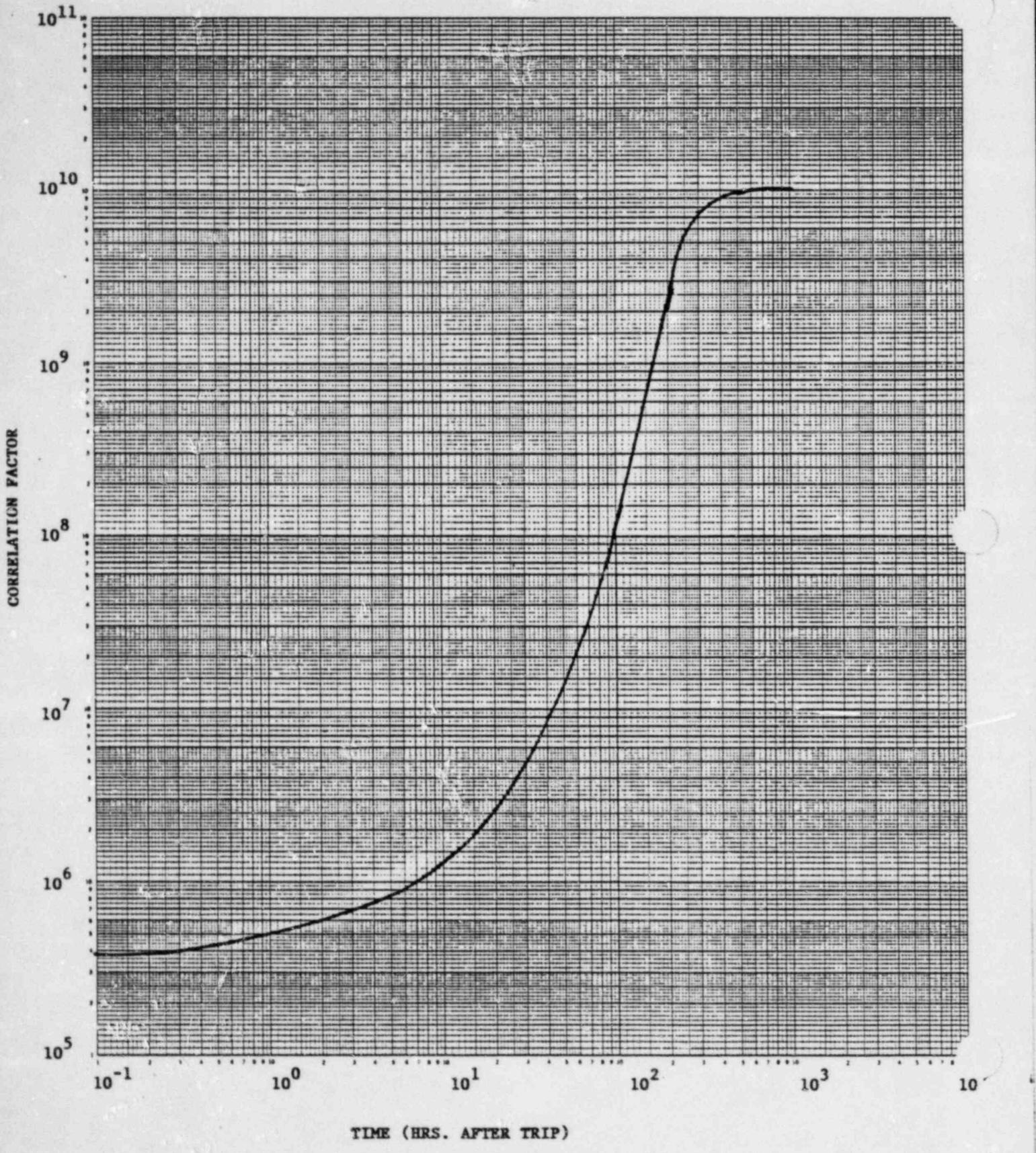
The correlation value is determined by using the graph on the following page.

DR_{survey} is taken from the 6th floor inside the Auxiliary Building, 1 foot from the reactor wall and 4 feet from the floor.

ENCLOSURE 5.2

SURVEY INSTRUMENT CORRELATION CURVE

TIME VS. CORRELATION FACTOR



Enclosure 5.3
HP/O/B/1009/14
Table of Two-Hour Relative Concentration Factors

Temperature Difference ΔT°C (°F)	Distance (Miles)									
	1	2	3	4	5	6	7	8	9	10
<-0.7 (<-1.3)	1.5E-6	9.4E-7	5.4E-7	4.0E-7	3.4E-7	2.9E-7	2.5E-7	2.2E-7	2.0E-7	1.8E-7
-0.69 to -0.56 (-1.2 to -1.0)	5.8E-5	1.6E-5	8.1E-6	4.9E-6	3.4E-6	2.5E-6	1.9E-6	1.5E-6	1.2E-6	1.0E-6
-0.55 to -0.22 (-0.9 to -0.4)	1.5E-4	5.6E-5	3.1E-5	2.1E-5	1.5E-5	1.2E-5	7.6E-6	7.8E-6	6.7E-6	5.8E-6
-0.21 to +0.50 (-0.3 to +0.9)	2.9E-4	1.2E-4	6.7E-5	4.9E-5	3.4E-5	2.7E-5	2.2E-5	1.9E-5	1.6E-5	1.4E-5
>+0.51 (>+1.0)	6.4E-4	3.1E-4	1.8E-4	1.3E-4	9.5E-5	7.3E-5	6.1E-5	5.0E-5	4.3E-5	3.6E-5

Enclosure 5.3
Table of Two Hour Relative Concentration Factors

ENCLOSURE 5.4
HP/0/B/1009/14
IODINE AND NOBLE DECAY CONSTANT (DC)

TIME	D C	TIME	D C
0	1.3309E-05	100-198 hr	6.70E-5
2	2.7292E-05		
4	3.4886E-05		
6	4.8606E-05	200-298 hr	6.788E-5
8	5.5033E-05		
10	4.8522E-05		
12	5.1300E-05	300-398 hr	6.845E-5
14	5.3531E-05		
16	5.5344E-05		
18	5.6834E-05	400-498 hr	6.90E-5
20	5.8073E-05		
22	5.9115E-05		
24	5.9999E-05		
26	6.0754E-05		
28	6.1403E-05		
30	6.1963E-05		
32	6.2448E-05		
34	6.2871E-05		
36	6.3240E-05		
38	6.3568E-05		
40	6.3846E-05		
42	6.4097E-05		
44	6.4318E-05		
46	6.4515E-05		
48	6.4690E-05		
50	6.4847E-05		
52	6.4988E-05		
54	6.5116E-05		
56	6.5232E-05		
58	6.5337E-05		
60	6.5434E-05		
62	6.5522E-05		
64	6.5604E-05		
66	6.5680E-05		
68	6.5751E-05		
70	6.5817E-05		
72	6.5879E-05		
74	6.5937E-05		
76	6.5992E-05		
79	6.6045E-05		
80	6.6094E-05		
82	6.6142E-05		
84	6.6187E-05		
86	6.6230E-05		
88	6.6272E-05		
90	6.6312E-05		
92	6.6351E-05		
94	6.6388E-05		
96	6.6424E-05		
98	6.6459E-05		

ENCLOSURE 5.5

HP/0/B/1009/14

EVALUATION OF PLUME LOCATION

1. Acquire the following information from Enclosure 5.1 and record on Offsite Dose Report form.

   a) Meteorological Data - identify source for each point

   b) Thyroid and whole body dose

2. Protective action guides submitted to the Offsite Radiological Coordinator are to be made based on the calculated dose on Enclosure 5.1 and the following information.

   A) For doses:

      > 5 Rem Whole Body or,

      > 25 Rem Thyroid

      Recommend Evacuation of Population in Affected Area.

   B) For doses:

      1-5 Rem Whole Body or,

      5-25 Rem Thyroid

      Recommend evacuation of children and pregnant women, and sheltering of remainder of personnel in the affected area.

   C) For doses:

      < 1 Rem Whole Body or,

      < 5 Rem Thyroid

      Recommend no action.

3. To determine sectors affected, complete one of the options under A or B, using meteorological data from Enclosure 5.1. Record the sectors affected on Offsite Dose Report form.

   A. Daytime (1000-1600 hrs.)

      1) Wind speed $\geq$ 5 mph for tower or river wind direction; use Table 1.

      2) Wind speed $\geq$ 5 mph for NWS wind direction; use Table 2.

ENCLOSURE 5.5

HP/0/B/1009/14

3) Wind speed < 5 mph for tower or river wind direction. Assume Sectors A1, B1, C1, D1, E1, and F1 are affected. Then use Table 1 to determine additional sectors affected.

4) Wind speed < 5 mph for NWS wind direction. Assume all sectors are affected (A1 through F1, A2 through F2).

B. Nighttime (1600-1000 hrs.)

(If river wind direction is unavailable, assume 70°-210°.)

1) If river wind direction is between 210°-70°, use Option A (Daytime).

2) If river wind direction is between 70°-210°, assume all sectors affected (A1 through F1, A2 through F2).

ENCLOSURE 5.5

HP/0/B/1009/14

EVALUATION OF PLUME LOCATION

TABLE 1

Wind Direction	Sectors Affected
14°-27°	C1, C2, D1, D2, E1, E2
27°-42°	C1, D1, D2, E1, E2
42°-66°	D1, D2, E1, E2
66°-85°	D1, D2, E1, E2, F2
85°-104°	D1, D2, E1, E2, F1, F2
104°-129°	E1, E2, F1, F2
129°-156°	A1, A2, E1, E2, F1, F2
156°-175°	A1, A2, E1, F1, F2
175°-181°	A1, A2, F1, F2
181°-219°	A1, A2, B1, B2, F1, F2
219°-255°	A1, A2, B1, B2
255°-271°	A1, A2, B1, B2, C1, C2
271°-297°	B1, B2, C1, C2
297°-312°	B1, B2, C1, C2, D2
312°-345°	B1, B2, C1, C2, D1, D2
345°-14°	C1, C2, D1, D2

ENCLOSURE 5.5

HP/0/B/1009/14

EVALUATION OF PLUME LOCATION

TABLE 2

Wind Direction	Sectors Affected
1°-39°	B1, B2, C1, C2, E1, E2, F1, F2
39°-75°	A1 through F1; A2 through F2
75°-91°	A1, A2, C1, C2, D1, D2, E1, E2, F1, F2
91°-117°	A1 through F1, A2 through F2
117°-132°	A1, A2, B1, B2, C1, D1, D2, E1, E2, F1, F2
132°-165°	A1, A2, B1, B2, D1, D2, E1, E2, F1, F2
165°-194°	A1 through F1, A2 through F2
194°-207°	A1, A2, B1, B2, C1, C2, E1, E2, F1, F2
207°-222°	A1, A2, B1, B2, C1, C2, D2, E1, E2, F1, F2
222°-246°	A1 through F1, A2 through F2
246°-265°	A1, A2, B1, B2, C1, C2, D1, D2, E1, F1, F2
265°-284°	A1, A2, B1, B2, C1, C2, D1, D2, F1, F2
284°-309°	A1 through F1, A2 through F2
309°-336°	A1, A2, B1, B2, C1, C2, D1, D2, E1, E2
336°-355°	A1, A2, B1, B2, C1, C2, D1, D2, E1, E2, F2
355°-1°	A1 through F1, A2 through F2

ENCLOSURE 5.5

HP/0/B/1009/14

EVALUATION OF PLUME LOCATION

4. Determine Stability Class by completing step (a) below and record on Offsite Dose Report form.

a)

ΔT	Stability Class
<-0.7	A
-0.69 to -0.56	C
-0.55 to -0.22	D
-0.21 to +0.51	E
>+0.51	F

DUKE POWER COMPANY

OCONEE NUCLEAR STATION

OPERATING PROCEDURE FOR POST-ACCIDENT CONTAINMENT

AIR SAMPLING SYSTEM

1.0 Purpose

This procedure describes the operation of the Post-Accident Containment Air Sampling System which is used to obtain a prompt containment air sample under accident conditions while keeping radiation exposure ALARA. This procedure is also used to perform the semi-annual functional test of the system.

2.0 References

2.1 Duke Power Company Nuclear Station Post-Accident Containment Air Sampling System Manual.

2.2 [illegible] Procedure for Preparation of Gas Calibration Sources

2.3 [illegible] Operating Procedure for the Post Accident Liquid Sampling (PALS) System

2.4 [illegible] 1009/10, Procedure for Sampling and Quantifying High Level Gaseous, Radioiodine and Particulate Radioactivity

2.5 [illegible], Loss of Coolant

2.6 Station Directive [illegible], Independent Verification Requirements

2.7 Station Directive [illegible], Interim [illegible] Independent Verification Requirements

3.0 Limits and Precautions

3.1 The sampling cycle will require two (2) qualified technicians approximately one (1) hour per sample, of which about ten (10) minutes will be spent in the sample panel area. One qualified technician will operate the control panel while the other will perform transit duties to and from the panel.

3.2 Personnel communications can be achieved by phone:

Unit 1 and 2 - Ext. [redacted] by column AX-28)
Unit 3 - Ext. [redacted] by door to RCA)

3.3 The following items will never be used on the panel:

a. Trap Area Evacuation

b. Fast Sample Dilution

INFORMATION ONLY

CONTROL COPY

Form 34731 (10-81)
(Formerly SPD-1002-1)

DUKE POWER COMPANY
PROCEDURE PREPARATION
PROCESS RECORD

(1) ID No: HP/1/A/1009/17
Change(s) 4 to
N/A Incorporated

(2) STATION: Oconee

(3) PROCEDURE TITLE: Operating Procedure for Post-Accident Containment Air Sampling System

(4) PREPARED BY: Sarah Coy DATE: 5-21-84

(5) REVIEWED BY: [signature] DATE: 5.21.84

Cross-Disciplinary Review By: _____ N/R: N

(6) TEMPORARY APPROVAL (IF NECESSARY):

By: _____ (SRO) Date: _____

By: _____ Date: _____

(7) APPROVED BY: [signature] Date: 5/22/84

(8) MISCELLANEOUS:

Reviewed/Approved By: _____ Date: _____

Reviewed/Approved By: _____ Date: _____

3.4 The Recirc Pump must never be used at any pressure other than 0 inches of Mercury.

3.5 Moving the Selector Switch from one mode to another stops all current system operations. Depressing the Activate button starts operation of the newly selected mode.

3.6 The radiation monitor on the control panel will provide levels of radiation at the sample panel. If the radiation monitor is not working properly, then a portable survey instrument will be used to determine radiation levels.

3.7 If problems with the pressure and/or temperature gauge are evident, such as going off scale or erratic response, the Selector Switch must be turned to the OFF mode and sampling discontinued until the problem is corrected.

3.8 If the sampling system cannot be operated, then HP/0/B/1009/15 (Ref. 2.4) will be used as an alternate method for obtaining a containment air sample.

3.9 Enclosure 5.5 will be used to check off the steps as the procedure is completed.

3.10 Operations must complete Enclosure 5.3 or 5.4 to bypass the Hydrogen Analyzer to bring containment air to the sampling system and to return the Hydrogen Analyzer to service after sampling is complete by Enclosure 5.6 or 5.7. These enclosures shall be independently verified to ensure that containment integrity is maintained. The Operations Unit Supervisor shall designate one "doer" and one "verifier" as required by Reference 2.6 and 2.7.

3.11 The front side of the sample panel is the side which contains the door. The left and right side of the sample panel will be determined by using this fact.

3.12 If radiation levels exceed 10 R/hr and cannot be reduced by purging the system, secure operation of the panel, move to a low background area, and contact the Station Health Physicist or his designee for further instructions.

