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LIMERICK GENERATING STATION

EMERGENCY PLAN PROCEDURE INDEX

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EP-101	4	Classification of Emergencies	03/25/85	10/26/84
EP-102	9	Unusual Event Response	09/27/85	10/26/84
EP-103	12	Alert Response	09/27/85	10/26/84
EP-104	11	Site Emergency Response	09/27/85	10/26/84
EP-105	11	General Emergency Response	09/27/85	10/26/84
EP-106	4	Written Summary Notification	04/01/85	10/26/84
EP-110	6	Personnel Assembly and Accountability	03/14/85	10/26/84
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EP-230	5	Chemistry Sampling and Analysis Team	03/14/85	10/26/84
EP-231	11	Operation of Post-Accident Sampling Systems (PASS)	04/01/86	10/26/84
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EP-233	7	Retrieving and Changing Sample Filters and Cartridges from the Containment Leak Detector During Emergencies	04/01/86	10/26/84

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EMERGENCY PLAN PROCEDURE INDEX

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EP-234	6	Obtaining Containment Gas Samples from the Containment Leak Detector During Emergencies	12/18/85	10/26/84
EP-235	5	Obtaining Reactor Water Samples from Sample Sinks Following Accident Conditions	03/14/85	10/26/84
EP-236	5	Obtaining Cooling Tower Blowdown Line Water Samples Following Radioactive Liquid Release after Accident Conditions	03/14/85	10/26/84
EP-237	7	Obtaining the Iodine/ Particulate and/or Gas Samples from the North Vent Wide Range Gas Monitor (WRGM)	03/28/85	10/26/84
EP-238	4	Obtaining Liquid Radwaste Samples from Radwaste Sample Sink Following Accident Conditions	12/12/84	10/26/84
EP-240		CANCELLED		
EP-241	8	Sample Preparation and Handling of Highly Radioactive Liquid Samples	03/14/85	10/26/84
EP-242	5	Sample Preparation and Handling of Highly Radioactive Particulate Filters and Iodine Cartridges	03/28/85	10/26/84
EP-243	5	Sample Preparation and Handling of Highly Radioactive Gas Samples	12/12/84	10/26/84
EP-244	3	Offsite Analysis of High Activity Samples	03/12/85	10/26/84
EP-250	2	Personnel Safety Team	12/12/84	10/26/84
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LIMERICK GENERATING STATION

EMERGENCY PLAN PROCEDURE INDEX

PROCEDURE NUMBER	REV. NO.	TITLE	DATE SIGNED BY SUPER.	DATE OF LAST PERIODIC REVIEW
EP-252	6	Search and Rescue/First Aid Group	04/22/85	04/01/85
EP-253	0	Personnel Dosimetry, Bioassay, and Respiratory Protection Group	12/12/84	12/12/84
EP-254	3	Vehicle and Evacuee Control Group	02/04/85	10/26/84
EP-255	2	Vehicle Decontamination	12/12/84	10/26/84
EP-260	2	Fire and Damage Control Team	12/12/84	10/26/84
EP-261	2	Damage Repair Group	12/12/84	10/26/84
EP-272	5	Philadelphia Electric Company Officials Phone List	02/10/86	10/26/84
EP-273	6	Limerick Station Supervision Call List	01/02/86	01/02/86
EP-275		CANCELLED		
EP-276	7	Fire and Damage Team Phone List	02/10/86	02/10/86
EP-277	8	Personnel Safety Team Phone List	01/09/86	01/09/86
EP-278	6	Security Team Phone List	02/10/86	02/10/86
EP-279	7	Emergency Operations Facility (EOF) Group Phone List	03/11/86	10/26/84
EP-280	8	Technical Support Center Phone List	02/10/86	02/10/86
EP-282	6	Government and Emergency Management Agencies Phone List	02/10/86	04/22/85
EP-284	5	Company Consultants and Contractors Phone List	02/10/86	02/10/86
EP-287	3	Nearby Public and Industrial Users of Downstream Water	02/11/85	10/26/84
EP-291	6	Staffing Augmentation	04/18/85	10/26/84

LIMERICK GENERATING STATION

EMERGENCY PLAN PROCEDURE INDEX

PROCEDURE NUMBER	REV. NO.	TITLE	DATE SIGNED BY SUPER.	DATE OF LAST PERIODIC REVIEW
EP-325	3	Use of Containment Dose Rates to Estimate Release Source Term	02/27/85	10/26/84
EP-330	4	Emergency Response Facility Habitability	03/14/85	10/26/84
EP-333	1	Adjustment of Wide Range Gas Monitor Conversion Factors	05/08/85	05/08/85
EP-401	3	Entry for Emergency Repair and Operations	04/01/86	04/01/86
EP-410	3	Recovery Phase Implementation	03/29/85	10/26/84
EP-500	2	Review and Revision of Emergency Plan	12/12/84	10/26/84

PHILADELPHIA ELECTRIC COMPANY
LIMERICK GENERATING STATION
EMERGENCY PLAN IMPLEMENTING PROCEDURE

EP-202 OPERATIONS SUPPORT CENTER (OSC) ACTIVATION

1.0 PARTICIPANTS

1.1 Operations Support Center Coordinator shall activate, direct and coordinate the activities of the OSC.

2.0 ACTIONS - IMMEDIATE

2.1 Operations Support Center (OSC) Coordinator shall:

2.1.1 Assign an individual the duties of OSC Communicator and one as OSC Status Board Keeper. Use Appendix EP-202-1 for the plant status board format.

2.1.2 Direct the establishment and maintenance of a log of pertinent events. The log keeper can be any available operations person or technician.

PERSONNEL SHALL BE LOGGED IN AND OUT OF THE OPERATIONS SUPPORT CENTERS IN ORDER TO MAINTAIN PERSONNEL ACCOUNTABILITY AND EXPOSURE CONTROL.

2.1.3 Direct the Operations Support Center Communicator to connect phones which are kept in the supply cabinet and verify operability of the telephones between the OSC and the Technical Support Center (TSC) and Control Room (in accordance with Appendix EP-202-2, OSC Telephone Check List) and maintain the status board.

2.1.4 Notify the Emergency Director when the Operations Support Center is manned and communications are satisfactory between the Control Room, Technical Support Center and the Operations Support Center.

2.1.5 Direct Health Physics to check out equipment.

2.1.6 Direct Health Physics set up a portable area radiation monitor (if available) or use a survey meter to monitor radiation levels.

3.0 ACTIONS-FOLLOW-UP

3.1 Operations Support Center Coordinator shall:

3.1.1 Remain available for contact with the Control Room or TSC in order to provide personnel to support the various emergency teams.

3.1.2 Direct personnel entering or leaving the Operations Support Center to log in or out on the Personnel Assignment Status and Exposure Control Board.

3.1.2.1 The Personnel Assignment Status and Exposure Control Board should contain information pertaining to the individual's names, time left, group, what assignment he/she is out on, estimated return time, authorized exposure, accumulated daily exposure, and MPC-hrs.

3.1.3 Contact the Emergency Director for additional manpower, if needed.

3.1.4 If the OSC becomes overcrowded, assign excess personnel to report to the Auxiliary OSC on Elevation 239 (P.O. Shack) and have phones there checked.

3.1.5 Upon leaving the Operations Support Center for any reason, delegate the duties to the senior remaining operator or HP person.

3.1.6 Direct Health Physics to periodically confirm habitability using EP-330, Emergency Response Facility Habitability if required.

3.1.7 In the event the OSC becomes unhabitable, direct personnel as follows:

3.1.7.1 The OSC Coordinator, Plant Survey Group Leader and up to 5 HP Technicians and 5 Operators report to the MRF Room in the Control Room.

3.1.7.2 All others report to the Maintenance Shop.

4.0 APPENDICES

4.1 Appendix EP-202-1 OSC - Plant Status Board

4.2 Appendix EP-202-2 OSC - Telephone Check List

5.0 SUPPORTING INFORMATION

5.1 Purpose

The purpose of this procedure is to provide guidelines for the actions required by the Operations Support Center Coordinator to activate, man and manage the Operations Support Center (OSC).

5.2 Criteria for Use

5.2.1 This procedure shall be implemented;

5.2.1.1 When an event has been classified as an Alert, Site or General Emergency in accordance with EP-101, Classification of Emergencies,

5.2.1.2 At the discretion of the Emergency Director.

5.3 Special Equipment

5.3.1 Portable Area Radiation Monitor

5.4 References

5.4.1 Limerick Generating Station Emergency Plan

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

5.4.3 NUREG 0696 - Functional Criteria for Emergency Response Facilities.

5.4.4 EP-330 Emergency Response Facilities Habitability

APPENDIX EP-202-1

OSC PLANT STATUS BOARD

UNIT ____

RX LEVEL _____ TIME _____ EMERGENCY CLASS: _____

13 KV Bus	1:	2:		HPCI:
Condensate Pumps	A:	B:	C:	RCIC:
Recirc Pumps	A:	B:		
4 KV Bus	D 1:	D 2:	D 3:	D 4:
Diesel	D 1:	D 2:	D 3:	D 4:
RHR	A:	B:	C:	D:
RHRSW	A:	B:	C:	D:
Core Spray	A:	B:	C:	D:
ESW	A:	B:	C:	D:
CRD	A:			B:
SBLC Pumps	A:	B:	C:	
SBLC Valves	A:	B:	C:	
SBGT Fans	A:	B:	SBGT Filter A SBGT Filter B	
Containment H2 Recomb.	A:	B:		
Air Compressors:	A:	B:	Service Air:	
Backup Service Air:				

APPENDIX EP-202-2

OSC - EMERGENCY EQUIPMENT INVENTORY LIST

Check the following phones for dial tone:

YES/NO

_____

_____

_____

YES/NO

_____

_____

_____

YES/NO

_____

_____

PHILADELPHIA ELECTRIC COMPANY
LIMERICK GENERATING STATION
EMERGENCY PLAN IMPLEMENTING PROCEDURE

EP-231 OPERATION OF POST-ACCIDENT SAMPLING SYSTEM (PASS)

1.0 PARTICIPANTS

1.1 Chemistry Sampling and Analysis Team Leader shall obtain necessary information and permissions to obtain sample.

1.2 Chemistry Sampling and Analysis Group Leader shall organize and brief the sampling group and have operations defeat isolations.