3.13 Before sampling operations begin, the decision must be made based on radiological conditions in the reactor building and the sampling area whether to use a 100 ml gas bomb or a calibrated syringe for the gas sample. During emergency conditions, this decision will be made by the Station Health Physicist or his designee.

3.14 Enclosure 5.8, Valve Checklist for Sample Panel, may be used to provide assistance in determining flow inside the sample panel. It is not intended to provide a verification for valve operation.

3.15 During accident conditions, the keys needed for sampling will be located in the Shiftman's key cabinet.

3.16 The sampling system must not be used if reactor building pressure is greater than 40 psig.

4.0 Procedure

4.1 Locate the Shift Supervisor for Operations and request that Operations complete Enclosure 5.3 or 5.4 to bypass the Hydrogen Analyzer so the Post Accident Containment Gas Sampling System may be operated.

4.2 Obtain equipment necessary to perform sampling, including the thiosulfate solution. Also obtain keys to the control panel and the sixth floor Ventilation Equipment Room.

NOTE: Necessary equipment for sampling is listed on Enclosure 5.1.

4.3 Open the valve on the nitrogen bottle next to the sampling panel to 40 psig.

4.4 Open the

(a) DI Water Inlet

(b) Instrument Air Inlet

(c) N_2 Inlet

located on the left side of the sample panel.

NOTE: Open inlets by rotating the back switches counterclockwise one-quarter turn to the upward position.

4.4.1 Ensure the test tees on the sample inlet and outlet lines are closed.

4.4.2 Ensure inlet valve on gas sampler is open (black switch parallel with line).

4.4.3 Ensure DI water supply line is open to the panel.

4.5 Position the thiosulfate funnel directly over the fill port located on top of the sample panel. Attach the hose on the funnel to the fill port and pour the 500 ml of thiosulfate solution into the funnel.

4.6 Set the switches listed below as follows:

(a) Sample Volume Select - set on SMALL

(b) Dilution Volume Select - set on LARGE

(c) Selector Switch - set on OFF

(d) System Purge - set on NORMAL

(e) Refill Switch - set on OFF (down)

(f) TC Switch - set on POSITION 1 (thermocouple measures sample line temperature)

(g) Sample Line Select Switch - turn to Unit and Hydrogen Analyzer (Train A or B) being used for this operation of the sampling system

4.7 Turn the Key Lock Switch to POWER ON and ensure the power on light has come on.

4.8 Turn the Radiation Monitor toggle switch ON (up).

4.8.1 Turn the selector on the Radiation Monitor to BATT and ensure the needle is in the "red test region." Turn the selector to the MR/HR or R/HR scale.

NOTE: If the Radiation Monitor is not functioning properly, note that is is not working on Enclosure 5.5, Step 9 and use a portable survey instrument to determine radiation levels during sampling.

4.9 Purge the Sample Panel.

4.9.1 Turn Select Switch to SYSTEM PURGE

4.9.2 Move Normal - Sample Purge to SAMPLE PURGE

4.9.3 Depress ACTIVATE button.

4.9.4 Depress EVAC button (Evac light on) and watch pressure gauge slowly drop to ~ - 19" of Hg. Depress STOP.

4.9.5 Press down and release the GAS PURGE toggle switch and watch the pressure gauge swiftly rise to + 10" of Hg. Depress STOP button.

4.9.6 Depress the EVAC button and watch the pressure gauge drop to 0" of Hg. Depress STOP button.

4.9.7 Depress the PUMP button and wait for 30 seconds. Depress STOP button.

4.9.8 Repeat Step 4.9.4 through 4.9.7 twice to purge the sample panel two more times.

4.9.9 Move Normal - Sample Purge to NORMAL.

4.9.10 Turn Selector Switch to SOLUTION CHANGE OUT.

4.10 Preparation for Sampling

4.10.1 Set the 500 ml sample bottle in a clear poly bag. Place the portable shielded container on the floor under the Thiosulfate sampler (left side of panel), and place the sample bottle in the shielded container.

4.10.2 Detach the left side of the flexible tubing on the thiosulfate sampler located on the left side of the sample panel near the floor.

4.10.3 Insert the free end of the tubing into the 500 ml sample bottle.

4.10.4. Complete Steps a) and b) below if a 100 ml gas bomb will be used for the gas sample. If the gas sample will be drawn by syringe, go to Step 4.10.5.

a) Detach the side of the flexible tubing on the gas sampler between the inlet valve and the hard piping.

b) Attach a 100 ml gas bomb between the free end of the flexible tubing and the hard piping on the gas sampler. Ensure valves on gas bomb are open.

4.11 Flush Thiosulfate Sampler and fill with Thiosulfate.

4.11.1 Depress ACTIVATE button.

4.11.2 Depress FLUSH button and hold for 30 seconds.

4.11.3 Depress PURGE button and hold for 30 seconds.

4.11.4 Depress EMPTY button and hold for 60 seconds.

4.11.5 Open the TS (thiosulfate) valve located inside the sample panel directly below the fillport. (Open valve in same manner as valves in Step 4.4).

4.11.6 Move Refill toggle switch to ON (up) and wait 2 minutes. Move Refill to OFF (down).

4.11.7 Turn Selector Switch to DILUTION VOLUME EVACUATION.

4.12 Evacuate the Dilution Volume.

4.12.1 Depress ACTIVATE button and watch pressure gauge drop to ~ - 19" of Hg. Turn Selector Switch to SAMPLE RECIRC.

4.13 Recirc Containment Air and Trap a Sample.

4.13.1 Depress ACTIVATE button and wait 15 minutes.

4.13.2 Read and record sample inlet line pressure and temperature on Enclosure 5.2.

4.13.3 Depress SAMPLE button and wait 1 minute.

4.13.4 Depress TRAP button and wait 30 seconds.

4.13.5 Turn Selector Switch to SAMPLE DILUTION.

4.14 Dilute Sample with N_2 and Recirc.

4.14.1 Depress ACTIVATE button.

4.14.2 Depress SLOW button and watch pressure gauge slowly rise to 0" of Hg. Depress STOP button.

4.14.3 Depress RECIRC button and wait 5 minutes.

4.14.4 Complete step a) if a syringe will be used for the gas sample. If a 100 ml gas bomb is being used for the gas sample, continue on to Step 4.14.5.

a) Insert the calibrated gas syringe into the septum on the gas sampler. Withdraw a 5 cc sample of gas and place the syringe into the portable shielded container.

4.14.5 Depress the STOP button on the control panel.

4.14.6 Turn the Selector Switch to SOLUTION CHANGEOUT.

4.15 Collect Particulate and Iodine Sample.

4.15.1 Depress ACTIVATE button.

4.15.2 Depress TS SAMPLE button.

4.15.3 Depress and hold EMPTY button until thiosulfate solution has drained into 500 ml sample bottle.

4.15.4 Depress TS SAMPLE GRAB button.

4.15.5 Depress PURGE button and hold for 1 minute.

4.15.6 Turn the Selector Switch to SYSTEM PURGE.

4.16 Purge the Sample Panel.

4.16.1 Depress ACTIVATE button.

4.16.2 Depress EVAC button and watch pressure gauge slowly drop to ~ - 19" of Hg. Depress STOP button.

4.16.3 Press down and release GAS PURGE toggle switch and watch pressure swiftly rise to + 10" of Hg. Depress STOP button.

4.16.4 Depress EVAC button and watch the pressure gauge drop to 0" of Hg. Depress STOP button.

4.16.5 Depress the PUMP button and wait 30 seconds. Depress STOP button.

4.16.6 Repeat Steps 4.16.2 through 4.16.5 to purge the sample panel one additional time.

4.17 Remove Samples from Sample Panel.

4.17.1 Return to the sample panel and close both valves on the gas bomb (if used) and close the inlet valve on the gas sampler.

4.17.2 Disconnect the gas bomb (if used) from the sample panel. Place gas bomb in portable shielded container.

4.17.3 Reconnect the gas sampler line and open the inlet valve. Reconnect the thiosulfate sampler line.

4.17.4 Tightly cap the 500 ml sample bottle.

4.18 Switching the Sample System Off.

4.18.1 Turn the Selector Switch to OFF.

4.18.2 Turn the Radiation Monitor to OFF

4.18.3 Turn the Keylock Switch to OFF.

4.18.4 Close the following valves:

a) Nitrogen bottle - next to sample panel

b) TS Valve - inside sample panel

c) DI Water Inlet, Instrument Air Inlet, N_2 Inlet (On left side of sample panel)

4.19 Transport the samples to the Count Room for analysis.

4.20 Calculate the sample volume using the data from Enclosure 5.2. Record this volume on sample data sticker.

NOTE: If sample cannot be counted because of high activity, further dilute the gas samples as per procedure HP/0/B/1006/07.

4.21 Transmit sample analysis results to the Station Health Physicist or his designee.

4.22 Request Operations to return the Hydrogen Analyzer to service per Enclosure 5.6 or 5.7.

4.23 Clean the area around the sample panel and pump out the sump.

NOTE: This step may be N/A if additional samples will be pulled or radiological conditions do not allow clean up.

5.0 Enclosures

5.1 Sampling Equipment

5.2 Sample Data Sheet

5.3 Operations Checklist for Bypassing H_2 Analysis Panel currently in Standby Mode

5.4 Operations Checklist for Bypassing H_2 Analysis Panel currently in Analyze Mode

5.5 Checklist for Operation of Sample Panel

5.6 Operations Checklist for Returning H_2 Analysis Panel Back to Service in Standby Mode

5.7 Operations Checklist for Returning H_2 Analysis Panel Back to Service in Analyze Mode

5.8 Valve Checklist for Sample Panel

5.9 Control Panel Diagram

5.10 Flow Diagram

ENCLOSURE 5.1

HP/1/A/1009/17

SAMPLING PANEL EQUIPMENT

1	Nalgene 500 ml Thiosulfate sample bottle.
2	Stainless Steel Gas Bombs
1	9/16" Combination Wrench
1	Stainless Steel Portable Shielded Container
1	Stopwatch
1 bottle	Thiosulfate Solution (500 ml)
2	10" x 12" Clear Poly Bags
1	Calibrated Gas Syringe
1	Bucket

ENCLOSURE 5.2

HP/1/A/1009/17

SAMPLE DATA SHEET

1) NAME _____

DATE _____

UNIT _____

2) Sample Line Temperature _____ °F

3) Sample Inlet Line Pressure _____ psig

4) Gas Sample Volume = SV

$$SV = 1.3cc\left[\left(\frac{293}{273 + 5/9\ [°F-32]}\right)\left(\frac{14.7 + P}{14.7}\right)\right]$$

where:

°F = Sample Line Temperature in °F

P = Sample Line Pressure in psig

$$SV = \frac{5599.23 + 380.9\ (P)}{3751.77 + 8.167\ (°F)} = \_\_\_\_\_ ml$$

5) Diluted Volume = $\frac{SV}{1E4}$ (sample size) = _____ ml

Where:
sample size = 100cc gas bomb or 5cc gas syringe

6) Record Diluted Volume as Gas Sample Volume on Sample Label.

7) Record Iodine and Particulate Sample Volume as 1.3 ml of sample in 500 ml of thiosulfate solution on sample label.

Checked Control Copy _____

Date _____

ENCLOSURE 5.3

HP/1/A/1009/17

OPERATIONS CHECKLIST FOR BYPASSING

H_2 ANALYSIS PANEL CURRENTLY IN STANDBY MODE

		DATE INIT./TIME	VERIFICATION DATE INIT./TIME
1.0	Initial Conditions		
1.1	Containment Integrity is required.	_____	_____
1.2	Designate a Licensed Operator assigned to immediately close containment isolation valves from the Control Room if an ES actuation occurs. This person may have other responsibilities, but they shall not prevent him from performing this evolution.	_____	
	License Operator _____		
	Unit Supervisor _____		
1.3	Record that the containment isolation valves will be opened on Enclosures 5.1 and 5.6 of OP/0/A/1102/20 (Shift Turnover). (1PR-81 and 1PR-84 or 1PR-90 and 1PR-87).	_____	
1.4	H_2 Analysis Panel is in Standby Mode.	_____	
1.5	Reactor building pressure is less than 40 psig.	_____	
2.0	Procedure		
2.1	Place Post Accident Sampler in service as follows:		
2.1.1	Select which train to be used. Circle one: Trn. "A" or Trn. "B".	_____	
2.1.2	Ensure train is in standby mode by observing red light in gray cabinet.	_____	

NOTE: Use other train if not in standby.

ENCLOSURE 5.3

HP/1/A/1009/17

		DATE INIT./TIME	VERIFICATION DATE INIT./TIME
2.1.3	At the selected train "Remote" Panel (blue cabinet), depress both black ON buttons for 'BYP TO POST AC'. Opens (1PR-83, 1PR-86) or (1PR-89, (1PR-92).	_____	
2.1.4	Turn sample valve selector switch to 'Top Cont'. Opens 1PR-71 or 1PR-76. (Red light will come on).	_____	_____
2.1.5	From the Control Room, open 1PR-81 and 1PR-84 (Containment Isolation Valves) if train "A" was selected. OR Open 1PR-87 and 1PR-90 (Containment Isolation Valves) if train "B" was selected.	_____	_____
		_____	_____

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

2.1.6	Notify Unit Supervisor which train is selected.	_____	_____
	Unit Supervisor _____		
2.1.7	Return completed enclosure to Health Physics Personnel operating Sample Panel.	_____	

Checked Control Copy _____

Date _____

ENCLOSURE 5.4

HP/1/A/1009/17

OPERATIONS CHECKLIST FOR BYPASSING

H_2 ANALYSIS PANEL CURRENTLY IN ANALYZE MODE

		DATE INIT./TIME	VERIFICATION DATE INIT./TIME
1.0	Initial Conditions		
1.1	H_2 Analyzer is in Analyze Mode.	_____	
1.2	Reactor building pressure is less than 40 psig.	_____	
2.0	Procedure		
2.1	Place Post Accident Sampler in service as follows:		
2.1.1	Select which train is to be used. Circle one: Trn. "A" or Trn. "B".	_____	
2.1.2	At the "Remote" Panel (blue cabinet), position the "Off Standby, Analyze" selector to "Standby" and observe red light in grey cabinet.	_____	
2.1.3	At selected train "Remote" Panel (blue cabinet), depress both black ON buttons for 'BYP TO POST AC'. Opens (1PR-S3, 1PR-S6) or (1PR-S9, 1PR-S2).	_____	
2.1.4	Notify Unit Supervisor which train is selected.	_____	
	Unit Supervisor _____		
2.1.5	Return completed enclosure to Health Physics Personnel operating Sample Panel.	_____	

Checked Control Copy _____

Date _____

ENCLOSURE 5.5
HP/1/A/1009/17
CHECKLIST FOR OPERATION OF SAMPLE PANEL

NOTE: Complete steps in order listed. Initial steps as completed.

A) Switching System On

_____1) Operations Bypass H_2 Analyzer by Enclosure 5.3 or 5.4.

_____2) Obtain Sampling Equipment and Keys.

_____3) Open Nitrogen bottle to 40 psig.

_____4) Open:

a) DI Water Inlet
b) Instrument Air Inlet
c) N_2 Inlet

_____5) a) Ensure test tees on sample inlet and outlet lines are closed.
b) Ensure inlet valve on gas sampler is open
c) Ensure DI water supply line is open to the panel

_____6) a) Position thiosulfate funnel
b) Attach hose to fill port
c) Pour 500 ml of thiosulfate into funnel.

_____7) Set switches on control panel:

a) Sample Volume Select - set on SMALL.

b) Dilution Volume Select - set on LARGE.

c) Selector Switch - set on OFF.

d) System Purge - set on NORMAL.

e) Refill Switch - set on OFF (down).

f) TC Switch - set on POSITION 1 (measures sample line temperature).

g) Sample Line Select Switch - Unit and Hydrogen Analyzer Train A or B

_____8) Key Lock Switch - POWER ON

ENCLOSURE 5.5
HP/1/A/1009/17
CHECKLIST FOR OPERATION OF SAMPLE PANEL

____9) a) Radiation Monitor - ON (up)

b) Radiation Monitor Selector - BATT (red test region)

c) Radiation Monitor Selector - MR/HR or R/HR

B) Purge the Sample Panel

____10) Selector Switch - SYSTEM PURGE

____11) Normal - Sample Purge - SAMPLE PURGE

☐ ☐ ☐ 12) a) ACTIVATE

b) EVAC

c) Pressure slowly drops to ~ - 19" of Hg.

d) STOP

☐ ☐ ☐ 13) a) GAS PURGE - press down and release.

b) Pressure swiftly rises to + 10" of Hg.

c) STOP

☐ ☐ ☐ 14) a) EVAC

b) Pressure drops to 0" of Hg.

c) STOP

☐ ☐ ☐ 15) a) PUMP - wait 30 seconds

b) STOP

☐ ☐ ☐ 16) a) Purge sample panel two (2) more times by completing Steps 12 through 15 two (2) more times.

____17) Normal - Sample Purge - NORMAL

ENCLOSURE 5.5
HP/1/A/1009/17
CHECKLIST FOR OPERATION OF SAMPLE PANEL

____18) Selector Switch - SOLUTION CHANGEOUT

C) Preparation for Sampling

____19) Attach 500 ml sample bottle to TS Sampler.

____20) Attach gas bomb to gas sampler and ensure valves on gas bomb are open (N/A step if syringe will be used instead of gas bomb).

D) Flush Thiosulfate Sampler and fill with Thiosulfate

____21) a) ACTIVATE

b) FLUSH - hold 30 seconds

c) PURGE - hold 30 seconds

d) EMPTY - hold 60 seconds

_____22) a) Open TS (thiosulfate) valve

b) Refill - ON - wait 2 minutes

c) Refill - OFF

____23) Selector Switch - DILUTION VOLUME EVACUATION

ENCLOSURE 5.5
HP/1/A/1009/17
CHECKLIST FOR OPERATION OF SAMPLE PANEL

E) Evacuate the Dilution Volume

___24) a) Activate

b) Pressure slowly drops to ~ - 19" of Hg.

c) Selector Switch - SAMPLE RECIRC

F) Recirc Containment Air and Trap a Sample

___25) ACTIVATE - wait 15 minutes

___26) Read and record sample inlet line temperature and pressure on Enclosure 5.2.

___27) a) SAMPLE - wait 1 minute

b) TRAP - wait 30 seconds

c) Selector Switch - SAMPLE DILUTION

G) Dilute Sample with N_2 and Recirc.

___28) a) ACTIVATE

b) SLOW

c) Pressure slowly rises to 0" of Hg.

d) STOP

___29) RECIRC - wait 5 minutes

___30) Complete a) if syringe will be used for gas sample. If gas bomb is being used, N/A this step and continue on to Step 31.

a) Withdraw a 5 cc gas sample from the septum of the gas sampler using calibrated syringe. Place syringe in portable shielded container.

ENCLOSURE 5.5
HP/1/A/1009/17
CHECKLIST FOR OPERATION OF SAMPLE PANEL

___31) a) STOP

b) Selector Switch - SOLUTION CHANGEOUT

H) Collect Particulate and Iodine Sample

___32) a) ACTIVATE

b) TS SAMPLE

c) EMPTY - hold button until thiosulfate solution has drained into sample bottle.

d) TS SAMPLE GRAB

e) PURGE - hold button 1 minute

___33) Selector Switch - SYSTEM PURGE

I) Purge the Sample Panel.

□ □ 34) a) ACTIVATE

b) EVAC

c) Pressure slowly drops to ~ - 19" of Hg.

d) STOP

□ □ 35) a) GAS PURGE - press down and release

b) Pressure swiftly rise to + 10" of Hg.

c) STOP

ENCLOSURE 5.5
HP/1/A/1009/17
CHECKLIST FOR OPERATION OF SAMPLE PANEL

☐ ☐ 36) a) EVAC

b) Pressure drop to 0" of Hg.

c) STOP

☐ ☐ 37 a) PUMP - wait 30 seconds

b) STOP

☐ ☐ 38) Repeat Steps 34 through 37 one additional time.

J) Remove Samples from Sample Panel

___39) Return to sample panel and close both valves on the gas bomb and the inlet valve on the gas sampler. (N/A step if gas bomb not used).

___40) Disconnect gas bomb from sample panel. Place gas bomb in portable shielded container. (N/A step if gas bomb not used).

____41) a) Reconnect gas sampler line and open inlet valve.
b) Reconnect thiosulfate sampler line.
c) Tightly cap sample bottle.

K) Switching System Off

___42) Selector Switch - OFF

___43) Turn the Radiation Monitor - OFF

___44) Key Lock Switch - OFF

ENCLOSURE 5.5
HP/1/A/1009/17
CHECKLIST FOR OPERATION OF SAMPLE PANEL

____45) Close:

a) Nitrogen bottle

b) TS Valve - inside sample panel

c) DI Water Inlet

d) Instrument Air Inlet

e) N_2 Inlet

____46) Transport samples to Count Room for analysis.

____47) Calculate sample volume using data from Enclosure 5.2. (Dilute gas samples per HP/0/B/1006/07 if needed).

____48) Transmit sample analysis results to Station Health Physicist or his designee.

____49) Request Operations to return the Hydrogen Analyzer to service per Enclosures 5.6 or 5.7.

____50) Clean area around sample panel and pump out sump. (This step may be N/A if additional samples will be pulled or radiological conditions do not allow cleanup.)

Checked Control Copy _____

Date _____

ENCLOSURE 5.6

HP/1/A/1009/17

OPERATIONS CHECKLIST FOR RETURNING H_2 ANALYSIS PANEL BACK TO SERVICE IN STANDBY MODE

		DATE INIT./TIME	VERIFICATION DATE INIT./TIME
1.0	**Procedure**		
1.1	Return the H_2 Analysis train back to service as follows:		
1.1.1	Turn Sample Valve Selector switch to OFF. (Red light will go off). Closes 1PR-71 or 1PR-76.	_____	_____
1.1.2	Depress the OFF buttons on both 'BYP TO POST AC' switches. Closes (1PR-83, 1PR-86) or (1PR-89, 1PR-92).	_____	
1.1.3	From the Control Room, Close 1PR-81 and 1PR-84 if train "A" is selected.	_____	_____
	OR		
	Close 1PR-87 and 1PR-90 if train "B" was selected.	_____	_____

NOTE: This will regain containment integrity. Remove the containment isolation valves from Enclosure 5.1 and 5.6 of OP/0/A/1102/20 (Shift Turnover).

1.1.4	Notify the Unit Supervisor the H_2 Analysis Train is back in service.	_____	
1.1.5	Return completed enclosure to personnel operating Post Accident Sample Panel.	_____	

Checked Control Copy _____

Date _____

ENCLOSURE 5.7

HP/1/A/1009/17

OPERATIONS CHECKLIST FOR RETURNING UNIT 1 H_2 ANALYSIS

PANEL BACK TO SERVICE IN ANALYZE MODE

	DATE INIT./TIME	VERIFICATION DATE INIT./Time
1.0 Initial Conditions		
1.1 H_2 Analysis Panel has been switched to Standby Mode for Post Accident sampling and is to be returned to Analyze Mode.	_____	
2.0 Procedure		
2.1 Return the H_2 Analysis train back to service as follows:		
2.1.1 Depress the OFF buttons on both "BYP to Post AC" switches. Closes (1PR-83, 1PR-86) or (1PR-89, 1PR-92).	_____	
2.1.2 Position the "Off, Standby, Analyze" Selector to Analyze.	_____	
NOTE: When Analyze is selected, the indication will go up scale resulting in a possible High Hydrogen Alarm on both panels and in the Control Room. Then return down scale to the correct reading in approximately 3 minutes.		
2.1.3 Push the Remote Selector button to ensure control is from Remote Panel.	_____	
2.1.4 Reset the Common Alarm after the meter reading stabilizes.	_____	
2.1.5 Notify the Unit Supervisor the H_2 Analysis Train is back in service.	_____	
2.1.6 Return completed enclosure to Health Physics Personnel Operating Post Accident Sample Panel.	_____	

ENCLOSURE 5.8

HP/1/A/1009/17

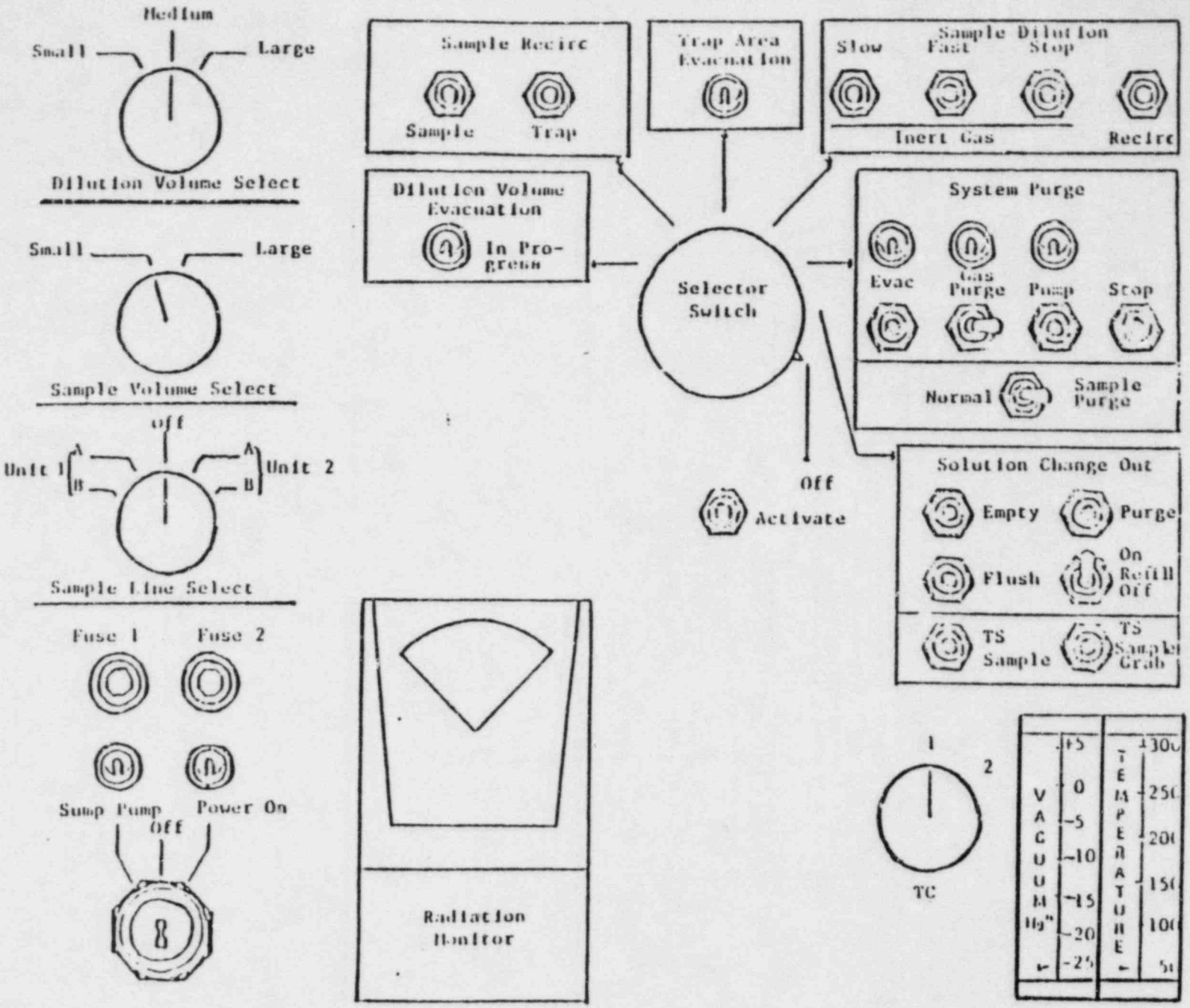
VALVE CHECKLIST FOR SAMPLE PANEL

NOTE: This checklist may be used to provide assistance in determining flow inside the sample panel. It is not intended to provide a verification for valve operation.

ACTION	RESPONSE
Dilution Volume Evacuation	
- Activate	Energize 1, 2, 9, 12, 19, 17
Sample Recirculate	
- Activate	Energize 1, 2, 5, 6, 27
- Sample	De-energize 27
- Trap	De-energize 2, 5
Sample Dilution	
- Activate	Energize 12, 17
- Slow	Energize 3, 20
- Stop	De-energize 3, 20
- Recirc	Energize Recirc Pump 16, 18

NOTE: Valve #17 will de-energize when selector switch is moved to another position.

System Purge	Energize 9, 12, 19, 27
- Activate	Energize 12, 22
- Evac	Energize 1, 2
- Stop	De-energize 1, 2
- Gas Purge (down)	Energize 15, De-energize 1, 2
- Stop	De-energize 15
- Normal - Sample Purge (Sample Purge)	Energize 17
- Pump	Energize Pump 16, 18 De-energize 15, or 1 and 2
- Stop	De-energize Pump 16, 18
Solution Change Out	
- Empty	Energize 10, 11, 13
- Flush	Energize 14, 10
- Purge	Energize 15, 10
- Refill	Energize 11, 13
- TS Sample	Energize 21
- TS Sample Grab	De-energize 21