1.3 HP Technicians shall provide radiological assessment of the task.

1.4 Chemistry Sampling and Analysis Group shall obtain the sample.

2.0 ACTIONS-IMMEDIATE

2.1 Chemistry Sampling and Analysis Team Leader shall:

2.1.1 Request input from the Control Room (via Emergency Director) to ascertain desired sample system availability.

2.1.2 After discussing the situation with the Emergency Director, determine which of the following PASS samples are required based on the following information:

Sample

1. Drywell Atmosphere

   A. Upper Drywell 291' El

   B. Lower Drywell 242' El

2. Suppression Pool Atmosphere

   A. 222' El-250 Deg Azimuth from North

   B. 222' El-70 Deg Azimuth from North

3. Secondary Containment Atmosphere

4. Primary Coolant Jet Pump

   At low (<1%) power for small break or non-break events, raise Reactor Water level to level of the moisture separators.

5. RHR

   A. "A" RHR

   B. "B" RHR

MODE	SYS. OP. TIME	SOURCE
LPCI	30 mins.	Supp. Pool
Cont. Spray Cooling		Supp. Pool
Supp. Pool Cooling		Supp. Pool
Shutdown Cooling	30 mins.	Rx Coolant
Steam Condensing		Rx Steam
Fuel Pool Cooling		Fuel Pool

2.1.3 Check the Plant Radiation Level Status Board to forecast anticipated radiological conditions.

2.1.4 Contact the Personnel Safety Team Leader and check on the latest developments related to radiological conditions and inform him what sample(s) are to be taken and that Health Physics' coverage is required.

CONTINUOUS COVERAGE BY A HEALTH PHYSICS TECHNICIAN MAY SUBSTITUTE FOR THE RADIATION WORK PERMIT.

2.1.5 Determine what analyses are required and inform the Chemistry Sampling and Analysis Group Leader what analyses are required. If an iodine/particulate sample is desired, recommend sampling time.

2.1.6 Request Emergency Exposure Authorizations from the Emergency Director for group members (as required) and inform the Personnel Safety Team Leader of this development.

2.1.7 Direct the Chemistry Sampling and Analysis Group Leader to collect and analyze the PASS samples.

2.2 Chemistry Sampling and Analysis Group Leader shall:

2.2.1 Assign the appropriate number of group members to obtain the necessary equipment to collect and transport the sample to the Chemistry Hot lab.

EYE PROTECTION SHOULD BE WORN BY ALL PERSONNEL WHEN OBTAINING SAMPLES FROM THE SAMPLE STATION.

2.2.2 If a particulate/iodine cartridge sample is to be obtained, contact the Chemistry Sampling and Analysis Team Leader (TSC) for an estimated sampling time and record this time on Appendix EP-231-3.

2.2.3 Once the sample type and sampling location has been determined, contact the Control Room and request a system line-up to permit collection of the appropriate sample in accordance with the following information. Also, inform operations to contact the Chemistry Sampling and Analysis Group Leader if problems with the line-up arise during sampling.

	SAMPLE LOCATION	SWITCH	SWITCH NAME	POSITION
A.	Upper Drywell (291') or Lower Drywell (242')	*SV-57-132,134,150 -(232,234,250)	1 B Containment Atmosphere Sample Sys. Isolation	OPEN
		*HS-57-153(253)	Drywell Atmosphere Sample Sys. Isolation	AUTO
		*SV-57-183(283)	1A Containment Atmosphere Sample Sys. Isolation	AUTO

SAMPLE LOCATION	SWITCH	SWITCH NAME	POSITION
	*HS-57-187(287)	Suppression Pool Atmosphere Sample Sys. Isolation	AUTO
	HV-52-1F001D(C)	Core Spray Suction D (C)	OPEN
	* IF A GROUP VI ISOLATION SIGNAL EXISTS (HI D/W PRESS (1.68 PSIG), LO-LO RX LEVEL (-38"), REFUEL FLOOR HVAC HI RAD (2 mR/Hr), AND RX ENC HVAC HI RAD (1.35 mR/Hr)), THE VALVE ISOLATIONS MAY BE BYPASSED PER GP-8.		
B. Suppression Pool(222') (250 Deg Azimuth from North)	*SV-57-183,191 -(283,291)	1 A Containment Atmosphere Sample Sys. Isolation	AUTO
	*HS-57-187(287)	Suppression Pool Atmosphere Sample Sys. Isolation	AUTO
	HV-52-1F001D(C)	Core Spray Suction D (C)	OPEN
	* IF A GROUP VI ISOLATION SIGNAL EXISTS (HI D/W PRESS (1.68 PSIG), LO-LO RX LEVEL (-38"), REFUEL FLOOR HVAC HI RAD (2 mR/Hr), AND RX ENC HVAC HI RAD (1.35 mR/Hr)), THE VALVE ISOLATIONS MAY BE BYPASSED PER GP-8.		
C. Suppression Pool (222') (70 Deg Azimuth from North)	*SV-57-181(281)	1 B Containment Atmosphere Sample Sys. Isolation	AUTO
	*HS-57-187(287)	Suppression Pool Atmosphere Sample Sys. Isolation	AUTO

SAMPLE LOCATION	SWITCH	SWITCH NAME	POSITION
	*SV-57-183, 191 -(283,291)	1A Containment Atmosphere Sample System Isolation	AUTO
	HV-52-1F001D (C)	Core Spray Suction D (C)	OPEN

* IF A GROUP VI ISOLATION SIGNAL EXISTS (HI D/W PRESS (1.68 PSIG), LO-LO RX LEVEL (-38"), AND REFUEL FLOOR (2 mR/Hr) OR RX ENC. HVAC HI RAD (1.35 mR/Hr)), THE VALVE ISOLATION MAY BE BYPASSED PER GP-8.

D. Secondary Containment

	HV-52-1F001D (C)	Core Spray Suction D (C)	OPEN
E. "A" RHR	*HV-51-1F079A (2F079A)	Sample Inboard	OPEN
	*HV-51-1F080A (2F080A)	Sample Outboard	OPEN
	**HV51-1F047A	Heat Exch Bypass INLET	OPEN
	HV-52-1F001D (C)	Core Spray Suction D (C)	OPEN

* IF A GROUP II ISOLATION EXISTS (LO RX LEVEL (+12.5"), OR D/W HI PRESS 1.68 PSIG), THE VALVE ISOLATIONS MAY BE BYPASSED PER GP-8.

SAMPLE LOCATION	SWITCH	SWITCH NAME	POSITION
F. "B" RHR	*HV-51-1F079B (2F079B)	Sample Inboard	OPEN
	*HV-51-1F080B (2F080B)	Sample Outboard	OPEN
	**HV51-1F047B (2F047B)	Heat Exch Bypass INLET	OPEN
	HV-52-1F001D (C)	Core Spray Suction D (C)	OPEN

* IF A GROUP II ISOLATION EXISTS (LO RX LEVEL (+12.5"), OR D/W HI PRESS 1.68 PSIG), THE VALVE ISOLATIONS MAY BE BYPASSED PER GP-8.

** ONLY NECESSARY IF RHR PLACED IN LPCI MODE.

G. JET PUMP			
	HV-52-1F001D (C)	Core Spray Suction D (C)	OPEN

To ensure a representative liquid sample from the jet pumps at low (<1%) power conditions for small break or non-break events, the reactor water level will be raised to the level of the moisture separator when this action is not inconsistent with station emergency procedures. This will fully flood the separators and will provide a thermally-induced recirculation flow path for mixing.

2.2.4 Appoint Group member(s) to prepare the Hot Lab for receiving the sample.

USE THE FOLLOWING PROCEDURES AS GUIDELINES FOR PREPARATION OF THE HOT LAB.

EP-241 (LIQUID)	Sample Preparation and Handling of Highly Radioactive Liquid Samples
EP-242 (IODINE)	Sample Preparation and Handling of Highly Radioactive Particulate Filters and Iodine Cartridges
EP-243 (GAS)	Sample Preparation and Handling of Highly Radioactive Gas Samples

2.2.5 If a large volume liquid sample is to be taken and an outside route is to be taken, contact the Fire and Damage Repair Team Leader for providing the means of transportation for the Large Volume Cask.

2.2.6 Brief the Chemistry Sampling and Analysis Group members on the following:

2.2.6.1 Communications equipment and channel

2.2.6.2 Type of sample(s) to be collected

2.2.6.3 Location of sample points

2.2.6.4 Suggested Routes to be taken

2.2.6.5 Precautions for operating the PASS

2.2.6.6 Projected amount of time required to collect and transport the sample

2.2.6.7 Review the procedures to be followed for sample collection, handling, preparation and analysis

2.2.6.8 Special tools and equipment required for sample handling and/or collection

2.2.6.9 Proper completion of data sheets

2.2.7 Dispatch the Chemistry Sampling and Analysis Team members to the OSC for Heatlh Physics support if radiological conditions permit or other appointed location as determined by the Plant Survey Group Leader.

2.3 Health Physics Technician shall:

2.3.1 Determine the appropriate route to be taken.

2.3.2 Take appropriate radiation survey equipment and ensure that equipment is functional and calibrated.

2.3.3 Provide group members with the appropriate dosimetry, protective clothing and respiratory equipment.

2.3.4 Perform a pre-job briefing with the Chemistry technicians assigned to obtain the sample to discuss the following:

2.3.4.1 RWP requirements

2.3.4.2 Routes to PASS Facility

2.3.4.3 Authorized doses

2.3.4.4 Radiological concerns and precautions

2.3.4.5 Review of procedure for obtaining and transporting sample to hot lab

2.3.4.6 Suggested methods to maintain exposures ALARA

2.3.4.7 Stay times and Abort Criteria

2.3.5 Provide constant coverage while obtaining and transporting samples from the PASS.

2.3.6 Monitor dose rates enroute and at the sample location. If the general area dose rates (unanticipated) exceed 5 R/hr enroute to or at the sampling point, instruct Group Members to immediately exit the area and report to the Chemistry Sampling and Analysis Group Leader.