Enclosure 5.2

Control Panel Diagram

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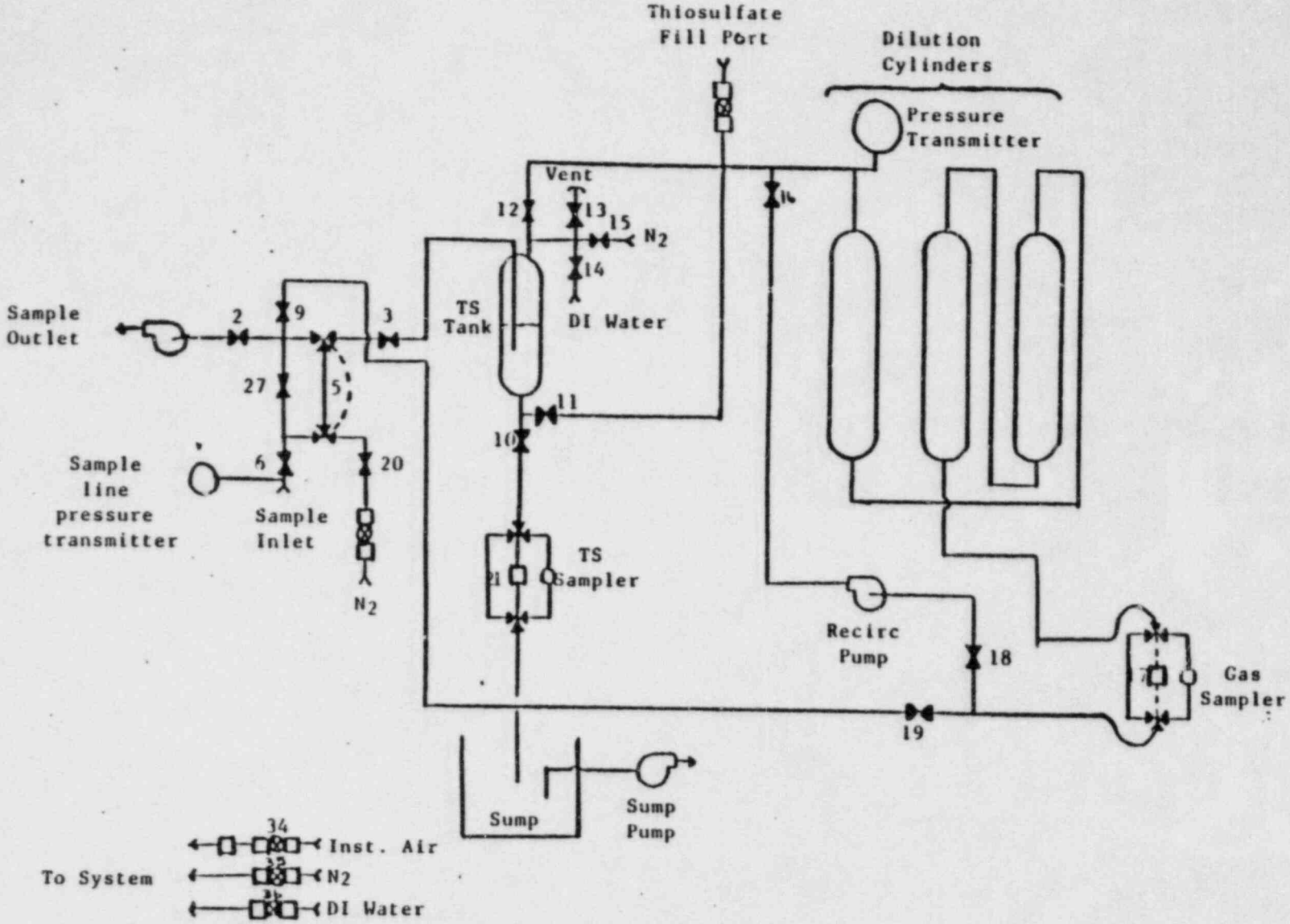
NF/1/A/2009/17



Enclosure 5.10
HP/1/A/1009/17
Flow Diagram

CONTROL COPY

Form 34731 (10-81)
(Formerly SPD-1002-1)

DUKE POWER COMPANY
PROCEDURE PREPARATION
PROCESS RECORD

(1) ID No: IP/2/A/1009/17
Change(s) 2 to
N/A Incorporated

(2) STATION: Oconee

(3) PROCEDURE TITLE: Operating Procedure for Post-Accident Containment Air Sampling System

(4) PREPARED BY: Sarah Coy DATE: 5-21-84

(5) REVIEWED BY: [signature] DATE: 5-21-84

Cross-Disciplinary Review By: _____ N/R: S

(6) TEMPORARY APPROVAL (IF NECESSARY):

By: _____ (SRO) Date: _____

By: _____ Date: _____

(7) APPROVED BY: [signature] Date: 5/22/84

(8) MISCELLANEOUS:

Reviewed/Approved By: _____ Date: _____

Reviewed/Approved By: _____ Date: _____

DUKE POWER COMPANY

OCONEE NUCLEAR STATION

OPERATING PROCEDURE FOR POST-ACCIDENT CONTAINMENT

AIR SAMPLING SYSTEM

1.0 Purpose

This procedure describes the operation of the Post-Accident Containment Air Sampling System which is used to obtain a prompt containment air sample under accident conditions while keeping radiation exposure ALARA. This procedure is also used to perform the semi-annual functional test of the system.

2.0 References

2.1 Duke Power Company Nuclear Station Post-Accident Containment Air Sampling System Manual.

2.2 HP/0/B/1006/07, Procedure for Preparation of Gas Calibration Sources

2.3 CP/1/A/2002/04C, Operating Procedure for the Post Accident Liquid Sampling (PALS) System

2.4 HP/0/B/1009/15, Procedure for Simpling and Quantifying High Level Gaseous, Radioiodine and Particulate Radioactivity

2.5 EP/0/A/1800/04, Loss of Coolant

2.6 Station Directive 4.2.5, Independent Verification Requirements

2.7 Station Directive 3.1.37, Interim Control of Independent Verification Requirements

3.0 Limits and Precautions

3.1 The sampling cycle will require two (2) qualified technicians approximately one (1) hour per sample, of which about ten (10) minutes will be spent in the sample panel area. One qualified technician will operate the control panel while the other will perform transit duties to and from the panel.

3.2 Personnel communications can be achieved by phone.

Unit 1 & 2 - Ext. [redacted] (by column AX-38)
Unit 3 - Ext. [redacted] (by door to RCA)

3.3 The following items will never be used on the panel.

a. Trap Area Evacuation

b. Fast Sample Dilution

3.4 The Recirc Pump must never be used at any pressure other than 0 inches of Mercury.

3.5 Moving the Selector Switch from one mode to another stops all current system operations. Depressing the Activate button starts operation of the newly selected mode.

3.6 The radiation monitor on the control panel will provide levels of radiation at the sample panel. If the radiation monitor is not working properly, then a portable survey instrument will be used to determine radiation levels.

3.7 If problems with the pressure and/or temperature gauge are evident, such as going off scale or erratic response, the Selector Switch must be turned to the OFF mode and sampling discontinued until the problem is corrected.

3.8 If the sampling system cannot be operated, then HP/0/B/1009/15 (Ref. 2.4) will be used as an alternate method for obtaining a containment air sample.

3.9 Enclosure 5.5 will be used to check off the steps as the procedure is completed.

3.10 Operations must complete Enclosure 5.3 or 5.4 to bypass the Hydrogen Analyzer to bring containment air to the sampling system and to return the Hydrogen Analyzer to service after sampling is complete by Enclosure 5.6 or 5.7. These enclosures shall be independently verified to ensure that containment integrity is maintained. The Operations Unit Supervisor shall designate one "doer" and one "verifier" as required by References 2.6 and 2.7.

3.11 The front side of the sample panel is the side which contains the door. The left and right side of the sample panel will be determined by using this fact.

3.12 If radiation levels exceed 16 R/hr and cannot be reduced by purging the system, secure operation of the panel, move to a low background area, and contact the Station Health Physicist or his designee for further instructions.

3.13 Before sampling operations begin, the decision must be made based on radiological conditions in the reactor building and the sampling area whether to use a 100 ml gas bomb or a calibrated syringe for the gas sample. During emergency conditions, this decision will be made by the Station Health Physicist or his designee.

3.14 Enclosure 5.8, Valve Checklist for Sample Panel, may be used to provide assistance in determining flow inside the sample panel. It is not intended to provide a verification for valve operation.

3.15 During accident conditions, the keys needed for sampling will be located in the Shiftman's key cabinet.

3.16 The sampling system must not be used if reactor building pressure is greater than 40 psig.

4.0 Procedure

4.1 Locate the Shift Supervisor for Operations and request that Operations complete Enclosure 5.3 or 5.4 to bypass the Hydrogen Analyzer so the Post Accident Containment Gas Sampling System may be operated.

4.2 Obtain equipment necessary to perform sampling, including the thiosulfate solution. Also obtain keys to the control panel and the sixth floor Ventilation Equipment Room.

NOTE: Necessary equipment for sampling is listed on Enclosure 5.1.

4.3 Open the valve on the nitrogen bottle next to the sampling panel to 40 psig.

4.4 Open the

(a) DI Water Inlet

(b) Instrument Air Inlet

(c) N_2 Inlet

located on the left side of the sample panel.

NOTE: Open inlets by rotating the back switches counterclockwise one-quarter turn to the upward position.

4.4.1 Ensure the test tees on the sample inlet and outlet lines are closed.

4.4.2 Ensure inlet valve on gas sampler is open (black switch parallel with line).

4.4.3 Ensure DI water supply line is open to the panel.

4.5 Position the thiosulfate funnel directly over the fill port located on top of the sample panel. Attach the hose on the funnel to the fill port and pour the 500 ml of thiosulfate solution into the funnel.

4.6 Set the switches listed below as follows:

(a) Sample Volume Select - set on SMALL

(b) Dilution Volume Select - set on LARGE

(c) Selector Switch - set on OFF

(d) System Purge - set on NORMAL

(e) Refill Switch - set on OFF (down)

(f) TC Switch - set on POSITION 1 (thermocouple measures sample line temperature)

(g) Sample Line Select Switch - turn to Unit and Hydrogen Analyzer (Train A or B) being used for this operation of the sampling system

4.7 Turn the Key Lock Switch to POWER ON and ensure the power on light has come on.

4.8 Turn the Radiation Monitor toggle switch ON (up).

4.8.1 Turn the selector on the Radiation Monitor to BATT and ensure the needle is in the "red test region." Turn the selector to the MR/HR or R/HR scale.

NOTE: If the Radiation Monitor is not functioning properly, note that is is not working on Enclosure 5.5, Step 9 and use a portable survey instrument to determine radiation levels during sampling.

4.9 Purge the Sample Panel.

4.9.1 Turn Select Switch to SYSTEM PURGE

4.9.2 Move Normal - Sample Purge to SAMPLE PURGE

4.9.3 Depress ACTIVATE button.

4.9.4 Depress EVAC button (Evac light on) and watch pressure gauge slowly drop to ~ - 19" of Hg. Depress STOP.

4.9.5 Press down and release the GAS PURGE toggle switch and watch the pressure gauge swiftly rise to + 10" of Hg. Depress STOP button.

4.9.6 Depress the EVAC button and watch the pressure gauge drop to 0" of Hg. Depress STOP button.

4.9.7 Depress the PUMP button and wait for 30 seconds. Depress STOP button.

4.9.8 Repeat Step 4.9.4 through 4.9.7 twice to purge the sample panel two more times.

4.9.9 Move Normal - Sample Purge to NORMAL.

4.9.10 Turn Selector Switch to SOLUTION CHANGE OUT.

4.10 Preparation for Sampling

4.10.1 Set the 500 ml sample bottle in a clear poly bag. Place the portable shielded container on the floor under the Thiosulfate sampler (left side of panel), and place the sample bottle in the shielded container.

4.10.2 Detach the left side of the flexible tubing on the thiosulfate sampler located on the left side of the sample panel near the floor.

4.10.3 Insert the free end of the tubing into the 500 ml sample bottle.

4.10.4. Complete Steps a) and b) below if a 100 ml gas bomb will be used for the gas sample. If the gas sample will be drawn by syringe, go to Step 4.10.5.

a) Detach the side of the flexible tubing on the gas sampler between the inlet valve and the hard piping.

b) Attach a 100 ml gas bomb between the free end of the flexible tubing and the hard piping on the gas sampler. Ensure valves on gas bomb are open.

4.11 Flush Thiosulfate Sampler and fill with Thiosulfate.

4.11.1 Depress ACTIVATE button.

4.11.2 Depress FLUSH button and hold for 30 seconds.

4.11.3 Depress PURGE button and hold for 30 seconds.

4.11.4 Depress EMPTY button and hold for 60 seconds.

4.11.5 Open the TS (thiosulfate) valve located inside the sample panel directly below the fillport. (Open valve in same manner as valves in Step 4.4).

4.11.6 Move Refill toggle switch to ON (up) and wait 2 minutes. Move Refill to OFF (down).

4.11.7 Turn Selector Switch to DILUTION VOLUME EVACUATION.

4.12 Evacuate the Dilution Volume.

4.12.1 Depress ACTIVATE button and watch pressure gauge drop to ~ - 19" of Hg. Turn Selector Switch to SAMPLE RECIRC.

4.13 Recirc Containment Air and Trap a Sample.

4.13.1 Depress ACTIVATE button and wait 15 minutes.

4.13.2 Read and record sample inlet line pressure and temperature on Enclosure 5.2.

4.13.3 Depress SAMPLE button and wait 1 minute.

4.13.4 Depress TRAP button and wait 30 seconds.

4.13.5 Turn Selector Switch to SAMPLE DILUTION.

4.14 Dilute Sample with N_2 and Recirc.

4.14.1 Depress ACTIVATE button.

4.14.2 Depress SLOW button and watch pressure gauge slowly rise to 0" of Hg. Depress STOP button.

4.14.3 Depress RECIRC button and wait 5 minutes.

4.14.4 Complete step a) if a syringe will be used for the gas sample. If a 100 ml gas bomb is being used for the gas sample, continue on to Step 4.14.5.

a) Insert the calibrated gas syringe into the septum on the gas sampler. Withdraw a 5 cc sample of gas and place the syringe into the portable shielded container.

4.14.5 Depress the STOP button on the control panel.

4.14.6 Turn the Selector Switch to SOLUTION CHANGEOUT.

4.15 Collect Particulate and Iodine Sample.

4.15.1 Depress ACTIVATE button.

4.15.2 Depress TS SAMPLE button.

4.15.3 Depress and hold EMPTY button until thiosulfate solution has drained into 500 ml sample bottle.

4.15.4 Depress TS SAMPLE GRAB button.

4.15.5 Depress PURGE button and hold for 1 minute.

4.15.6 Turn the Selector Switch to SYSTEM PURGE.

4.16 Purge the Sample Panel.

4.16.1 Depress ACTIVATE button.

4.16.2 Depress EVAC button and watch pressure gauge slowly drop to ~ - 19" of Hg. Depress STOP button.

4.16.3 Press down and release GAS PURGE toggle switch and watch pressure swiftly rise to + 10" of Hg. Depress STOP button.

4.16.4 Depress EVAC button and watch the pressure gauge drop to 0" of Hg. Depress STOP button.

4.16.5 Depress the PUMP button and wait 30 seconds. Depress STOP button.

4.16.6 Repeat Steps 4.16.2 through 4.16.5 to purge the sample panel one additional time.

4.17 Remove Samples from Sample Panel.

4.17.1 Return to the sample panel and close both valves on the gas bomb (if used) and close the inlet valve on the gas sampler.

4.17.2 Disconnect the gas bomb (if used) from the sample panel. Place gas bomb in portable shielded container.

4.17.3 Reconnect the gas sampler line and open the inlet valve. Reconnect the thiosulfate sampler line.

4.17.4 Tightly cap the 500 ml sample bottle.

4.18 Switching the Sample System Off.

4.18.1 Turn the Selector Switch to OFF.

4.18.2 Turn the Radiation Monitor to OFF.

4.18.3 Turn the Keylock Switch to OFF.

4.18.4 Close the following valves:

a) Nitrogen bottle - next to sample panel

b) TS Valve - inside sample panel

c) DI Water Inlet, Instrument Air Inlet, N_2 Inlet (On left side of sample panel)

4.19 Transport the samples to the Count Room for analysis.

4.20 Calculate the sample volume using the data from Enclosure 5.2. Record this volume on sample data sticker.

NOTE: If sample cannot be counted because of high activity, further dilute the gas samples as per procedure HP/0/B/1006/07.

4.21 Transmit sample analysis results to the Station Health Physicist or his designee.

4.22 Request Operations to return the Hydrogen Analyzer to service per Enclosure 5.6 or 5.7.

4.23 Clean the area around the sample panel and pump out the sump.

NOTE: This step may be N/A if additional samples will be pulled or radiological conditions do not allow clean up.