2.3.7 Survey the sample area (concentrating especially on the PASS) and the sample container once the sample has been collected and the shielded sample cask.

MINIMUM AMOUNT OF TIME SHOULD BE SPENT NEAR THE SURFACE OF THE SAMPLE ENCLOSURE.

2.3.8 Document the sample cask survey results and give them to the Chemistry Sampling and Analysis Group Leader (or other designated group member) when arriving at the hot lab.

2.3.9 Provide constant coverage during sample preparation and handling as specified in EP-241, EP-242 or EP-243.

2.4 Chemistry Sampling and Analysis Group members shall:

2.4.1 Assemble for a pre-job briefing at the chemistry lab.

2.4.2 Inform the Group Leader if they are approaching the Administrative exposure guidelines, or may not have sufficient exposure remaining to successfully complete the assigned task.

2.4.3 Obtain the Chemistry Emergency Supplies Toolbox Key.

2.4.4 Obtain the necessary equipment to collect the sample and ensure that the Hot Lab is ready to accept the sample.

PROPERLY LABEL ALL SAMPLE CONTAINERS

2.4.5 Once the group has been briefed and the appropriate equipment has been assembled proceed to the OSC or other designated location for Health Physics coverage. Once briefed by Health Physics collect the sample in accordance with the appropriate appendix to this procedure. (see following)

THE INDICATOR FOR AREA RADIATION DETECTOR RE-507 IS ON THE CONTROL PANEL AND ITS READING SHOULD BE NOTED.

Appendix	Title
EP-231-1	Procedure for Obtaining a 14.4 ml Gas Sample
EP-231-2	Procedure for Obtaining an Iodine/Particulate Sample
EP-231-3	Procedure for Obtaining a 14.4 ml Gas Sample and an Iodine/Particulate Sample Simultaneously
EP-231-4	Procedure for Obtaining a Small Volume Liquid Sample
EP-231-5	Procedure for Monitoring Total Dissolved Gas (and, if desired, Obtaining a Dissolved Gas Sample) and/or Obtaining a Large Volume Liquid Sample.

2.4.6 Once the H.P. technician has surveyed the sample cask, take the sample to the hot lab retracing the route back from the sample point.

2.4.7 Upon introduction of the sample into the hot lab, the sample will be handled and stored in a manner that personnel exposures are kept ALARA.

2.4.8 Contact the Group Leader as soon as the sample reaches the hot lab and inform him that the sample collection has been completed and what the sample status is.

3.0 ACTIONS - FOLLOWUP

3.1 Chemistry Sampling and Analysis Team Leader shall:

3.1.1 Report the results to the Emergency Director and the Health Physics and Chemistry Coordinator if the EOF has been activated.

3.2 Chemistry Sampling and Analysis Group Leader shall:

3.2.1 Notify Shift Supervision that a sample has been taken and the aligned valves may be returned to the "NORMAL" position.

3.2.2 Have group member(s) dose monitored to ensure that exposure limits have not been exceeded.

3.2.3 Inform the Chemistry Sampling and Analysis Team Leader that the required sample is in the hot lab.

3.2.4 Instruct the group members to perform calculations (if any) on the Data Sheet of the appropriate Appendix.

3.2.5 Obtain PASS key from Group member.

3.2.6 Instruct the appropriate group members to refer to the appropriate procedure for guidance on sample preparation and handling.

Sample	Procedure No.
Liquid (EP-241)	Sample Preparation and Handling of Highly Radioactive Liquid Samples
Iodine (EP-242) (Particulate)	Sample Preparation and Handling of Highly Radioactive Particulate Filters and Iodine Cartridges
Gas (EP-243)	Sample Preparation and Handling of Highly Radioactive Gas Samples

3.2.7 Obtain and review ALL Data Sheets and report the sample results to the Chemistry Sampling and Analysis Team Leader and attach all Data Sheets to Appendix EP-230-2.

3.3 Chemistry Sampling and Analysis Group members shall:

3.3.1 Complete the appropriate Appendix Data Sheet(s) when applicable.

3.3.2 Prepare, handle, and analyze the sample using the appropriate procedure.

3.3.3 Report the results to the Chemistry Sampling and Analysis Group Leader.

3.3.4 Return sampling equipment to the CHEMISTRY EMERGENCY CABINET, if applicable.

3.3.5 Return CHEMISTRY EMERGENCY CABINET and CHEMISTRY EMERGENCY SUPPLIES Tool Box Keys to the appropriate control point.

4.0 APPENDICES

4.1 EP-231-1 Procedure for Obtaining a 14.4 ml Gas Sample.

4.2 EP-231-2 Procedure for Obtaining an Iodine/Particulate Sample.

4.3 EP-231-3 Procedure for Obtaining a 14.4 ml Gas Sample and an Iodine/Particulate Sample Simultaneously.

4.4 EP-231-4 Procedure for Obtaining a Small Volume Liquid Sample

4.5 EP-231-5 Procedure for Monitoring Total Dissolved Gas (and, if desired, Obtaining a Dissolved Gas Sample) and/or Obtaining a Large Volume Liquid Sample.

5.0 SUPPORTING INFORMATION

5.1 Purpose - The purpose of this procedure is to provide guidelines for obtaining samples from the Post-Accident Sampling Station following accident conditions.

5.2 Criteria for use

5.2.1 This procedure shall be implemented when a sample shall be taken from the PASS during an emergency situation.

5.2.2 Planned radiation exposures should be limited to the administrative guide levels in Appendix EP-230-1, Emergency Exposure Guidelines.

5.2.3 There is no automatic drain or blow down but there is an alarm light to indicate that the level in the trap T-717 is high and that the trap needs to be drained right away. This trap removes water from the gas sample lines. If the liquid level becomes too high, water will be sucked into the gas breakdown pump and mechanical damage may result.

5.3 Special equipment

5.3.1 Gas vial sample tube

5.3.2 Iodine & particulate sample assembly

5.3.3 14.4 ml gas vials and caps

5.3.4 Liquid sample bottles and caps

5.3.5 10cc syringe with luer-lok fitting

5.3.6 Silver zeolite cartridges

5.3.7 47mm particulate filters (Gelman)

5.3.8 Small bottle of demin water

5.3.9 Large volume cask

5.3.10 Small volume cask

5.3.11 Gas sample cask

5.3.12 Flashlight

5.3.13 Mirror

5.3.14 Watch with secondhand or stopwatch

5.3.15 Plastic bags

5.3.16 PASS carrying box

5.3.17 Copy of EP-231-Operation of Post-Accident Sampling System (PASS)

5.3.18 Blank Data Sheets

5.3.19 Portable Communication Equipment (if available)

5.3.20 Clip Board

5.3.21 Pens, Pencils, etc.

5.3.22 Towels

5.3.23 Control Panel Power Key

5.3.24 Ramp for Large Volume Case

5.3.25 Scissors

5.3.26 1 cc gas-tight syringe

5.4 References

5.4.1 EP-230 - Chemistry Sampling and Analysis Team

5.4.2 M-102 - General Arrangement Plan at El. 217'-0"

5.4.3 M-30, Rev. 7 - Post Accident Sampling P&ID

5.4.4 M-42, Proposed Rev. 19 - Nuclear Boiler Vessel Instrumentation

5.4.5 M-51, Sht. 1 - Rev. 29, Sht. 2 - Rev. 29, Residual Heat Removal P&ID

5.4.6 M-57- Sht. 1 - Rev. 19, Containment Atmosphere Control P&ID

5.4.7 M1-D24-Z00 1, Vol. I & II, GEK83344, Operation and Maintenance Instructions - PASS, Vol. I & II

5.4.8 A-107, Rev. 30, Architectural Floor Plan at Elevation 217'-0".

APPENDIX EP-231-1

PROCEDURE FOR OBTAINING A 14.4 ML GAS SAMPLE

1. If Demin Tank is not at least half full, first ensure that valve 30-0017 is closed then vent the tank to relieve pressure and allow the tank to fill. Open valve 30-0010 enough to allow flow, then open and adjust valve 30-0011 to slowly fill the tank. When the tank is full, close valves 30-0011 and 30-0010 and the vent.

2. Ensure that the nitrogen supply valves are open and that the pressure is set at 100 psig by opening the following valves: (Check-off Required)

N2 Bottle 1			N2 Bottle 2	
Bottle Valve	_____	*OR*	Bottle Valve	_____
PCV-30-074	_____		PCV-30-073	_____
Isolation Valve	_____		Isolation Valve	_____
30-0022	_____		30-0023	_____

Unit 1			Unit 2	
30-1114	_____	*OR*	30-2114	_____

Demin Water Tank

30-0017 _____

Ensure that the Demineralized Flush Water Tank OOT 945 is pressurized at 100 psig and the following valves are open to the sample station: (Check-off required)

30-0014 _____

Unit 1			Unit 2	
30-1100	_____	*OR*	30-2100	_____

3. Contact the Control room and have shift verify a pressure difference of at least 0.25 inches of water on PDI-76-198A or PDI-76-198D located on MCR Panel 10C681, then open the damper (fully) to Secondary Containment.

4. Adjust PCV-627 on the control panel to have a 15 psi reading on the gauge.

5. Turn all control panel switches "OFF" (except HC-723, place in position 4 "SPARE") and then TURN the Control Panel Power Selector Switch HC-600 to "A" (Alternate "B").