5.0 Enclosures

5.1 Sampling Equipment

5.2 Sample Data Sheet

5.3 Operations Checklist for Bypassing H_2 Analysis Panel Currently in Standby Mode

5.4 Operations Checklist for Bypassing H_2 Analysis Panel Currently in Analyze Mode

5.5 Checklist for Operation of Sample Panel

5.6 Operations Checklist for Returning H_2 Analysis Panel Back to Service in Standby Mode

5.7 Operations Checklist for Returning H_2 Analysis Panel Back to Service in Analyze Mode

5.8 Valve Checklist for Sample Panel

5.9 Control Panel Diagram

5.10 Flow Diagram

ENCLOSURE 5.1

HP/2/A/1009/17

SAMPLING PANEL EQUIPMENT

1	Nalgene 500 ml Thiosulfate sample bottle.
2	Stainless Steel Gas Bombs
1	9/16" Combination Wrench
1	Stainless Steel Portable Shielded Container
1	Stopwatch
1 bottle	Thiosulfate Solution (500 ml)
2	10" x 12" Clear Poly Bags
1	Calibrated Gas Syringe
1	Bucket

ENCLOSURE 5.2

HP/2/A/1009/17

SAMPLE DATA SHEET

1) NAME _____

DATE _____

UNIT _____

2) Sample Line Temperature _____ °F

3) Sample Inlet Line Pressure _____ psig

4) Gas Sample Volume = SV

$$SV = 1.3cc \left[\left(\frac{293}{273 + 5/9[°F-32]}\right)\left(\frac{14.7 + P}{14.7}\right)\right]$$

where:

°F = Sample Line Temperature in °F

P = Sample Line Pressure in psig

$$SV = \frac{5599.23 + 380.9(P)}{3751.77 + 8.167(°F)} = \_\_\_\_ ml$$

5) Diluted Volume = $\frac{SV}{1E4}$ (sample size) = _____ ml

where:

sample size = 100cc gas bomb or 5cc gas syringe

6) Record Diluted Volume as Gas Sample Volume on Sample Label.

7) Record Iodine and Particulate Sample Volume as 1.3 ml of sample in 500 ml of thiosulfate solution on sample label.

Checked Control Copy _____

Date _____

ENCLOSURE 5.3

HP/2/A/1009/17

OPERATIONS CHECKLIST FOR BYPASSING

H_2 ANALYSIS PANEL CURRENTLY IN STANDBY MODE

		DATE INIT./TIME	VERIFICATION DATE INIT./TIME
1.0	Initial Conditions		
1.1	Containment Integrity is required.	_____	_____
1.2	Designate a Licensed Operator assigned to immediately close containment isolation valves from the Control Room if an ES actuation occurs. This person may have other responsibilities, but they shall not prevent him from performing this evolution.	_____	
	License Operator _____		
	Unit Supervisor _____		
1.3	Record that the containment isolation valves will be opened on Enclosures 5.1 and 5.6 of OP/0/A/1102/20 (Shift Turnover). (2PR-81 and 2PR-84 or 2PR-90 and 2PR-87)	_____	
1.4	H_2 Analysis Panel is in Standby Mode.	_____	
1.5	Reactor building pressure is less than 40 psig.	_____	
2.0	Procedure		
2.1	Place Post Accident Sampler in service as follows:		
	2.1.1 Select which train to be used. Circle one: Trn. "A" or Trn. "B".	_____	
	2.1.2 Ensure train is in standby mode by observing red light in gray cabinet.	_____	

NOTE: Use other train if not in standby.

ENCLOSURE 5.3

HP/2/A/1009/17

		DATE INIT./TIME	VERIFICATION DATE INIT./TIME
2.1.3	At the selected train "Remote" Panel (blue cabinet), depress both black ON buttons for 'BYP TO POST AC'. Opens (2PR-83, 2PR-86) or (2PR-89, 2PR-92).	_____	
2.1.4	Turn sample valve selector switch to 'Top Cont'. Opens 2PR-71 or 2PR-76. (Red light will come on).	_____	_____
2.1.5	From the Control Room, open 2PR-81 and 2PR-84 (Containment Isolation Valves) if train "A" was selected.	_____	_____
	OR		
	Open 2PR-87 and 2PR-90 (Containment Isolation Valves) if train "B" was selected.	_____	_____

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

2.1.6	Notify Unit Supervisor which train is selected.	_____	_____
	Unit Supervisor _____		
2.1.7	Return completed enclosure to Health Physics Personnel operating Sample Panel.	_____	

Checked Control Copy _____

Date _____

ENCLOSURE 5.4

HP/2/A/1009/17

OPERATIONS CHECKLIST FOR BYPASSING

H_2 ANALYSIS PANEL CURRENTLY IN ANALYZE MODE

		DATE INIT./TIME	VERIFICATION DATE INIT./TIME
1.0	Initial Conditions		
1.1	H_2 Analyzer is in Analyze Mode.	_____	
1.2	Reactor building pressure is less than 40 psig.	_____	
2.0	Procedure		
2.1	Place Post Accident Sampler in service as follows:		
2.1.1	Select which train is to be used. Circle one: Trn. "A" or Trn. "B".	_____	
2.1 2	At the "Remote" Panel (blue cabinet), position the "Off Standby, Analyze" selector to "Standby" and observe red light in grey cabinet.	_____	
2.1.3	At selected train "Remote" Panel (blue cabinet), depress both black ON buttons for 'BYP TO POST AC'. Opens (2PR-83, 2PR-86) or (2PR-89, 2PR-92).	_____	
2.1.4	Notify Unit Supervisor which train is selected.	_____	
	Unit Supervisor _____		
2.1.5	Return completed enclosure to Health Physics Personnel operating Sample Panel.	_____	

Checked Control Copy _____

Date _____

ENCLOSURE 5.5
HP/2/A/1009/17
CHECKLIST FOR OPERATION OF SAMPLE PANEL

NOTE: Complete steps in order listed. Initial steps as completed.

A) Switching System On

____1) Operations Bypass H_2 Analyzer by Enclosure 5.3 or 5.4.

____2) Obtain Sampling Equipment and Keys.

____3) Open Nitrogen bottle to 40 psig.

____4) Open:

a) DI Water Inlet
b) Instrument Air Inlet
c) N_2 Inlet

____5) a) Ensure test tees on sample inlet and outlet lines are closed.
b) Ensure inlet valve on gas sampler is open.
c) Ensure DI water supply line is open to the panel.

____6) a) Position thiosulfate funnel
b) Attach hose to fill port
c) Pour 500 ml of thiosulfate into funnel.

____7) Set switches on control panel:

a) Sample Volume Select - set on SMALL.

b) Dilution Volume Select - set on LARGE.

c) Selector Switch - set on OFF.

d) System Purge - set on NORMAL.

e) Refill Switch - set on OFF (down).

f) TC Switch - set on POSITION 1 (measures sample line temperature).

g) Sample Line Select Switch - Unit and Hydrogen Analyzer Train A or B

____8) Key Lock Switch - POWER ON

ENCLOSURE 5.5
HP/2/A/1009/17
CHECKLIST FOR OPERATION OF SAMPLE PANEL

____9) a) Radiation Monitor - ON (up)

b) Radiation Monitor Selector - BATT (red test region)

c) Radiation Monitor Selector - MR/HR or R/HR

B) Purge the Sample Panel

____10) Selector Switch - SYSTEM PURGE

____11) Normal - Sample Purge - SAMPLE PURGE

□ □ □ 12) a) ACTIVATE

b) EVAC

c) Pressure slowly drops to ~ - 19" of Hg.

d) STOP

□ □ □ 13) a) GAS PURGE - press down and release.

b) Pressure swiftly rises to + 10" of Hg.

c) STOP

□ □ □ 14) a) EVAC

b) Pressure drops to 0" of Hg.

c) STOP

□ □ □ 15) a) PUMP - wait 30 seconds

b) STOP

□ □ □ 16) a) Purge sample panel two (2) more times by completing Steps 12 through 15 two (2) more times.

____17) Normal - Sample Purge - NORMAL

ENCLOSURE 5.5
HP/2/A/1009/17
CHECKLIST FOR OPERATION OF SAMPLE PANEL

____18) Selector Switch - SOLUTION CHANGEOUT

C) Preparation for Sampling

____19) Attach 500 ml sample bottle to TS Sampler.

____20) Attach gas bomb to gas sampler and ensure valves on gas bomb are open (N/A step if syringe will be used instead of gas bomb).

D) Flush Thiosulfate Sampler and fill with Thiosulfate

____21) a) ACTIVATE

b) FLUSH - hold 30 seconds

c) PURGE - hold 30 seconds

d) EMPTY - hold 60 seconds

____22) a) Open TS (thiosulfate) valve

b) Refill - ON - wait 2 minutes

c) Refill - OFF

____23) Selector Switch - DILUTION VOLUME EVACUATION

E) Evacuate the Dilution Volume

____24) a) Activate

b) Pressure slowly drops to ~ - 19" of Hg.

c) Selector Switch - SAMPLE RECIRC

ENCLOSURE 5.5
HP/2/A/1009/17
CHECKLIST FOR OPERATION OF SAMPLE PANEL

F) Recirc Containment Air and Trap a Sample

____25) ACTIVATE - wait 15 minutes

____26) Read and record sample inlet line temperature and pressure on Enclosure 5.2.

____27) a) SAMPLE - wait 1 minute

b) TRAP - wait 30 seconds

c) Selector Switch - SAMPLE DILUTION

G) Dilute Sample with N_2 and Recirc.

____28) a) ACTIVATE

b) SLOW

c) Pressure slowly rises to 0" of Hg.

d) STOP

____29) RECIRC - wait 5 minutes

____30) Complete a) if syringe will be used for gas sample. If gas bomb is being used, N/A this step and continue on to Step 31.

a) Withdraw a 5 cc gas sample from the septum of the gas sampler using calibrated syringe. Place syringe in portable shielded container.

____31) a) STOP

b) Selector Switch - SOLUTION CHANGEOUT

ENCLOSURE 5.5
HP/2/A/1009/17
CHECKLIST FOR OPERATION OF SAMPLE PANEL

H) Collect Particulate and Iodine Sample

____32) a) ACTIVATE

b) TS SAMPLE

c) EMPTY - hold button until thiosulfate solution has drained into sample bottle.

d) TS SAMPLE GRAB

e) PURGE - hold button 1 minute

_____33) Selector Switch - SYSTEM PURGE

I) Purge the Sample Panel.

□ □ 34) a) ACTIVATE

b) EVAC

c) Pressure slowly drops to ~ - 19" of Hg.

d) STOP

□ □ 35) a) GAS PURGE - press down and release

b) Pressure swiftly rise to + 10" of Hg.

c) STOP

□ □ 36) a) EVAC

b) Pressure drop to 0" of Hg.

c) STOP

ENCLOSURE 5.5
HP/2/A/1009/17
CHECKLIST FOR OPERATION OF SAMPLE PANEL

☐ ☐ 37 a) PUMP - wait 30 seconds

b) STOP

☐ ☐ 38) Repeat Steps 34 through 37 one additional time.

J) Remove Samples from Sample Panel

____39) Return to sample panel and close both valves on the gas bomb and the inlet valve on the gas sampler (N/A step if gas bomb not used).

____40) Disconnect gas bomb from sample panel. Place gas bomb in portable shielded container. (N/A step if gas bomb not used).

____41) a) Reconnect gas sampler line and open inlet valve.
b) Reconnect thiosulfate sampler line.
c) Tightly cap sample bottle.

K) Switching System Off

____42) Selector Switch - OFF

____43) Turn the Radiation Monitor - OFF

____44) Key Lock Switch - OFF

____45) Close:

a) Nitrogen bottle

b) TS Valve - inside sample panel

c) DI Water Inlet

d) Instrument Air Inlet

e) N_2 Inlet

ENCLOSURE 5.5
HP/2/A/1009/17
CHECKLIST FOR OPERATION OF SAMPLE PANEL

_____46) Transport samples to Count Room for analysis.

_____47) Calculate sample volume using data from Enclosure 5.2. (Dilute gas samples per HP/0/B/1006/07 if needed).

_____48) Transmit sample analysis results to Station Health Physicist or his designee.

_____49) Request Operations to return the Hydrogen Analyzer to service per Enclosures 5.6 or 5.7.

_____50) Clean area around sample panel and pump out sump. (This step may be N/A if additional samples will be pulled or radiological conditions do not allow clean up.)

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ENCLOSURE 5.6

HP/2/A/1009/17

OPERATIONS CHECKLIST FOR RETURNING H_2 ANALYSIS PANEL

BACK TO SERVICE IN STANDBY MODE

		DATE INIT./TIME	VERIFICATION DATE INIT./TIME
1.0	Procedure		
1.1	Return the H_2 Analysis train back to service as follows:		
1.1.1	Turn Sample Valve Selector switch to OFF. (Red light will go off). Closes 2PR-71 or 2PR-76.	_____	_____
1.1.2	Depress the OFF buttons on both 'BYP TO POST AC' switches. Closes (2PR-83, 2PR-86) or (2PR-89, 2PR-92).	_____	
1.1.3	From the Control Room, Close 2PR-81 and 2PR-84 if train "A" is selected.	_____	_____
	OR		
	Close 2PR-87 and 2PR-90 if train "B" was selected.	_____	_____

NOTE: This will regain containment integrity. Remove the containment isolation valves from Enclosure 5.1 and 5.6 of OP/0/A/1102/20 (Shift Turnover).

1.1.4	Notify the Unit Supervisor the H_2 Analysis Train is back in service.	_____	
1.1.5	Return completed enclosure to personnel operating Post Accident Sample Panel.	_____	

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Date _____

ENCLOSURE 5.7

HP/2/A/1009/17

OPERATIONS CHECKLIST FOR RETURNING UNIT 2 H_2 ANALYSIS PANEL BACK TO SERVICE IN ANALYZE MODE

	DATE INIT./TIME	VERIFICATION DATE INIT./Time
1.0 Initial Conditions		
1.1 H_2 Analysis Panel has been switched to Standby Mode for Post Accident sampling and is to be returned to Analyze Mode.	_____	
2.0 Procedure		
2.1 Return the H_2 Analysis train back to service as follows:		
2.1.1 Depress the OFF buttons on both "BYP to Post AC" switches. Closes (2PR-83, 2PR-86) or (2PR-89, 2PR-92).	_____	
2.1.2 Position the "Off, Standby, Analyze" Selector to Analyze.	_____	
NOTE: When Analyze is selected, the indication will go up scale resulting in a possible High Hydrogen Alarm on both panels and in the Control Room. Then return down scale to the correct reading in approximately 3 minutes.		
2.1.3 Push the Remote Selector button to ensure control is from Remote Panel.	_____	
2.1.4 Reset the Common Alarm after the meter reading stabilizes.	_____	
2.1.5 Notify the Unit Supervisor the H_2 Analysis Train is back in service.	_____	
2.1.6 Return completed enclosure to Health Physics Personnel Operating Post Accident Sample Panel.	_____	