APPENDIX EP-231-1 (CONT'D)

PROCEDURE FOR OBTAINING A 14.4 ML GAS SAMPLE

6. Turn the Liquid or Gas Selector Switch to Liquid.

7. Turn Flush System Switch HC-628-1 counterclockwise to position 6 and HC-626 to position 1 (Jet Pump) and observe that approximately 0.3 gpm flow per FI-664 is occurring and providing a positive indication that the discharge line to the Suppression Pool is open.

   a) The nitrogen bottle pressure regulators (PCV-30-073, 074) should be adjusted after the commencement of flush flow such that the outlet pressure gauge reads 100 psi. (The outlet pressure normally drops to about 70 psi after CV-628 opens and flush flow begins.)

   b) The piping station pressure control valve (PCV-627) should be fully open. Flush flow should now be approximately 0.5 gpm.

   c) Flush for at least 10 minutes and monitor the flow rate and adjust the nitrogen regulators as necessary during the course of the flush to ensure that 100 psig is maintained on the regulator output.

   d) Return the nitrogen regulator to its original setting prior to terminating the flush. This will prevent lifting of the nitrogen bottle discharge relief valve PSV-30-028.

   e) Adjust PCV-627 on the Control Panel to have a 15 psi reading on the gauge.

8. After being assured that the discharge line to the suppression pool is open, drain Collector Tank, Trap and Sump by turning Switch HC-715-1 clockwise through its eight positions pausing approximately 5 seconds at each position.

AFTER PERFORMING STEP NO. 8 ABOVE:

9. Turn HC-626 to "OFF" FIRST and then HC-628-1 to "OFF".

10. With the Drain System Switch (HC-715-1) in the "OFF" position, place Switch HC-700 (liquid/gas selector) in the "GAS" position. Ensure N2 bottle valves are open and regulated to approximately 100 psig.

11. Ensure the Chiller E-703 is on.

APPENDIX EP-231-1 (CONT'D)

PROCEDURE FOR OBTAINING A 14.4 ML GAS SAMPLE

12. Quickly inspect the needle in the gas port to determine that its condition is satisfactory for obtaining a sample.

IN THE FOLLOWING STEP, ONLY TIGHTEN THE IODINE CARTRIDGE DRAWER UNTIL THE "CARTRIDGE IN" LIGHT TURNS GREEN AND NO FURTHER.

13. If a particulate/iodine sample will be obtained later, make sure that the desired filter and cartridges are properly installed (including "O" rings) in the cartridge retainer. Install the gas filter drawer into position. Verify that the "CARTRIDGE IN" light is green.

14. Turn Switch HC-723 (GAS SAMPLE SELECTOR SWITCH) to the desired sample location:

POSITION	LOCATION
1	Drywell Atmosphere
2	Suppression Pool Atmosphere
3	Secondary Containment Atmosphere
4	Spare

15. Open the respective Reactor system valve in the gas sample line as follows:

SAMPLE LOCATION	SWITCH NAME	POSITION
* Upper Drywell ATM. (291')	SUP POOL/DRYWELL AIR TO POST ACDT SAMP SV57-146A/SV57-146B	DRYWELL
* Lower Drywell ATM. (242')	SUP POOL/DRYWELL AIR TO POST ACDT SAMP SV57-147A/SV57-147B	DRYWELL
* Suppression Pool ATM. (222') (250 Deg Azimuth from North)	SUP POOL/DRYWELL TO POST ACDT SAMP SV57-147A/SV57-147B	SUPP POOL
* Suppression Pool ATM. (222') (70 Deg Azimuth from North)	SUP POOL/DRYWELL AIR TO POST ACDT SAMP SV57-146A/SV57-146B	SUPP POOL
Secondary Containment ATM.	No Line-up Necessary	

* Verify that the light changes from green to red.

APPENDIX EP-231-1 (CONT'D)

PROCEDURE FOR OBTAINING A 14.4 ML GAS SAMPLE

16. Place a standard 14.4 milliliter off gas vial into the gas vial positioner, slide the positioner into the gas port. Observe that the "Bottle In" status light changes from red to green. If the light does not change to green, reposition the bottle.

17. Turn the "15 ml Gas Sample Switch" HC-705 to position 2 and circulate gas for the appropriate time:

Sample		Time (min)
Drywell Atmosphere		
elevation 291		8
elevation 242		12
Suppression Pool Atmosphere		
elevation 220	250 degrees	3
	70 degrees	5
Secondary Containment		1

Be sure that the flow as read by the rotameter (FI-725) thru the sample enclosure window is greater than 10 SLPM. Record flow and flush duration on data sheet.

18. Turn HC-705 to position 3 and evacuate the off gas vial. Record pressure as P1 from PI-708 of the evacuated vial on the data sheet. Make sure the vacuum in the gas vial reaches a stable minimum reading.

19. Turn HC-705 to position 4, "TAKE SAMPLE". Verify that pressure (PI-708) does not change significantly. If the pressure changes significantly, it may indicate a system leak. Therefore, turn Switch HC-705 counter clockwise to position 2. Remove the sample vial and place in a plastic bag for transportation to the hot lab. Place a new 14.4 ml off gas sample vial into the gas positioner and return to Step 5.

20. Press the HC-720 button to obtain the sample. Keep button depressed until a steady pressure is reached (approximately 5 seconds). Record pressure as P2 from PI-708 on data sheet. This pressure should correspond to actual pressure of sample being obtained. Record sample temperature from TI-724 on data sheet.

21. Turn HC-705 to position 5 "FLUSH SYSTEM" and flush for approximately 1 minute.

APPENDIX EP-231-1 (CONT'D)

PROCEDURE FOR OBTAINING A 14.4 ML GAS SAMPLE

22. Turn HC-705 clockwise to "OFF".

23. Turn Switch SV57-147A/SV57-147B or SV57-146A/SV57-146B (if opened in Step 14) to the CLOSE position.

24. Wearing cotton liners and gloves, and observing ALARA practices, withdraw the gas vial positioner and immediately have the HP technician survey the gas sample vial and record the Initial Contact Dose Rate on the Data Sheet. Keep the vial at the maximum distance from the individual and quickly insert the sample bottle into the gas vial cask. Close and latch the gas vial cask. Put a stopper or the gas vial positioner back into the port in the sample station.

25. Turn HC-700 (Liquid/Gas Selector) to the LIQUID position.

26. Turn Flush Sytem HC-628-1 counterclockwise to position 6 and HC-626 to position 1 and observe that approximately 0.3 gpm flow per FI-664 is occuring.

    a) The nitrogen bottle pressure regulators (PCV-30-073, 074) should be adjusted after the commencement of flush flow such that the outlet pressure gauge reads 100 psi. (The outlet pressure normally drops to about 70 psi after CV-628 opens and flush flow begins.)

    b) The piping station pressure control valve (PCV-627) should be fully open. Flush flow should now be approximately 0.5 gpm.

    c) Flush for at least <u>10 minutes</u> and monitor the flow rate and adjust the nitrogen regulators as necessary during the course of the flush to ensure that 100 psig is maintained on the regulator output.

    d) Return the nitrogen regulator to its original setting prior to terminating the flush. This will prevent lifting of the nitrogen bottle discharge relief valve PSV-30-028.

    e) Adjust PCV-627 on the Control Panel to have a 15 psi reading on the gauge.

27. Drain Collector Tank, Trap and Sump by turning switch HC-715-1 clockwise through its eight positions pausing approximately 5 seconds at each position.

28. Turn HC-626 to "OFF" <u>First</u> and then HC-628-1 to "OFF".

APPENDIX EP-231-1 (CONT'D)

PROCEDURE FOR OBTAINING A 14.4 ML GAS SAMPLE

29. Close FCV-627 to 0 psig by turning counterclockwise.

30. Close the nitrogen supply valves opened in Step No. 1: (Check-off required)

N2 Bottle 1			N2 Bottle 2	
Bottle Valve	_____	*OR*	Bottle Valve	_____
PCV-30-074	_____		PCV-30-073	_____
Isolation Valve	_____		Isolation Valve	_____
30-0022	_____		30-0023	_____

Unit 1			Unit 2	
30-1114	_____	*OR*	30-2114	_____

Demin Water Tank

30-0017 _____

31. Close the Demin Water Tank valves opened in Step No. 2: (Check-off required)

30-0014 _____

Unit 1			Unit 2	
30-1100	_____	*OR*	30-2100	_____

32. Close the damper.

33. Turn the Chiller E-703 OFF.

34. Turn all switches (except for HC-723 which is left in position 4) to their "OFF" position.

APPENDIX EP-231-1 (CONT'D)

PROCEDURE FOR OBTAINING A 14.4 ML GAS SAMPLE

Data Sheet for 14.4 ML Gas Sample

DESIRED ANALYSIS

A._____

B._____

C._____

SAMPLE #

1. Sample Source _____ Date _____ Time _____
2. Sample Flow _____ FI-725 (SLPM)
3. Flush Duration _____ (Min.)
4. Absolute Pressure of Vial (P1)_____ PI-708 (PSIA)
5. Final Sample Pressure (P2)_____ PI-708 (PSIA)
6. Sample Temperature _____ TI-724 (F)
7. Calculated Sample Volume (ML) Corrected to STP

$$\text{Vol @ STP} = \frac{(P2-P1)(14.4\ ml)(492\ deg.\ R)}{(T + 460\ deg.\ R)(14.7\ PSIA)}$$

$$= \_\_\_\_\_\ ml\ @\ STP$$

8. Initial Contact Dose Rate _____(mR)

Name_____

APPENDIX EP-231-2

PROCEDURE FOR OBTAINING IODINE/PARTICULATE SAMPLE

1. If Demin Tank is not at least half full, first ensure that valve 30-0017 is closed then vent the tank to relieve pressure and allow the tank to fill. Open valve 30-0010 enough to allow flow, then open and adjust valve 30-0011 to slowly fill the tank. When the tank is full, close valves 30-0011 and 30-0010 and the vent.

2. Ensure that the nitrogen supply valves are open and that the pressure is set at 100 psig by opening the following valves: (Check-off Required)

N2 Bottle 1			N2 Bottle 2	
Bottle Valve	_____	*OR*	Bottle Valve	_____
PCV-30-074	_____		PCV-30-073	_____
Isolation Valve	_____		Isolation Valve	_____
30-0022	_____		30-0023	_____

Unit 1			Unit 2	
30-1114	_____	*OR*	30-2114	_____

Demin Water Tank

30-0017 _____

Ensure that the Demineralized Flush Water Tank OOT 945 is pressurized at 100 psig and the following valves are open to the sample station: (Check-off required)

30-0014 _____

Unit 1			Unit 2	
30-1100	_____	*OR*	30-2100	_____

3. Contact the Control Room and have shift verify a pressure difference of at least 0.25 inches of water on PDI-76-198A or PDI-76-198D located on MCR Panel 10C681, then open the damper(fully) to Secondary Containment.

4. Adjust PCV-627 on the control panel to have a 15 psi reading on the gauge.

5. Turn all control panel switches "OFF" (except HC-723, place in position 4 "SPARE") and then TURN the Control Panel Power Selector Switch HC-600 to "A" (Alternate "B").

APPENDIX EP-231-2 (CONT'D)

PROCEDURE FOR OBTAINING IODINE/PARTICULATE SAMPLE

6. Turn the Liquid or Gas Selector Switch to Liquid.

7. Turn Flush System Switch HC-628-1 counterclockwise to position 6 and HC-626 to position 1 (Jet Pump) and observe that approximately 0.3 gpm flow per FI-664 is occurring and providing a positive indication that the discharge line to the Suppression Pool is open.

   a) The nitrogen bottle pressure regulators (PCV-30-073, 074) should be adjusted after the commencement of flush flow such that the outlet pressure gauge reads 100 psi. (The outlet pressure normally drops to about 70 psi after CV-628 opens and flush flow begins.)

   b) The piping station pressure control valve (PCV-627) should be fully open. Flush flow should now be approximately 0.5 gpm.

   c) Flush for at least 10 minutes and monitor the flow rate and adjust the nitrogen regulators as necessary during the course of the flush to ensure that 100 psig is maintained on the regulator output.

   d) Return the nitrogen regulator to its original setting prior to terminating the flush. This will prevent lifting of the nitrogen bottle discharge relief valve PSV-30-028.

   e) Adjust PCV-627 on the Control Panel to have a 15 psi reading on the gauge.

8. After being assured that the discharge line to the suppression pool is open, drain Collector Tank, Trap and Sump by turning Switch HC-715-1 clockwise through its eight positions pausing approximately 5 seconds at each position.

9. Turn HC-626 to "OFF" FIRST and then HC-628-1 to "OFF".

10. Verify that HC-715-1 DRAIN SYSTEM SWITCH is in the "OFF" position. Place Switch HC-700 (LIQUID/GAS SELECTOR) in the "GAS" position.

APPENDIX EP-231-2 (CONT'D)

PROCEDURE FOR OBTAINING IODINE/PARTICULATE SAMPLE

IN THE FOLLOWING STEP, ONLY TIGHTEN THE IODINE CARTRIDGE DRAWER UNTIL THE "CARTRIDGE IN" LIGHT TURNS GREEN AND NO FURTHER.

11. If the gas filter drawer is already in place and there is any doubt about the desired filters and cartridges being in place, pull the drawer and check the filters and cartridge(s). Put the desired filter cartridge(s) into the cartridge retainer, put the cartridge retainer into the gas filter drawer including "O" rings and put the drawer into the sample station and verify that the "CARTRIDGE IN" light is green. If not, reposition the drawer.

    CONTACT THE GROUP LEADER AND VERIFY THE SAMPLING TIME.

12. Decide whether a timed or non-timed sample is desired and record. Generally speaking, if a high activity condition exists or is suspected, a timed sample should be taken. For a timed sample, set the Timer KC-712 between the range of 0 to 30 seconds. Select a low enough time so that the activity on the filter cartridge will not be unnecessarily high and cause special handling problems. It is suggested that 5 seconds be used for the first try. Observe the RI-704 reading to determine if there is a rapid activity buildup. This reading will also include non-absorbing gases. If the activity level does not exceed a pre-set value of 40 mR/hr, another timed flow through the cartridges can be made. Set the Switch HC-704 located to the left of the timer labeled TIME SAMPLE on either YES or NO.

13. Adjust PCV-30-127 to 2 psi (located in back of Control Panel).

14. Turn the Chiller E-703 ON.

15. Turn the GAS SAMPLE SELECTOR SWITCH (HC-723) to the desired sample source.

SAMPLE SOURCE	POSITION
Drywell Atmosphere	1
Suppression Pool Atmosphere	2
Secondary Containment Atmosphere	3
Spare	4

APPENDIX EP-231-2 (CONT'D)

PROCEDURE FOR OBTAINING IODINE/PARTICULATE SAMPLE

16. Open the respective Reactor system valve in the gas sample line for the appropriate sample as follows:

SAMPLE LOCATION	SWITCH NAME	POSITION
* Upper Drywell ATM. (291')	SUP POOL/DRYWELL AIR TO POST ACDT SAMP SV57-146A/SV57-146B	DRYWELL
* Lower Drywell ATM. (242')	SUP POOL/DRYWELL AIR TO POST ACDT SAMP SV57-147A/SV57-147B	DRYWELL
* Suppression Pool ATM. (222') (250 Deg Azimuth from North)	SUP POOL/DRYWELL AIR TO POST ACDT SAMP SV57-147A/SV57-147B	SUPP POOL
* Suppression Pool ATM. (222') (70 Deg Azimuth from North)	SUP POOL/DRYWELL AIR TO POST ACDT SAMP SV57-146A/SV57-146B	SUPP POOL
Secondary Containment ATM.	No Line-up Necessary	

* Verify that the light changes from green to red.

17. Turn the IODINE CARTRIDGE SAMPLE SWITCH HC-712 to position 2 and circulate gas for the appropriate time:

Sample		Time (min)
Drywell Atmosphere		
elevation 291		8
elevation 242		12
Suppression Pool Atmosphere		
elevation 220	250 degrees	3
	70 degrees	5
Secondary Containment		1

18. Be sure the flow as read by the rotometer which is visible thru the window in the sample station enclosure is greater than 10 SLPM. Record the flow (FI-725), temperature (TI-724) and pressure (PI-726 and PI-727) on the data sheet. The two pressure gages (PI-726 and PI-727), as read thru the window, should be the same.

APPENDIX EP-231-2 (CONT'D)

PROCEDURE FOR OBTAINING IODINE/PARTICULATE SAMPLE

19. Turn HC-712 to position 3. The sample gas will start to flow through the filter cartridge. On the DATA SHEET record PI-727, PI-726, FI-725, the flow duration in seconds, RI-704, and the sample volume.

20. After the timer has timed out for a timed sample or after the predetermined time has elapsed for a non-timed sample, turn Selector Switch HC-712 to position 4 for 10 seconds to evacuate the filter cartridge. A vacuum will be quickly drawn on the system. If a timed sample was taken and the Activity reading from RI-704 is below 40 mR/hr, return to step No. 17 but only circulate the gas for one minute and record the flush time as one (1) minute onto the Data Sheet. Verify critical flow by completing the appropriate sections of the Data Sheet.

21. Turn Switch HC-712 to position 5 which will admit a nitrogen flush through the filter cartridge to remove Krypton and Xenon gases. This purge should last approximately 20 seconds or until RI-704 is stable. Record the final radiation, RI-704.

22. Rotate HC-712 clockwise to the "OFF" position. Turn other switches (except HC-600) to the "OFF" positions. Remove cartridge retainer and immediately survey the cartridge retainer and record the Initial Contact Dose Rate on the Data Sheet and put the cartridge retainer in a plastic bag. Tape bags closed. If available, install a new cartridge retainer complete with filter paper and iodine cartridges. Put drawer back into sample enclosure. Place the sample into a transport cask.

23. Turn Switch SV57-147A/SV57-147B or SV57-146A/SV57-146B (if opened in Step 15) to the CLOSE position.

24. Turn HC-700 (Liquid/Gas Selector) to the LIQUID position.

25. Turn Flush Sytem HC-628-1 counterclockwise to position 6 and HC-626 to position 1 and observe that approximately 0.3 gpm flow per FI-664 is occuring.

    a) The nitrogen bottle pressure regulators (PCV-30-073, 074) should be adjusted after the commencement of flush flow such that the outlet pressure gauge reads 100 psi. (The outlet pressure normally drops to about 70 psi after CV-628 opens and flush flow begins.)

APPENDIX EP-231-2 (CONT'D)

PROCEDURE FOR OBTAINING IODINE/PARTICULATE SAMPLE

b) The piping station pressure control valve (PCV-627) should be fully open. Flush flow should now be approximately 0.5 gpm.

c) Flush for at least 10 minutes and monitor the flow rate and adjust the nitrogen regulators as necessary during the course of the flush to ensure that 100 psig is maintained on the regulator output.

d) Return the nitrogen regulator to its original setting prior to terminating the flush. This will prevent lifting of the nitrogen bottle discharge relief valve PSV-30-028.

e) Adjust PCV-627 on the Control Panel to have a 15 psi reading on the gauge.

26. Drain Collector Tank, Trap and Sump by turning switch HC-715-1 clockwise through its eight positions pausing approximately 5 seconds at each position.