ENCLOSURE 5.8

HP/2/A/1009/17

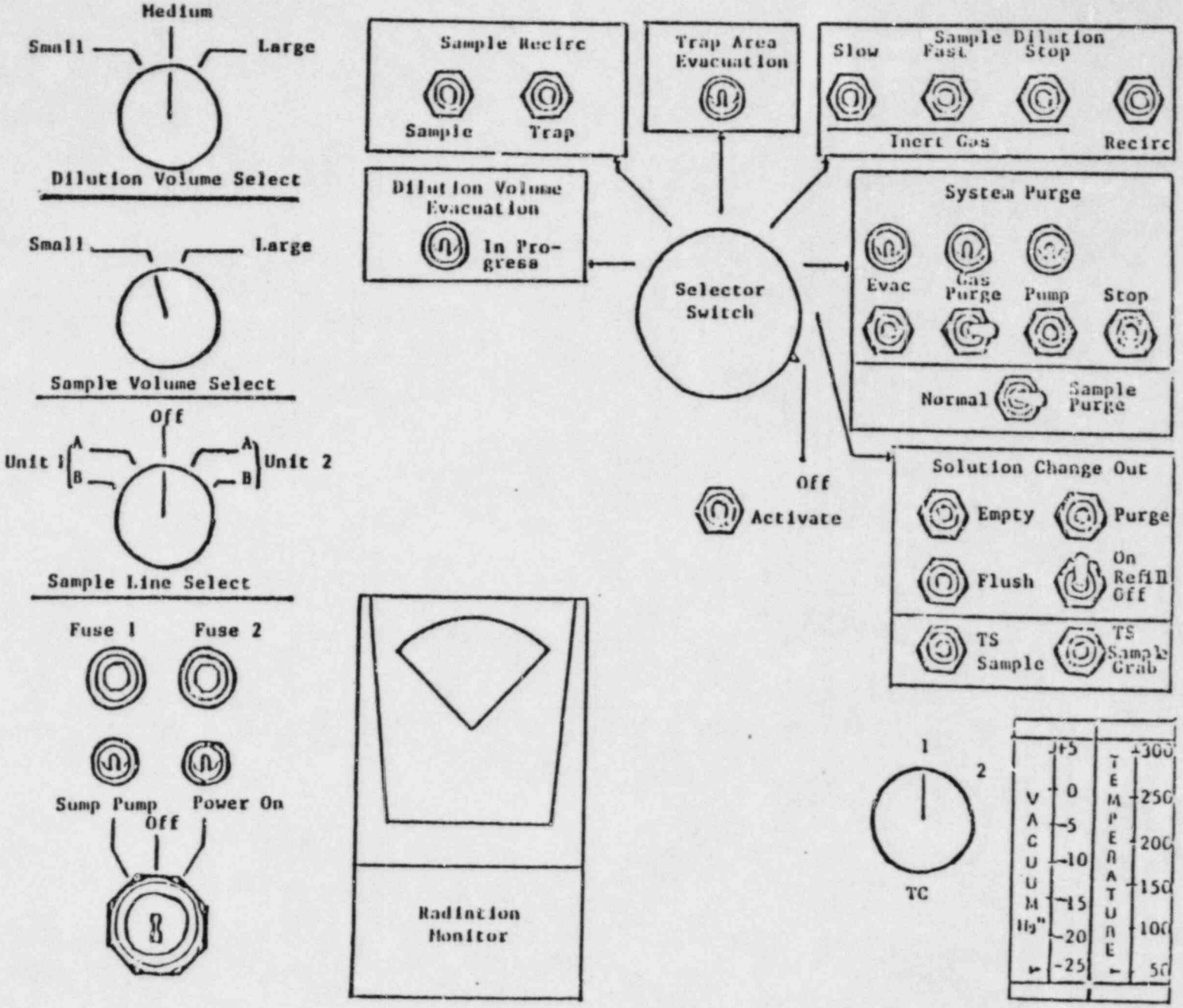
VALVE CHECKLIST FOR SAMPLE PANEL

NOTE: This checklist may be used to provide assistance in determining flow inside the sample panel. It is not intended to provide a verification for valve operation.

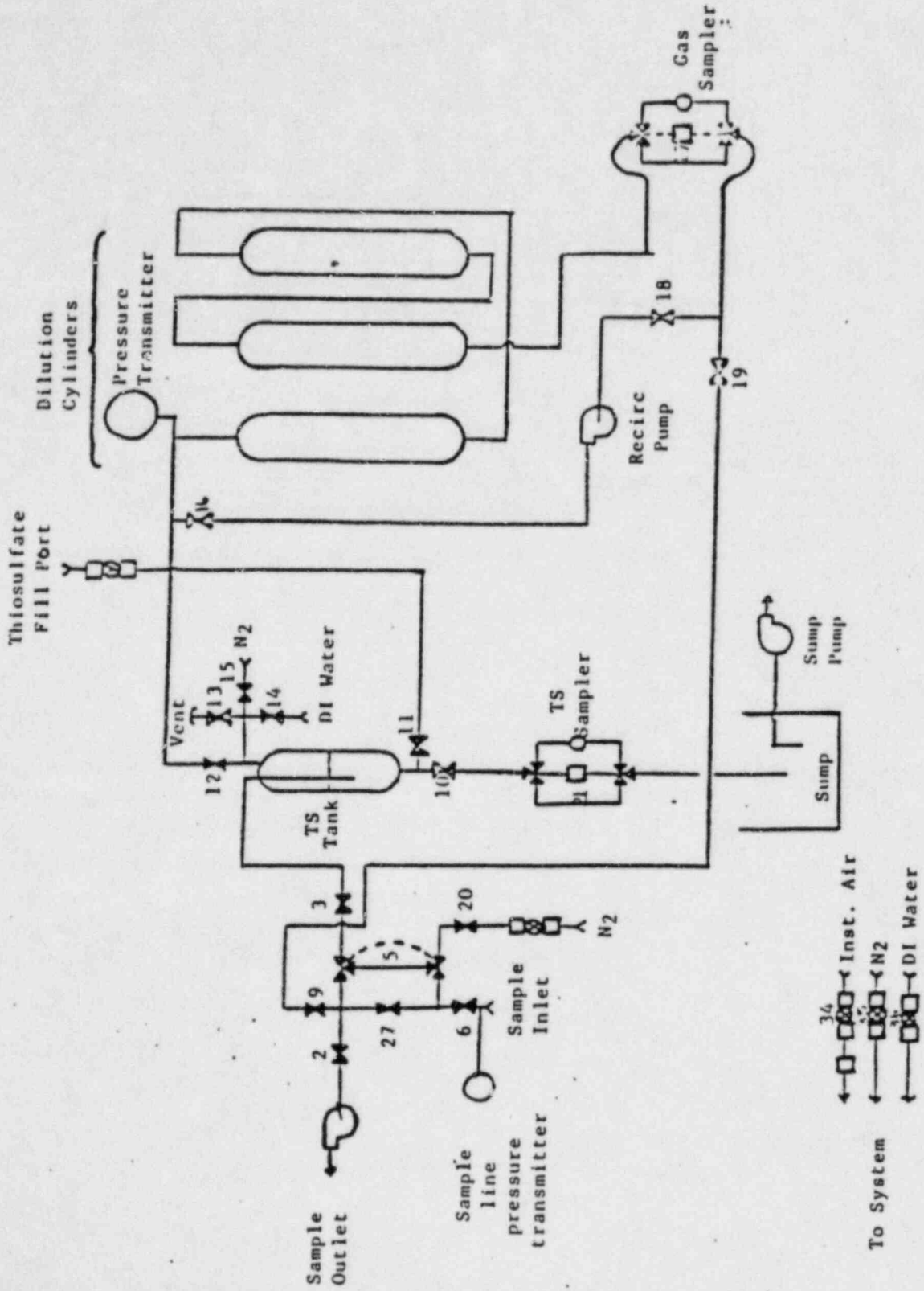
ACTION	RESPONSE
Dilution Volume Evacuation	
- Activate	Energize 1, 2, 9, 12, 19, 17
Sample Recirculate	
- Activate	Energize 1, 2, 5, 6, 27
- Sample	De-energize 27
- Trap	De-energize 2, 5
Sample Dilution	
- Activate	Energize 12, 17
- Slow	Energize 3, 20
- Stop	De-energize 3, 20
- Recirc	Energize Recirc Pump 16, 18

NOTE: Valve #17 will de-energize when selector switch is moved to another position.

System Purge	
- Activate	Energize 9, 12, 19, 27
- Evac	Energize 12, 22
- Stop	Energize 1, 2
- Gas Purge (down)	De-energize 1, 2
- Stop	Energize 15. De-energize 1, 2 .
- Normal - Sample Purge (Sample Purge)	De-energize 15
- Pump	Energize 17
	Energize Pump 16, 18
- Stop	De-energize 15, or 1 and 2
	De-energize Pump 16, 18
Solution Change Out	
- Empty	Energize 10, 11, 13
- Flush	Energize 14, 10
- Purge	Energize 15, 10
- Refill	Energize 11, 13
- TS Sample	Energize 21
- TS Sample Grab	De-energize 21


Medium
Small
Large
Dilution Volume Select
Small
Large
Sample Volume Select
Off
Unit 1
A
B
A
B
Unit 2
Sample Line Select
Fuse 1
Fuse 2
Sump Pump
Power On
Off
Sample Recirc
Sample
Trap
Trap Area Evacuation
Sample Dilution
Slow
Fast
Stop
Inert Gas
Recirc
Dilution Volume Evacuation
In Progress
Selector Switch
System Purge
Evac
Gas Purge
Pump
Stop
Normal
Sample Purge
Off
Activate
Solution Change Out
Empty
Purge
Flush
On
Refill
Off
TS Sample
TS Sample Grab
Radiation Monitor
1
2
TC
VACUUM in Hg
+5
0
-5
-10
-15
-20
-25
TEMPERATURE
300
250
200
150
100
50

Enclosure 5.10
RP/0/A/1009/17
Flow Diagram



CONTROL COPY INFORMATION ONLY

Form 34731 (10-81)
(Formerly SPD-1002-1)

DUKE POWER COMPANY
PROCEDURE PREPARATION
PROCESS RECORD

(1) ID No: HP/3/A/1009/17
Change(s) 2 to
N/A Incorporated

(2) STATION: Oconee

(3) PROCEDURE TITLE: Operating Procedure for Post-Accident Containment Air Sampling System

(4) PREPARED BY: Sarah Coy DATE: 5-21-84

(5) REVIEWED BY: [signature] DATE: 5-21-84

Cross-Disciplinary Review By: _____ N/R: N/A

(6) TEMPORARY APPROVAL (IF NECESSARY):

By: _____ (SRO) Date: _____

By: _____ Date: _____

(7) APPROVED BY: J L Barr Date: 5/22/84

(8) MISCELLANEOUS:

Reviewed/Approved By: _____ Date: _____

Reviewed/Approved By: _____ Date: _____

DUKE POWER COMPANY

OCONEE NUCLEAR STATION

OPERATING PROCEDURE FOR POST-ACCIDENT CONTAINMENT

AIR SAMPLING SYSTEM

1.0 Purpose

This procedure describes the operation of the Post-Accident Containment Air Sampling System which is used to obtain a prompt containment air sample under accident conditions while keeping radiation exposure ALARA. This procedure is also used to perform the semi-annual functional test of the system.

2.0 References

2.1 Duke Power Company Nuclear Station Post-Accident Containment Air Sampling System Manual

2.2 HP/0/B/1006/07, Procedure for Preparation of Gas Calibration Sources

2.3 OP/1/A/2002/04C, Operating Procedure for the Post Accident Liquid Sampling (PALS) System

2.4 HP/0/B/1009/15, Procedure for Sampling and Quantifying High Level Gaseous, Radioiodine and Particulate Radioactivity

2.5 EP/0/A/1800/04, Loss of Coolant

2.6 Station Directive 4.2.5, Independent Verification Requirements

2.7 Station Directive 3.1.37, Interim Control of Independent Verification Requirements

3.0 Limits and Precautions

3.1 The sampling cycle will require two (2) qualified technicians approximately one (1) hour per sample, of which about ten (10) minutes will be spent in the sample panel area. One qualified technician will operate the control panel while the other will perform transit duties to and from the panel.

3.2 Personnel communications can be achieved by phone.

Unit 1 & 2 - Ext. [redacted] (by column AK-38)
Unit 3 - Ext. [redacted] (by door to RCA)

3.3 The following items will never be used on the panel.

a. Trap Area Evacuation

b. Fast Sample Dilution

3.4 The Recirc Pump must never be used at any pressure other than 0 inches of Mercury.

3.5 Moving the Selector Switch from one mode to another stops all current system operations. Depressing the Activate button starts operation of the newly selected mode.

3.6 The radiation monitor on the control panel will provide levels of radiation at the sample panel. If the radiation monitor is not working properly, then a portable survey instrument will be used to determine radiation levels.

3.7 If problems with the pressure and/or temperature gauge are evident, such as going off scale or erratic response, the Selector Switch must be turned to the OFF mode and sampling discontinued until the problem is corrected.

3.8 If the sampling system cannot be operated, then HP/0/B/1009/15 (Ref. 2.4) will be used as an alternate method for obtaining a containment air sample.

3.9 Enclosure 5.5 will be used to check off the steps as the procedure is completed.

3.10 Operations must complete Enclosure 5.3 or 5.4 to bypass the Hydrogen Analyzer to bring containment air to the sampling system and to return the Hydrogen Analyzer to service after sampling is complete by Enclosure 5.6 or 5.7. These enclosures shall be independently verified to ensure that containment integrity is maintained. The Operations Unit Supervisor shall designate one "doer" and one "verifier" as required by References 2.6 and 2.7.

3.11 The front side of the sample panel is the side which contains the door. The left and right side of the sample panel will be determined by using this fact.

3.12 If radiation levels exceed 16 R/hr and cannot be reduced by purging the system, secure operation of the panel, move to a low background area, and contact the Station Health Physicist or his designee for further instructions.

3.13 Before sampling operations begin, the decision must be made based on radiological conditions in the reactor building and the sampling area whether to use a 100 ml gas bomb or a calibrated syringe for the gas sample. During emergency conditions, this decision will be made by the Station Health Physicist or his designee.

3.14 Enclosure 5.8, Valve Checklist for Sample Panel, may be used to provide assistance in determining flow inside the sample panel. It is not intended to provide a verification for valve operation.

3.15 During accident conditions, the keys needed for sampling will be located in the Shiftman's key cabinet.

3.16 The sampling system must not be used if reactor building pressure is greater than 40 psig.

4.0 Procedure

4.1 Locate the Shift Supervisor for Operations and request that Operations complete Enclosure 5.3 or 5.4 to bypass the Hydrogen Analyzer so the Post Accident Containment Gas Sampling System may be operated.

4.2 Obtain equipment necessary to perform sampling, including the thiosulfate solution. Also obtain keys to the control panel and the sixth floor Ventilation Equipment Room.

NOTE: Necessary equipment for sampling is listed on Enclosure 5.1.

4.3 Open the valve on the nitrogen bottle next to the sampling panel to 40 psig.

4.4 Open the

(a) DI Water Inlet

(b) Instrument Air Inlet

(c) N_2 Inlet

located on the left side of the sample panel.

NOTE: Open inlets by rotating the back switches counterclockwise one-quarter turn to the upward position.

4.4.1 Ensure the test tees on the sample inlet and outlet lines are closed.

4.4.2 Ensure inlet valve on gas sampler is open (black switch parallel with line).

4.4.3 Ensure DI water supply line is open to the panel.

4.5 Position the thiosulfate funnel directly over the fill port located on top of the sample panel. Attach the hose on the funnel to the fill port and pour the 500 ml of thiosulfate solution into the funnel.

4.6 Set the switches listed below as follows:

(a) Sample Volume Select - set on SMALL

(b) Dilution Volume Select - set on LARGE

(c) Selector Switch - set on OFF

(d) System Purge - set on NORMAL

(e) Refill Switch - set on OFF (down)

(f) IC Switch - set on POSITION 1 (thermocouple measures sample line temperature)

(g) Sample Line Select Switch - turn to Unit and Hydrogen Analyzer (Train A or B) being used for this operation of the sampling system

4.7 Turn the Key Lock Switch to POWER ON and ensure the power on light has come on.

4.8 Turn the Radiation Monitor toggle switch ON (up).

4.8.1 Turn the selector on the Radiation Monitor to BATT and ensure the needle is in the "red test region." Turn the selector to the MR/HR or R/HR scale.