27. Turn HC-626 to "OFF" FIRST and then HC-628-1 to "OFF".

28. Close FCV-627 to 0 psig by turning counterclockwise.

29. Close the nitrogen supply valves opened in Step No. 1: (Check-off required).

N2 Bottle 1			N2 Bottle 2	
Bottle Valve PCV-30-074	_____	*OR*	Bottle Valve PCV-30-073	_____
Isolation Valve 30-0022	_____		Isolation Valve 30-0023	_____
Unit 1			Unit 2	
30-1114	_____	*OR*	30-2114	_____
Demin Water Tank				
30-0017	_____			

APPENDIX EP-231-2 (CONT'D)

PROCEDURE FOR OBTAINING IODINE/PARTICULATE SAMPLE

30. Close the Demin Water Tank valves opened in Step No. 2: (Check-off required)

    30-0014 _____

Unit 1		Unit 2
30-1100 _____	*OR*	30-2100 _____

31. Close the damper.

32. Turn the Chiller E-703 OFF.

33. Turn all switches (except for HC-723 which is left in position 4) to their "OFF" position.

APPENDIX EP-231-2 (CONT'D)

PROCEDURE FOR OBTAINING IODINE/PARTICULATE SAMPLE

Data Sheet for Iodine/Particulate Sample

DESIRED ANALYSIS

A. _____

B. _____

SAMPLE # _____

ESTIMATED SAMPLING TIME _____

1. Sample Source _____ Date _____ Time _____
2. Orifice Size 3.0 SLPM

3. Timed Sample (circle one)	Y/N	Y/N	Y/N	Y/N	Y/N
4. Flush Time (minutes)					
5. Sample Flow (not thru cartridge) FI-725 (SLPM)					
6. Temperature TI-724 (F)					
7. Pressure PI-726 (PSIG or "Hg)					
8. Pressure PI-727 (PSIG or "Hg)					
9. Pressure PI-726 (PSIG or "Hg)					
10. Pressure PI-727 (PSIG or "Hg)					
11. Flow (flow thru cartridge) FI-725 (SLPM)					
12. Flow Duration (seconds)					
13. Radiation RI-704 (mR/hr)					
14. Sample Volume (from No. 17)					

15. Final Radiation _____ RI-704 (mR/hr)

16. Initial Contact Dose Rate _____(mR/hr)

17. Total Sample Volume:

Flow Rate X Flow Duration = Sample Volume
0.05 LPS X _____ seconds = _____ liters

Name _____
_____
_____
_____

APPENDIX EP-231-2 (CONT'D)

DATA SHEET FOR IODINE/PARTICULATE SAMPLE VERIFICATION OF CRITICAL FLOW

For the Upstream Pressure Found on PI-726, verify Critical Flow through the Iodine Cartridge by having the corresponding value or greater vacuum on the downstream pressure gage PI-727 as given below.

9. UPSTREAM PRESSURE PI-726 _____ PSIG or "Hg	10. DOWNSTREAM PRESSURE PI-727 _____ PSIG OR "Hg
11 "Hg	21 "Hg
10 "Hg	20 "Hg
9 "Hg	20 "Hg
8 "Hg	19 "Hg
7 "Hg	19 "Hg
6 "Hg	18 "Hg
5 "Hg	18 "Hg
4 "Hg	17 "Hg
3 "Hg	17 "Hg
2 "Hg	16 "Hg
1 "Hg	16 "Hg
0 PSIG	16 "Hg
1 PSIG	15 "Hg
2 PSIG	13 "Hg
3 PSIG	12 "Hg
4 PSIG	11 "Hg
5 PSIG	10 "Hg
6 PSIG	9 "Hg
7 PSIG	8 "Hg
8 PSIG	7 "Hg
9 PSIG	6 "Hg
10 PSIG	5 "Hg
11 PSIG	4 "Hg
12 PSIG	3 "Hg
13 PSIG	2 "Hg
14 PSIG	1 "Hg
15 PSIG	0 PSIG
16 PSIG	0 PSIG
17 PSIG	1 PSIG
18 PSIG	1 PSIG
19 PSIG	2 PSIG
20 PSIG	2 PSIG
21 PSIG	3 PSIG
22 PSIG	3 PSIG
23 PSIG	4 PSIG
24 PSIG	4 PSIG
25 PSIG	5 PSIG
26 PSIG	5 PSIG
27 PSIG	6 PSIG
28 PSIG	6 PSIG
29 PSIG	7 PSIG
30 PSIG	7 PSIG
Critical Flow _____ (Yes/No)	

NOTE: When critical flow is obtained through the cartridge assembly, a flow of 3.0 liters per minute ± 15% is achieved.

APPENDIX EP-231-3

PROCEDURE FOR OBTAINING A 14.4 ML GAS SAMPLE AND AN IODINE/PARTICULATE SAMPLE SIMULTANEOUSLY

1. If Demin Tank is not at least half full, first ensure that valve 30-0017 is closed then vent the tank to relieve pressure and allow the tank to fill. Open valve 30-0010 enough to allow flow, then open and adjust valve 30-0011 slowly fill the tank. When the tank is full, close 30-0011 and 30-0010 and the vent.

2. Ensure that the nitrogen supply valves are open and that the pressure is set at 100 psig by opening the following valves: (Check-off Required)

N2 Bottle 1			N2 Bottle 2	
Bottle Valve	_____	*OR*	Bottle Valve	_____
PCV-30-074	_____		PCV-30-073	_____
Isolation Valve	_____		Isolation Valve	_____
30-0022	_____		30-0023	_____

Unit 1			Unit 2	
30-1114	_____	*OR*	30-2114	_____

Demin Water Tank

30-0017 _____

Ensure that the Demineralized Flush Water Tank OOT 945 is pressurized at 100 psig and the following valves are open to the sample station: (Check-off required)

30-0014 _____

Unit 1			Unit 2	
30-1100	_____	*OR*	30-2100	_____

3. Contact the Control Room and have shift verify a pressure difference of at least 0.25 inches of water on PDI-76-198A or PDI-76-198D located on MCR Panel 10C681, then open the damper (fully) to Secondary Containment.

4. Adjust PCV-627 on the control panel to have a 15 psi reading on the gauge.

5. Turn all control panel switches "OFF" (except HC-723, place in position 4 "SPARE") and then TURN the Control Panel Power Selector Switch HC-600 to "A" (Alternate "B").

APPENDIX EP-231-3 (CONT'D)

PROCEDURE FOR OBTAINING A 14.4 ML GAS SAMPLE
AND AN IODINE/PARTICULATE SAMPLE SIMULTANEOUSLY

6. Turn the Liquid or Gas Selector Switch to Liquid.

7. Turn Flush System Switch HC-628-1 counterclockwise to position 6 and HC-626 to position 1 (Jet Pump) and observe that approximately 0.3 gpm flow per FI-664 is occurring and providing a positive indication that the discharge line to the Suppression Pool is open.

   a) The nitrogen bottle pressure regulators (PCV-30-073, 074) should be adjusted after the commencement of flush flow such that the outlet pressure gauge reads 100 psi. (The outlet pressure normally drops to about 70 psi after CV-628 opens and flush flow begins.)

   b) The piping station pressure control valve (PCV-627) should be fully open. Flush flow should now be approximately 0.5 gpm.

   c) Flush for at least 10 minutes and monitor the flow rate and adjust the nitrogen regulators as necessary during the course of the flush to ensure that 100 psig is maintained on the regulator output.

   d) Return the nitrogen regulator to its original setting prior to terminating the flush. This will prevent lifting of the nitrogen bottle discharge relief valve PSV-30-028.

   e) Adjust PCV-627 on the Control Panel to have a 15 psi reading on the gauge.

8. After being assured that the discharge line to the suppression pool is open, drain Collector Tank, Trap and Sump by turning Switch HC-715-1 clockwise through its eight positions pausing approximately 5 seconds at each position.

9. Turn HC-626 to "OFF" FIRST and then HC-628-1 to "OFF".

10. With the Drain System Switch (HC-715-1) in the "OFF" position, place Switch HC-700 (liquid/gas selector) in the "GAS" position.

11. Ensure the Chiller E-703 is on.

12. Quickly inspect the needle in the gas port to determine that its condition is satisfactory for obtaining a sample.

APPENDIX EP-231-3 (CONT'D)

PROCEDURE FOR OBTAINING A 14.4 ML GAS SAMPLE
AND AN IODINE/PARTICULATE SAMPLE SIMULTANEOUSLY

IN THE FOLLOWING STEP, ONLY TIGHTEN THE IODINE, CARTRIDGE DRAWER UNTIL THE "CARTRIDGE IN" LIGHT TURNS GREEN AND NO FURTHER.

13. If the gas filter drawer is already in place and there is any doubt that the desired filters being in place, pull the drawer and check the filter and cartridge(s). Put the desired filter cartridge(s) into the cartridge retainer, put the cartridge retainer into the gas filter drawer including "O" rings and put the drawer into the sample station and verify that the "CARTRIDGE IN" light is green. If not, reposition the drawer.

    CONTACT THE GROUP LEADER AND VERIFY THE SAMPLING TIME.

14. Decide whether a timed or non-timed sample is desired and record. Generally speaking, if a high activity condition exists or is suspected, a timed sample should be taken. For a timed sample, set the Timer KC-712 between the range of 0 to 30 seconds. Select a low enough time so that the activity on the filter cartridge will not be unnecessarily high and cause special handling problems. It is suggested that 5 seconds be used for the first try. Observe the RI-704 reading to determine if there is a rapid activity buildup. This reading will also include non-absorbing gases. If the activity level does not exceed a pre-set value of 40 mR/hr, another timed flow through the cartridge can be made. Set the Switch HC-704 located to the left of the timer labeled TIME SAMPLE on either YES or NO.

15. Adjust PCV-30-127 to 2 psi (located in back of Control Panel).

16. Turn Switch HC-723 (GAS SAMPLE SELECTOR SWITCH) to the desired sample location:

POSITION	LOCATION
1	Drywell Atmosphere
2	Suppression Pool Atmosphere
3	Secondary Containment Atmosphere
4	Spare

APPENDIX EP-231-3 (CONT'D)

PROCEDURE FOR OBTAINING A 14.4 ML GAS SAMPLE AND AN IODINE/PARTICULATE SAMPLE SIMULTANEOUSLY

17. Open the respective Reactor system valve in the gas sample line as follows:

SAMPLE LOCATION	SWITCH NAME	POSITION
* Upper Drywell ATM. (291')	SUP POOL/DRYWELL AIR TO POST ACDT SAMP SV57-146A/SV57-146B	DRYWELL
* Lower Drywell ATM. (242')	SUP POOL/DRYWELL AIR TO POST ACDT SAMP SV57-147A/SV57-147B	DRYWELL
* Suppression Pool ATM. (222') (250 Deg Azimuth from North)	SUP POOL/DRYWELL AIR TO POST ACDT SAMP SV57-147A/SV57-147B	SUPP POOL
* Suppression Pool ATM. (222') (70 Deg Azimuth from North)	SUP POOL/DRYWELL AIR TO POST ACDT SAMP SV57-146A/SV57-146B	SUPP POOL
Secondary Containment ATM.	No Line-up Necessary	

* Verify that the light changes from green to red.

18. Place a standard 14.4 milliliter off gas vial into the gas vial positioner, slide the positioner into the gas port. Observe that the "Bottle In" status light changes from red to green. If the light does not change to green, reposition the bottle.

19. Turn the "15 ml Gas Sample Switch" HC-705 to position 2 and circulate gas for the appropriate time:

Sample		Time (min)
Drywell Atmosphere		
elevation 291		8
elevation 242		12
Suppression Pool Atmosphere		
elevation 220	250 degrees	3
	70 degrees	5
Secondary Containment		1

APPENDIX EP-231-3 (CONT'D)

PROCEDURE FOR OBTAINING A 14.4 ML GAS SAMPLE AND AN IODINE/PARTICULATE SAMPLE SIMULTANEOUSLY

Be sure that the flow as read by the rotameter (FI-725) thru the sample enclosure window is greater than 10 SLPM. Record flow and flush duration on data sheet.

20. Turn HC-705 to position 3 and evacuate the off gas vial. Record pressure as P1 from PI-708 of the evacuated vial on the data sheet. Make sure the vacuum in the gas vial reaches a stable minimum reading.

21. Turn HC-705 to position 4, "TAKE SAMPLE". Verify that pressure (PI-708) does not change significantly. If the pressure changes significantly, it may indicate a system leak. Therefore, turn Switch HC-705 counter clockwise to position 2. Remove the sample vial and place in a plactic bag for transportation to the hot lab. Place a new 14.4 ml off gas sample vial into the gas positioner and return to Step 5.

22. Press the HC-720 button to obtain the sample. Keep button depressed until a steady pressure is reached (approximately 5 seconds). Record pressure as P2 from PI-708 on data sheet. This pressure should correspond to actual pressure of sample being obtained. Record sample temperature from TI-724 on data sheet.

23. Turn HC-705 to position 5 "FLUSH SYSTEM" and flush for approximately 1 minute.

24. Turn HC-705 clockwise to "OFF".

25. Wearing cotton liners and gloves, and observing ALARA practices, withdraw the gas vial positioner and immediately have the HP technician survey the gas sample vial and record the Initial Contact Dose Rate on the Data Sheet. Keep the vial at the maximum distance from the individual and quickly insert the sample bottle into the gas vial cask. Close and latch the gas vial cask. Put a stopper or the gas vial positioner back into the port in the sample station.

APPENDIX EP-231-3 (CONT'D)

PROCEDURE FOR OBTAINING A 14.4 ML GAS SAMPLE
AND AN IODINE/PARTICULATE SAMPLE SIMULTANEOUSLY

26. Turn the IODINE CARTRIDGE SAMPLE SWITCH HC-712 to position 2 and circulate gas for the appropriate time:

Sample		Time (min)
Drywell Atmosphere		
elevation 291		8
elevation 242		12
Suppression Pool Atmosphere		
elevation 220	250 degrees	3
	70 degrees	5
Secondary Containment		1

27. Be sure the flow as read by the rotometer which is visible thru the window in the sample station enclosure is greater than 10 SLPM. Record the flow (FI-725), temperature (TI-724) and pressure (PI-726 and PI-727) on the data sheet. The two pressure gages (PI-726 and PI-727), as read thru the window, should be the same.

28. Turn HC-712 to position 3. The sample gas will start to flow through the fiter cartridge. On the DATA SHEET record PI-727, PI-726, FI-725, the flow duration in seconds, RI-704, and the sample volume.

29. After the timer has timed out for a timed sample or after the predetermined time has elapsed for a non-timed sample, turn Selector Switch HC-712 to position 4 for 10 seconds to evacuate the filter cartridge. A vacuum will be quickly drawn on the system. If a timed sample was taken and the Activity reading from RI-704 is below 40 mR/hr, return to step 26 but only circulate the gas for one minute and record the flush time as one (1) minute onto the Data Sheet. Verify critical flow by completing the appropriate section of the Data Sheet.

30. Turn Switch HC-712 to position 5 which will admit a nitrogen flush through the filter cartridge to remove Krypton and Xenon gases. This purge should last approximately 20 seconds or until RI-704 is stable. Record the final radiation, RI-704.

APPENDIX EP-231-3 (CONT'D)

PROCEDURE FOR OBTAINING A 14.4 ML GAS SAMPLE
AND AN IODINE/PARTICULATE SAMPLE SIMULTANEOUSLY

31. Rotate HC-712 clockwise to the "OFF" position. Turn other switches (except HC-600) to the "OFF" positions. Remove cartridge retainer and immediately survey the cartridge retaininer and record the Initial Contact Dose Rate on the Data Sheet and put the cartirdge retainer in a plastic bag. Tape bags closed. If available, install a new cartridge retainer complete with filter paper and iodine cartridges. Put drawer back into sample enclosure. Place the sample into a transport cask.

32. Turn Switch SV57-147A/SV57-147B or SV57-146A/SV57-146B (if opened in Step 16) to the CLOSE position.

33. Turn HC-700 (Liquid/Gas Selector) to the LIQUID position.

34. Turn Flush Sytem HC-628-1 counterclockwise to position 6 and HC-626 to position 1 and observe that approximately 0.3 gpm flow per FI-664 is occuring.

    a) The nitrogen bottle pressure regulators (PCV-30-073, 074) should be adjusted after the commencement of flush flow such that the outlet pressure gauge reads 100 psi. (The outlet pressure normally drops to about 70 psi after LV-628 opens and flush flow begins.)

    b) The piping station pressure control valve (PCV-627) should be fully open. Flush flow should now be approximately 0.5 gpm.

    c) Flush for at least 10 minutes and monitor the flow rate and adjust the nitrogen regulators as necessary during the course of the flush to ensure that 100 psig is maintained on the regulator output.

    d) Return the nitrogen regulator to its original setting prior to terminating the flush. This will prevent lifting of the nitrogen bottle discharge relief valve PSV-30-028.

    e) Adjust PCV-627 on the Control Panel to have a 15 psi reading on the gauge.

35. Drain Collector Tank, Trap and Sump by turning switch HC-715-1 clockwise through its eight positions pausing approximately 5 seconds at each position.

AFTER PERFORMING STEP NO. 35 ABOVE:

36. Turn HC-626 to "OFF" FIRST and then HC-628-1 to "OFF".

APPENDIX EP-231-3 (CONT'D)

PROCEDURE FOR OBTAINING A 14.4 ML GAS SAMPLE
AND AN IODINE/PARTICULATE SAMPLE SIMULTANEOUSLY

37. Close FCV-627 to 0 psig by turning counterclockwise.

38. Close the nitrogen supply valves opened in Step No. 1: (Check-off required)

N2 Bottle 1			N2 Bottle 2	
Bottle Valve	_____	*OR*	Bottle Valve	_____
PCV-30-074	_____		PCV-30-073	_____
Isolation Valve 30-0022	_____		Isolation Valve 30-0023	_____

Unit 1			Unit 2	
30-1114	_____	*OR*	30-2114	_____

Demin Water Tank

30-0017 _____

39. Close the Demin Water Tank valves opened in Step No. 2: (Check-off required)

30-0014 _____

Unit 1			Unit 2	
30-1100	_____	*OR*	30-2100	_____

40. Close the damper.

41. Turn the Chiller E-703 OFF.

42. Turn all switches (except for HC-723 which is left in position 4) to their "OFF" position.

APPENDIX EP-231-3 (CONT'D)

PROCEDURE FOR OBTAINING A 14.4 ML GAS SAMPLE
AND AN IODINE/PARTICULATE SAMPLE SIMULTANEOUSLY

DATA SHEET FOR 14.4 ML GAS SAMPLE

DESIRED ANALYSIS

A. _____

B. _____

C. _____

SAMPLE #

1. Sample Source _____ Date _____ Time _____
2. Sample Flow _____ FI-725 (SLPM)
3. Flush Duration _____ (Min.)
4. Absolute Pressure of Vial (P1)_____ PI-708 (PSIA)
5. Final Sample Pressure (P2)_____ PI-708 (PSIA)
6. Sample Temperature _____ TI-724 (F)
7. Calculated Sample Volume (ML) Corrected to STP

$$\text{Vol @ STP} = \frac{(P2-P1)(14.4\ \text{ml})(492\ \text{deg. R})}{(T + 460\ \text{deg. R})(14.7\ \text{PSIA})}$$

$$= \text{ml @ STP}$$

8. Initial Contact Dose Rate _____(mR)

Name _____

APPENDIX EP-231-3 (CONT'D)

PROCEDURE FOR OBTAINING A 14.4 ML GAS SAMPLE
AND AN IODINE/PARTICULATE SAMPLE SIMULTANEOUSLY

DATA SHEET FOR IODINE/PARTICULATE SAMPLE

DESIRED ANALYSIS

A. _____

B. _____

SAMPLE #

ESTIMATED SAMPLING TIME _____

1. Sample Source _____ Date _____ Time _____
2. Orifice Size 3.0 SLPM

3. Timed Sample (circle one)	Y/N	Y/N	Y/N	Y/N	Y/N
4. Flush Time (minutes)					
5. Sample Flow (not thru cartridge) FI-725 (SLPM)					
6. Temperature TI-724 (F)					
7. Pressure PI-726 (PSIG or "Hg)					
8. Pressure PI-727 (PSIG or "Hg)					
9. Pressure PI-726 (PSIG or "Hg)					
10. Pressure PI-727 (PSIG or "Hg)					
11. Flow (flow thru cartridge) FI-725 (SLPM)					
12. Flow Duration (seconds)					
13. Radiation RI-704 (mR/hr)					
14. Sample Volume (from No. 17)					

15. Final Radiation _____ RI-704 (mR/hr)

16. Initial Contact Dose Rate _____(mR/hr)

17. Total Sample Volume:

Flow Rate X Flow Duration = Sample Volume
0.05 LPS X _____ seconds = _____ liters

Name

_____
_____
_____
_____

APPENDIX EP-231-3 (CONT'D)

DATA SHEET FOR IODINE/PARTICULATE SAMPLE VERIFICATION OF CRITICAL FLOW

For the Upstream Pressure Found on PI-726, verify Critical Flow through the Iodine Cartridge by having the corresponding value or greater vacuum on the downstream pressure gage PI-727 as given below.