NOTE: If the Radiation Monitor is not functioning properly, note that is is not working on Enclosure 5.5, Step 9 and use a portable survey instrument to determine radiation levels during sampling.

4.9 Purge the Sample Panel.

4.9.1 Turn Select Switch to SYSTEM PURGE

4.9.2 Move Normal - Sample Purge to SAMPLE PURGE

4.9.3 Depress ACTIVATE button.

4.9.4 Depress EVAC button (Evac light on) and watch pressure gauge slowly drop to ~ - 19" of Hg. Depress STOP.

4.9.5 Press down and release the GAS PURGE toggle switch and watch the pressure gauge swiftly rise to + 10" of Hg. Depress STOP button.

4.9.6 Depress the EVAC button and watch the pressure gauge drop to 0" of Hg. Depress STOP button.

4.9.7 Depress the PUMP button and wait for 30 seconds. Depress STOP button.

4.9.8 Repeat Step 4.9.4 through 4.9.7 twice to purge the sample panel two more times.

4.9.9 Move Normal - Sample Purge to NORMAL.

4.9.10 Turn Selector Switch to SOLUTION CHANGE OUT.

4.10 Preparation for Sampling

4.10.1 Set the 500 ml sample bottle in a clear poly bag. Place the portable shielded container on the floor under the Thiosulfate sampler (left side of panel), and place the sample bottle in the shielded container.

4.10.2 Detach the left side of the flexible tubing on the thiosulfate sampler located on the left side of the sample panel near the floor.

4.10.3 Insert the free end of the tubing into the 500 ml sample bottle.

4.10.4. Complete Steps a) and b) below if a 100 ml gas bomb will be used for the gas sample. If the gas sample will be drawn by syringe, go to Step 4.10.5.

a) Detach the side of the flexible tubing on the gas sampler between the inlet valve and the hard piping.

b) Attach a 100 ml gas bomb between the free end of the flexible tubing and the hard piping on the gas sampler. Ensure valves on gas bomb are open.

4.11 Flush Thiosulfate Sampler and fill with Thiosulfate.

4.11.1 Depress ACTIVATE button.

4.11.2 Depress FLUSH button and hold for 30 seconds.

4.11.3 Depress PURGE button and hold for 30 seconds.

4.11.4 Depress EMPTY button and hold for 60 seconds.

4.11.5 Open the TS (thiosulfate) valve located inside the sample panel directly below the fillport. (Open valve in same manner as valves in Step 4.4).

4.11.6 Move Refill toggle switch to ON (up) and wait 2 minutes. Move Refill to OFF (down).

4.11.7 Turn Selector Switch to DILUTION VOLUME EVACUATION.

4.12 Evacuate the Dilution Volume.

4.12.1 Depress ACTIVATE button and watch pressure gauge drop to ~ - 19" of Hg. Turn Selector Switch to SAMPLE RECIRC.

4.13 Recirc Containment Air and Trap a Sample.

4.13.1 Depress ACTIVATE button and wait 15 minutes.

4.13.2 Read and record sample inlet line pressure and temperature.

4.13.3 Depress SAMPLE button and wait 1 minute.

4.13.4 Depress TRAP button and wait 30 seconds.

4.13.5 Turn Selector Switch to SAMPLE DILUTION.

4.14 Dilute Sample with N_2 and Recirc.

4.14.1 Depress ACTIVATE button.

4.14.2 Depress SLOW button and watch pressure gauge slowly rise to 0" of Hg. Depress STOP button.

4.14.3 Depress RECIRC button and wait 5 minutes.

4.14.4 Complete step a) if a syringe will be used for the gas sample. If a 100 ml gas bomb is being used for the gas sample, continue on to Step 4.14.5.

a) Insert the calibrated gas syringe into the septum on the gas sampler. Withdraw a 5 cc sample of gas and place the syringe into the portable shielded container.

4.14.5 Depress the STOP button on the control panel.

4.14.6 Turn the Selector Switch to SOLUTION CHANGEOUT.

4.15 Collect Particulate and Iodine Sample.

4.15.1 Depress ACTIVATE button.

4.15.2 Depress TS SAMPLE button.

4.15.3 Depress and hold EMPTY button until thiosulfate solution has drained into 500 ml sample bottle.

4.15.4 Depress TS SAMPLE GRAB button.

4.15.5 Depress PURGE button and hold for 1 minute.

4.15.6 Turn the Selector Switch to SYSTEM PURGE.

4.16 Purge the Sample Panel.

4.16.1 Depress ACTIVATE button.

4.16.2 Depress EVAC button and watch pressure gauge slowly drop to ~ - 19" of Hg. Depress STOP button.

4.16.3 Press down and release GAS PURGE toggle switch and watch pressure swiftly rise to + 10" of Hg. Depress STOP button.

4.16.4 Depress EVAC button and watch the pressure gauge drop to 0" of Hg. Depress STOP button.

4.16.5 Depress the PUMP button and wait 30 seconds. Depress STOP button.

4.16.6 Repeat Steps 4.16.2 through 4.16.5 to purge the sample panel one additional time.

4.17 Remove Samples from Sample Panel.

4.17.1 Return to the sample panel and close both valves on the gas bomb (if used) and close the inlet valve on the gas sampler.

4.17.2 Disconnect the gas bomb (if used) from the sample panel. Place gas bomb in portable shielded container.

4.17.3 Reconnect the gas sampler line and open the inlet valve. Reconnect the thiosulfate sampler line.

4.17.4 Tightly cap the 500 ml sample bottle.

4.18 Switching the Sample System Off.

4.18.1 Turn the Selector Switch to OFF.

4.18.2 Turn the Radiation Monitor to OFF.

4.18.3 Turn the Keylock Switch to OFF.

4.18.4 Close the following valves:

a) Nitrogen bottle - next to sample panel

b) TS Valve - inside sample panel

c) DI Water Inlet, Instrument Air Inlet, N_2 Inlet (On left side of sample panel)

4.19 Transport the samples to the Count Room for analysis.

4.20 Calculate the sample volume using the data from Enclosure 5.2. Record this volume on sample data sticker.

NOTE: If sample cannot be counted because of high activity, further dilute the gas samples as per procedure HP/0/B/1006/07.

4.21 Transmit sample analysis results to the Station Health Physicist or his designee.

4.22 Request Operations to return the Hydrogen Analyzer to service per Enclosure 5.6 or 5.7.

4.23 Clean the area around the sample panel and pump out the sump.

NOTE: This step may be N/A if additional samples will be pulled or radiological conditions do not allow clean up.

5.0 Enclosures

5.1 Sampling Equipment

5.2 Sample Data Sheet

5.3 Operations Checklist for Bypassing H_2 Analysis Panel currently in Standby Mode

5.4 Operations Checklist for Bypassing H_2 Analysis Panel currently in Analyze Mode

5.5 Checklist for Operation of Sample Panel

5.6 Operations Checklist for Returning H_2 Analysis Panel Back to Service in Standby Mode

5.7 Operations Checklist for Returning H_2 Analysis Panel Back to Service in Analyze Mode

5.8 Valve Checklist for Sample Panel

5.9 Control Panel Diagram

5.10 Flow Diagram

ENCLOSURE 5.1

HP/3/A/1009/17

SAMPLING PANEL EQUIPMENT

1	Nalgene 500 ml Thiosulfate sample bottle.
2	Stainless Steel Gas Bombs
1	9/16" Combination Wrench
1	Stainless Steel Portable Shielded Container
1	Stopwatch
1 bottle	Thiosulfate Solution (500 ml)
2	10" x 12" Clear Poly Bags
1	Calibrated Gas Syringe
1	Bucket

ENCLOSURE 5.2

HP/3/A/1009/17

SAMPLE DATA SHEET

1) NAME _____

DATE _____

UNIT _____

2) Sample Line Temperature _____ °F

3) Sample Inlet Line Pressure _____ psig

4) Gas Sample Volume = SV

$$SV = 1.2cc \left[\left(\frac{293}{273 + 5/9\ [°F-32]} \right) \left(\frac{14.7 + P}{14.7} \right) \right]$$

where:

°F = Sample Line Temperature in °F

P = Sample Line Pressure in psig

$$SV = \frac{5168.52 + 351.6\ (P)}{3751.77 + 8.167\ (°F)} = \_\_\_\_\_ ml$$

5) Diluted Volume = $\frac{SV}{1E4}$ (sample size) = _____ ml

where:

Sample Size = 100cc gas bomb or 5cc gas syringe

6) Record Diluted Volume as Gas Sample Volume on Sample Label.

7) Record Iodine and Particulate Sample Volume as 1.2 ml of sample in 500 ml of thiosulfate solution on sample label.

Checked Control Copy _____

Date _____

ENCLOSURE 5.3

HP/3/A/1009/17

OPERATIONS CHECKLIST FOR BYPASSING

H_2 ANALYSIS PANEL CURRENTLY IN STANDBY MODE

	DATE INIT./TIME	VERIFICATION DATE INIT./TIME
1.0 Initial Conditions		
1.1 Containment Integrity is required.	_____	_____
1.2 Designate a Licensed Operator assigned to immediately close containment isolation valves from the Control Room if an ES actuation occurs. This person may have other responsibilities, but they shall not prevent him from performing this evolution.	_____	
License Operator _____		
Unit Supervisor _____		
1.3 Record the containment isolation valves that will be opened on Enclosures 5.1 and 5.6 of OP/0/A/1102/20 (Shift Turnover). (3PR-81 and 3PR-84 or 3PR-90 and 3PR-87)	_____	
1.4 H_2 Analysis Panel is in standby mode.		
1.5 Reactor Building pressure is less than 40 psig.	_____	
2.0 Procedure		
2.1 Place Post Accident Sampler in service as follows:		
2.1.1 Select which train to be used. Circle one: Trn. "A" or Trn. "B".	_____	

ENCLOSURE 5.3

HP/3/A/1009/17

		DATE INIT./TIME	VERIFICATION DATE INIT./TIME
2.1.2	Ensure train is in standby mode by observing red light in gray cabinet.	_____	

NOTE: Use other train if not in standby.

2.1.3	At the selected train "Remote" Panel (blue cabinet), depress both black ON buttons for 'BYP TO POST AC'. Opens (3PR-83, 3PR-86) or (3PR-89, 3PR-92).	_____	
2.1.4	Turn sample valve selector switch to 'Top Cont'. Opens 3PR-71 or 3PR-76. (Red light will come on).	_____	_____
2.1.5	From the Control Room, open 3PR-81 and 3PR-84 (Containment Isolation Valves) if train "A" was selected. OR Open 3PR-87 and 3PR-90 (Containment Isolation Valves) if train "B" was selected.	_____ _____	_____ _____

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

2.1.6	Notify Unit Supervisor which train is selected. Unit Supervisor _____	_____	_____
2.1.7	Return completed enclosure to Health Physics Personnel operating Sample Panel.	_____	

Checked Control Copy _____

Date _____

ENCLOSURE 5.4

HP/3/A/1009/17

OPERATIONS CHECKLIST FOR BYPASSING

H_2 ANALYSIS PANEL CURRENTLY IN ANALYZE MODE

		DATE INIT./TIME	VERIFICATION DATE INIT./TIME
1.0	Initial Conditions		
1.1	H_2 Analyzer is in Analyze Mode.	_____	
1.2	Reactor Building pressure is less than 40 psig.	_____	
2.0	Procedure		
2.1	Place Post Accident Sampler in service as follows:		
2.1.1	Select which train is to be used. Circle one: Trn. "A" or Trn. "B".	_____	
2.1.2	At the "Remote" Panel (blue cabinet) position the "Off, Standby, Analyze" selector to "Standby" and observe red light in grey cabinet.	_____	
2.1.3	At selected train "Remote" Panel (blue cabinet), depress both black ON buttons for 'BYP TO POST AC'. Opens (3PR-83, 3PR-86) or (3PR-89, 3PR-92).	_____	
2.1.4	Notify Unit Supervisor which train is selected.	_____	
	Unit Supervisor _____		
2.1.5	Return completed enclosure to Health Physics Personnel operating Sample Panel.	_____	

Checked Control Copy _____

Date _____

ENCLOSURE 5.5
HP/3/A/1009/17
CHECKLIST FOR OPERATION OF SAMPLE PANEL

NOTE: Complete steps in order listed. Initial steps as completed.

A) Switching System On

_____1) Operations Bypass H_2 Analyzer by Enclosure 5.3 or 5.4.

_____2) Obtain Sampling Equipment and Keys.

_____3) Open Nitrogen bottle to 40 psig.

_____4) Open:

a) DI Water Inlet
b) Instrument Air Inlet
c) N_2 Inlet

_____5) a) Ensure test tees on sample inlet and outlet lines are closed.
b) Ensure inlet valve on gas sampler is open.
c) Ensure DI water supply line is open to the panel.

_____6) a) Position thiosulfate funnel
b) Attach hose to fill port
c) Pour 500 ml of thiosulfate into funnel

_____7) Set switches on control panel:

a) Sample Volume Select - set on SMALL.

b) Dilution Volume Select - set on LARGE.

c) Selector Switch - set on OFF.

d) System Purge - set on NORMAL.

e) Refill Switch - set on OFF (down).

f) TC Switch - set on POSITION 1 (measures sample line temperature).

g) Sample Line Select Switch - Unit and Hydrogen Analyzer Train A or B

_____8) Key Lock Switch - POWER ON

_____9) a) Radiation Monitor - ON (up)

ENCLOSURE 5.5
HP/3/A/1009/17
CHECKLIST FOR OPERATION OF SAMPLE PANEL

b) Radiation Monitor Selector - BATT (red test region)

c) Radiation Monitor Selector - MR/HR or R/HR

B) Purge the Sample Panel

___10) Selector Switch - SYSTEM PURGE

___11) Normal - Sample Purge - SAMPLE PURGE

☐ ☐ ☐ 12) a) ACTIVATE

b) EVAC

c) Pressure slowly drops to ~ - 19" of Hg.

d) STOP

☐ ☐ ☐ 13) a) GAS PURGE - press down and release.

b) Pressure swiftly rises to + '0" of Hg.

c) STOP

☐ ☐ ☐ 14) a) EVAC

b) Pressure drops to 0" of Hg.

c) STOP

☐ ☐ ☐ 15) a) PUMP - wait 30 seconds

b) STOP

☐ ☐ ☐ 16) a) Purge sample panel two (2) more times by completing Steps 12 through 15 two (2) more times.

___17) Normal - Sample Purge - NORMAL

___18) Selector Switch - SOLUTION CHANGEOUT

ENCLOSURE 5.5
HP/3/A/1009/17
CHECKLIST FOR OPERATION OF SAMPLE PANEL

C) Preparation for Sampling

___19) Attach 500 ml sample bottle to TS Sampler.

___20) Attach gas bomb to gas sampler and ensure valves on gas bomb are open (N/A step if syringe will be used instead of gas bomb).

D) Flush Thiosulfate Sampler and fill with Thiosulfate

___21) a) ACTIVATE

b) FLUSH - hold 30 seconds

c) PURGE - hold 30 seconds

d) EMPTY - hold 60 seconds

___22) a) Open TS (thiosulfate) valve

b) Refill - ON - wait 2 minutes

c) Refill - OFF

___23) Selector Switch - DILUTION VOLUME EVACUATION

E) Evacuate the Dilution Volume

___24) a) Activate

b) Pressure slowly drops to ∿ - 19" of Hg.

c) Selector Switch - SAMPLE RECIRC

ENCLOSURE 5.5
HP/3/A/1009/17
CHECKLIST FOR OPERATION OF SAMPLE PANEL

F) Recirc Containment Air and Trap a Sample

___25) ACTIVATE - wait 15 minutes

___26) Read and record sample inlet line temperature and pressure on Enclosure 5.2.

___27) a) SAMPLE - wait 1 minute

b) TRAP - wait 30 seconds

c) Selector Switch - SAMPLE DILUTION

G) Dilute Sample with N_2 and Recirc.

___28) a) ACTIVATE

b) SLOW

c) Pressure slowly rises to 0" of Hg.

d) STOP

___29) RECIRC - wait 5 minutes

___30) Complete a) if syringe will be used for gas sample. If gas bomb is being used, N/A this step and continue on to Step 31.

a) Withdraw a 5 cc gas sample from the septum of the gas sampler using calibrated syringe. Place syringe in portable shielded container.

___31) a) STOP

b) Selector Switch - SOLUTION CHANGEOUT

ENCLOSURE 5.5
HP/3/A/1009/17
CHECKLIST FOR OPERATION OF SAMPLE PANEL

H) Collect Particulate and Iodine Sample

____32) a) ACTIVATE

b) TS SAMPLE

c) EMPTY - hold button until thiosulfate solution has drained into sample bottle.

d) TS SAMPLE GRAB

e) PURGE - hold button 1 minute

_____33) Selector Switch - SYSTEM PURGE

I) Purge the Sample Panel.

□ □ 34) a) ACTIVATE

b) EVAC

c) Pressure slowly drops to ~ - 19" of Hg.

d) STOP

□ □ 35) a) GAS PURGE - press down and release

b) Pressure swiftly rise to + 10" of Hg.

c) STOP

□ □ 36) a) EVAC

b) Pressure drop to 0" of Hg.

c) STOP

ENCLOSURE 5.5
HP/3/A/1009/17
CHECKLIST FOR OPERATION OF SAMPLE PANEL

□ □ 37 a) PUMP - wait 30 seconds

b) STOP

□ □ 38) Repeat Steps 34 through 37 one additional time.

J) Remove Samples from Sample Panel

____39) Return to sample panel and close both valves on the gas bomb and the inlet valve on the gas sampler. (N/A step if gas bomb not used).

____40) Disconnect gas bomb from sample panel. Place gas bomb in portable shielded container. (N/A step if gas bomb not used).

____41) a) Reconnect gas sampler line and open inlet valve.
b) Reconnect thiosulfate sampler line.
c) Tightly cap sample bottle.

K) Switching System Off

____42) Selector Switch - OFF

____43) Turn the Radiation Monitor - OFF

____44) Key Lock Switch - OFF

____45) Close:

a) Nitrogen bottle

b) TS Valve - inside sample panel

c) DI Water Inlet

d) Instrument Air Inlet

e) N_2 Inlet

ENCLOSURE 5.5
HP/3/A/1009/17
CHECKLIST FOR OPERATION OF SAMPLE PANEL

_____46) Transport samples to Count Room for analysis.

_____47) Calculate sample volume using data from Enclosure 5.2. (Dilute gas samples per HP/0/B/1006/07 if needed).

_____48) Transmit sample analysis results to Station Health Physicist or his designee.

_____49) Request Operations to return the Hydrogen Analyzer to service per Enclosures 5.6 or 5.7.

_____50) Clean area around sample panel and pump out sump. (This step may be N/A if additional samples will be pulled or radiological conditions do not allow clean up.)

Checked Control Copy _____

Date _____

ENCLOSURE 5.6

HP/3/A/1009/17

OPERATIONS CHECKLIST FOR RETURNING H_2 ANALYSIS PANEL

BACK TO SERVICE IN STANDBY MODE

		DATE INIT./TIME	VERIFICATION DATE INIT./TIME
1.0	Procedure		
1.1	Return the H_2 Analysis train back to service as follows:		
1.1.1	Turn Sample Valve Selector switch to OFF. (Red light will go off). Closes 3PR-71 or 3PR-76.	_____	_____
1.1.2	Depress the OFF buttons on both 'BYP TO POST AC' switches. Closes (3PR-83, 3PR-86) or (3PR-89, 3PR-92).	_____	_____
1.1.3	From the Control Room, Close 3PR-81 and 3PR-84 if train "A" is selected.	_____	_____
	OR		
	Close 3PR-87 and 3PR-90 if train "B" was selected.	_____	_____

NOTE: This will regain containment integrity. Remove the containment isolation valves from Enclosure 5.1 and 5.6 of OP/0/A/1102/20 (Shift Turnover).

1.1.4	Notify the Unit Supervisor the H_2 Analysis Train is back in service.	_____	
1.1.5	Return completed enclosure to personnel operating Post Accident Sample Panel.	_____	

Checked Control Copy _____

Date _____

ENCLOSURE 5.7

HP/3/A/1009/17

OPERATIONS CHECKLIST FOR RETURNING UNIT 3 H_2 ANALYSIS PANEL BACK TO SERVICE IN ANALYZE MODE

		DATE INIT./TIME	VERIFICATION DATE INIT./Time
1.0	Initial Conditions		
1.1	H_2 Analysis Panel has been switched to Standby Mode for Post Accident sampling and is to be returned to Analyze Mode.	_____	
2.0	Procedure		
2.1	Return the H_2 Analysis train back to service as follows:		
2.1.1	Depress the OFF buttons on both "BYP to Post AC" switches. Closes (3PR-83, 3PR-86) or (3PR-89, 3PR-92).	_____	
2.1.2	Position the "Off, Standby, Analyze" Selector to Analyze.	_____	
NOTE:	When Analyze is selected, the indication will go up scale resulting in a possible High Hydrogen Alarm on both panels and in the Control Room. Then return down scale to the correct reading in approximately 3 minutes.		
2.1.3	Push the Remote Selector button to ensure control is from Remote Panel.	_____	
2.1.4	Reset the Common Alarm after the meter reading stabilizes.	_____	
2.1.5	Notify the Unit Supervisor the H_2 Analysis Train is back in service.	_____	
2.1.6	Return completed enclosure to Health Physics Personnel Operating Post Accident Sample Panel.	_____	

ENCLOSURE 5.8

HP/3/A/1009/17

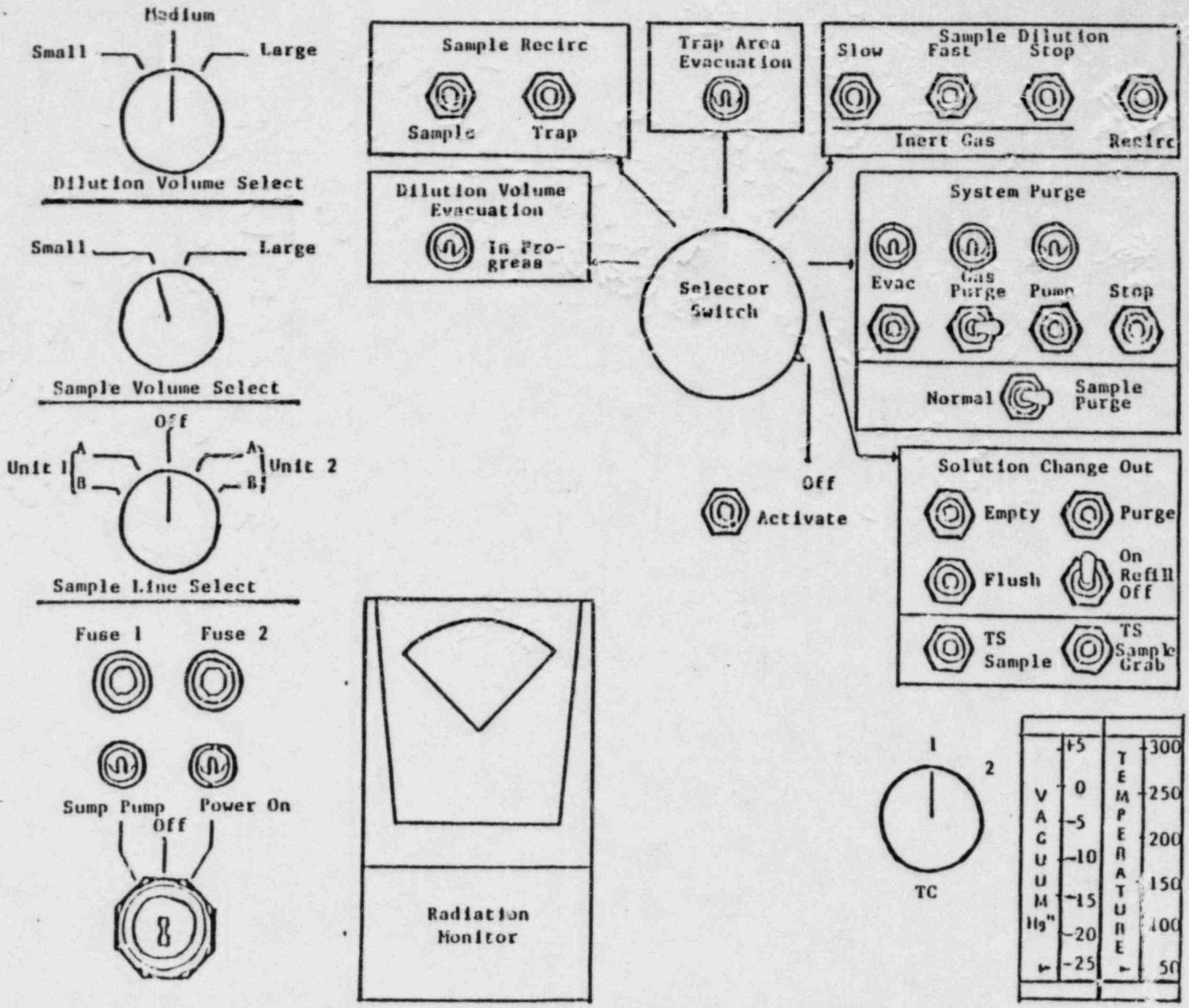
VALVE CHECKLIST FOR SAMPLE PANEL

NOTE: This checklist may be used to provide assistance in determining flow inside the sample panel. It is not intended to provide a verification for valve operation.

ACTION	RESPONSE
Dilution Volume Evacuation	
- Activate	Energize 1, 2, 9, 12, 19, 17
Sample Recirculate	
- Activate	Energize 1, 2, 5, 6, 27
- Sample	De-energize 27
- Trap	De-energize 2, 5
Sample Dilution	
- Activate	Energize 12, 17
- Slow	Energize 3, 20
- Stop	De-energize 3, 20
- Recirc	Energize Recirc Pump 16, 18

NOTE: Valve #17 will de-energize when selector switch is moved to another position.

System Purge	Energize 9, 12, 19, 27
- Activate	Energize 12, 22
- Evac	Energize 1, 2
- Stop	De-energize 1, 2
- Gas Purge (down)	Energize 15, De-energize 1, 2
- Stop	De-energize 15
- Normal - Sample Purge (Sample Purge)	Energize 17
- Pump	Energize Pump 16, 18
	De-energize 15, or 1 and 2
- Stop	De-energize Pump 16, 18
Solution Change Out	
- Empty	Energize 10, 11, 13
- Flush	Energize 14, 10
- Purge	Energize 15, 10
- Refill	Energize 11, 13
- TS Sample	Energize 21
- TS Sample Grab	De-energize 21



Enclosure 5.9

Control Panel Diagram

EP/3/A/1009/17

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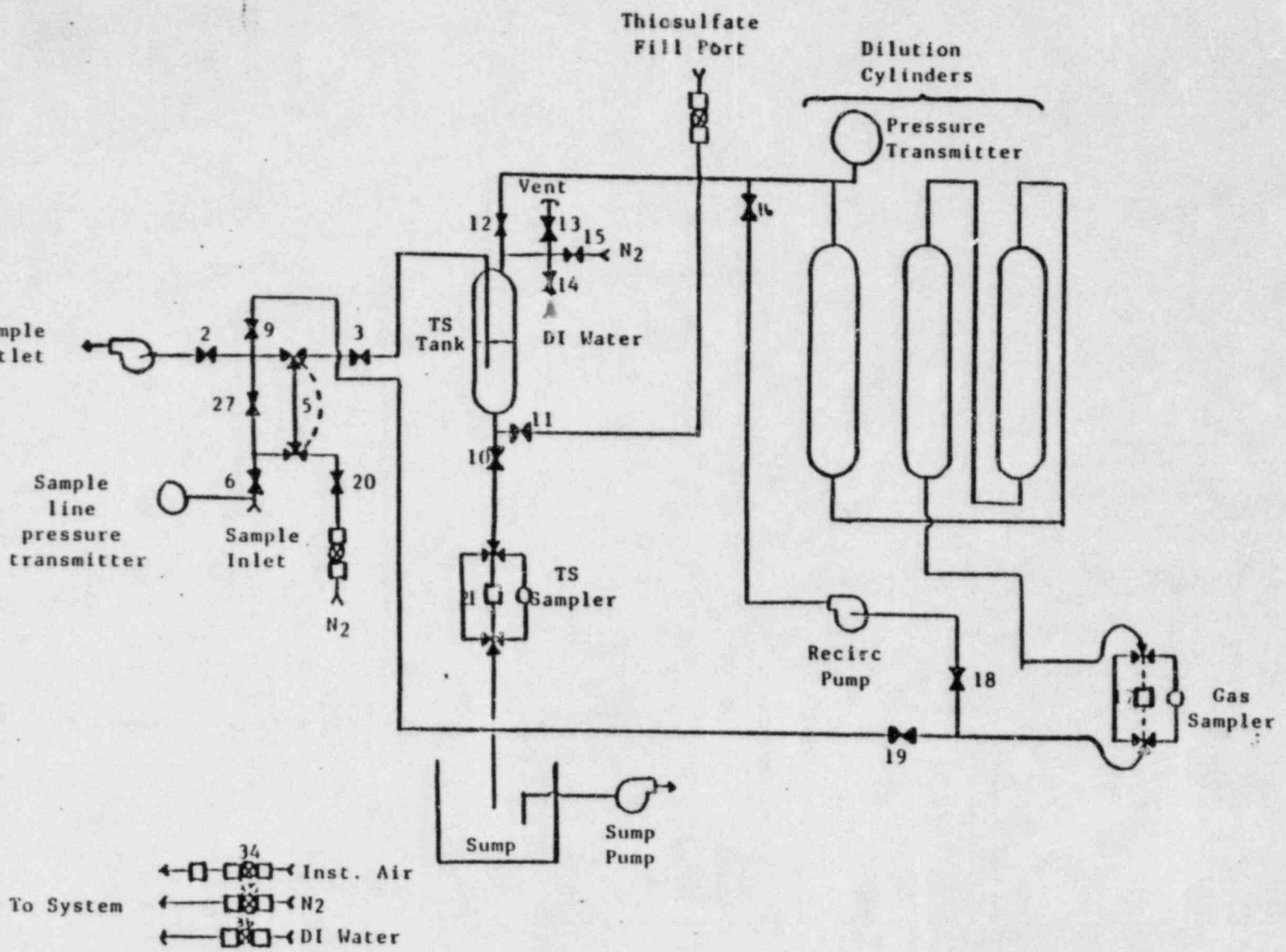

Enclosure 5.10
HP/3/A/1009/17
Flow Diagram

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

August 8, 1984

50-269/270/287 Oconee

MEMORANDUM FOR: Chief, Document Management Branch, TIDC

FROM: Director, Division of Rules and Records, ADM

SUBJECT: REVIEW OF UTILITY EMERGENCY PLAN DOCUMENTATION

The Division of Rules and Records has reviewed the attached document and has determined that it may now be made publicly available.

J. M. Felton, Director
Division of Rules and Records
Office of Administration

Attachment: As stated