9. UPSTREAM PRESSURE PI-726 _____ PSIG or "Hg	10. DOWNSTREAM PRESSURE PI-727 _____ PSIG OR "Hg
11 "Hg	21 "Hg
10 "Hg	20 "Hg
9 "Hg	20 "Hg
8 "Hg	19 "Hg
7 "Hg	19 "Hg
6 "Hg	18 "Hg
5 "Hg	18 "Hg
4 "Hg	17 "Hg
3 "Hg	17 "Hg
2 "Hg	16 "Hg
1 "Hg	16 "Hg
0 PSIG	16 "Hg
1 PSIG	15 "Hg
2 PSIG	13 "Hg
3 PSIG	12 "Hg
4 PSIG	11 "Hg
5 PSIG	10 "Hg
6 PSIG	9 "Hg
7 PSIG	8 "Hg
8 PSIG	7 "Hg
9 PSIG	6 "Hg
10 PSIG	5 "Hg
11 PSIG	4 "Hg
12 PSIG	3 "Hg
13 PSIG	2 "Hg
14 PSIG	1 "Hg
15 PSIG	0 PSIG
16 PSIG	0 PSIG
17 PSIG	1 PSIG
18 PSIG	1 PSIG
19 PSIG	2 PSIG
20 PSIG	2 PSIG
21 PSIG	3 PSIG
22 PSIG	3 PSIG
23 PSIG	4 PSIG
24 PSIG	4 PSIG
25 PSIG	5 PSIG
26 PSIG	5 PSIG
27 PSIG	6 PSIG
28 PSIG	6 PSIG
29 PSIG	7 PSIG
30 PSIG	7 PSIG

Critical Flow _____ (Yes/No)

NOTE: When critical flow is obtained through the cartridge assembly, a flow of 7.0 liters per minute ± 15% is achieved.

APPENDIX EP-231-4

PROCEDURE FOR OBTAINING A SMALL VOLUME LIQUID SAMPLE

IF A SAMPLE IS TO BE OBTAINED FROM THE JET PUMP (JET PUMP 4 SENSING LINE), THERE EXISTS THE POSSIBILITY OF EXCESS FLOW CHECK VALVE XV-42-1F059H TRIPPING WHICH WILL REQUIRE MANUAL RESETTING BY OPERATIONS. THE ALARMS ARE LOCATED ON LOCAL PANEL 10C228 (20C228) AND MAIN CONTROL BOARD ANNUNCIATOR 1BC802-35 (2BC802-35) (EXCESS FLOW CHECK VALVE OPERATED PANEL C228). IF AT ANY TIME WHILE SAMPLING AN INDICATION OF DECREASING FLOW (FCV627 on FI-664) AND/OR DECREASING PRESSURE (PI661) IS NOTICED, CONTACT THE CONTROL ROOM AND REQUEST MONITORING OF THESE ANNUNCIATORS.

1. If Demin Tank is not at least half full, first ensure that valve 30-0017 is closed then vent the tank to relieve pressure and allow the tank to fill. Open valve 30-0010 enough to allow flow, then open and adjust valve 30-0011 to slowly fill the tank. When the tank is full, close valves 30-0011 and 30-0010 and the vent.

2. Ensure that the nitrogen supply valves are open and that the pressure is set at 100 psig by opening the following valves: (Check-off Required)

N2 Bottle 1			N2 Bottle 2	
Bottle Valve	_____	*OR*	Bottle Valve	_____
PCV-30-074	_____		PCV-30-073	_____
Isolation Valve 30-0022	_____		Isolation Valve 30-0023	_____

Unit 1			Unit 2	
30-1114	_____	*OR*	30-2114	_____

Demin Water Tank

30-0017 _____

Ensure that the Demineralized Flush Water Tank OOT 945 is full and is pressurized at 100 psig and the following valves are open to the sample station: (Check-off required)

30-0014 _____

Unit 1			Unit 2	
30-1100	_____	*OR*	30-2100	_____

APPENDIX EP-231-4 (CONT'D)

PROCEDURE FOR OBTAINING A SMALL VOLUME LIQUID SAMPLE

3. Contact the Control Room and have shift verify a pressure difference of at least 0.25 inches of water on PDI-76-198A or PDI-76-198D located on MCR Panel 10C681, then open the damper (fully) to Secondary Containment.

4. Adjust PCV-627 on the control panel to have a panel a 15 psi reading on the gauge.

5. Turn all control panel switches "OFF" (except HC-723, place in position 4 "SPARE") and then TURN the Control Panel Power Selector Switch HC-600 to "A" (Alternate "B").

6. Turn the Liquid or Gas Selector Switch to Liquid.

7. Turn Flush System Switch HC-628-1 counterclockwise to position 6 and HC-626 to position 1 (Jet Pump) or position 5 (RHR) and observe that approximately 0.3 gpm flow per FI-664 is occurring and providing a positive indication that the discharge line to the Suppression Pool is open.

   a) The nitrogen bottle pressure regulators (PCV-30-073, 074) should be adjusted after the commencement of flush flow such that the outlet pressure gauge reads 100 psi. (The outlet pressure normally drops to about 70 psi after CV-628 opens and flush flow begins.)

   b) The piping station pressure control valve (PCV-627) should be fully open. Flush flow should now be approximately 0.5 gpm.

   c) Flush for at least 10 minutes and monitor the flow rate and adjust the nitrogen regulators as necessary during the course of the flush to ensure that 100 psig is maintained on the regulator output.

   d) Return the nitrogen regulator to its original setting prior to terminating the flush. This will prevent lifting of the nitrogen bottle discharge relief valve PSV-30-028.

   e) Adjust PCV-627 on the Control Panel to have a 15 psi reading on the gauge.

8. After being assured that the discharge line to the suppression pool is open, drain Collector Tank, Trap and Sump by turning Switch HC-715-1 clockwise through its eight positions pausing approximately 5 seconds at each position.

APPENDIX EP-231-4 (CONT'D)

PROCEDURE FOR OBTAINING A SMALL VOLUME LIQUID SAMPLE

9. Turn HC-626 to "OFF" FIRST and then HC-628-1 to "OFF".

10. Load the syringe with 10cc of demineralized water. Place the stopcock on the syringe and load the assembly onto the injection port.

11. Remove lead stopper and carrying handle from the small cask by unscrewing it and lifting it out. Leave stopper near by.

    USE APPROPRIATE ANTI-C CLOTHING AND GOGGLES IF DIRECTLY INSPECTING THE SAMPLE NEEDLES BELOW THE SAMPLE STATION.

    CAUTION: THE LEAD SHIELDING DRAWER WEIGHS APPROXIMATELY 70 POUNDS.

12. Make certain the lead shielding drawer is out and inspect the needles with a mirror and flashlight.

13. Put a wide mouth liquid sample bottle with an outer aluminum retainer ring and septum into the small volume cask. Check that the bottle lifting lever is free to move up and down and the bottle is properly attached with Velcro tape.

14. Check that the small volume cask is in the cask positioner, and that both are hanging from the hooks below the sample station.

15. Swing the cask into position under the sample station (ensure notches of positioner are located on the inside of the sample enclosure frame) and lock the arms of the cask holder so the cask and bottle will remain in position.

16. Turn HC-616-1 SMALL VOLUME SAMPLE switch to position 3 (FLUSH LOOP).

17. Set the Liquid Sample Selector Switch HC-626 to position 2 (Jet Pump Line) if a jet pump sample is desired or to position 4 (RPV or Suppression Pool) if the Reactor valves were set for a RHR sample. Adust PCV-627 so that the flow thru FCV-627 is approximately 0.3 gpm (See FI-664).

APPENDIX EP-231-4 (CONT'D)

PROCEDURE FOR OBTAINING A SMALL VOLUME LIQUID SAMPLE

Also, if a RHR sample is desired, close the normal RHR sample lines by placing the respective switch in the following position:

SAMPLE LOCATION	SWITCH NAME	POSITION
"A" RHR	RHR HX OUTLET NORMAL SAMPL ISLN LOOP A HV51-199A	CLOSE
"B" RHR	RHR HX OUTLET NORMAL SAMPL ISLN LOOP B HV51-199B	CLOSE

IF THE SMALL VOLUME SAMPLE BOTTLE WILL NOT EASILY SLIDE ONTO THE NEEDLES, THEN THE BOTTLE IS NOT POSITIONED IN THE LIFT TUBE PROPERLY. THE CASK SHOULD BE LOWERED AND THE BOTTLE REPOSITIONED IN THE LIFT TUBE. IN NO CASE SHOULD THE BOTTLE BE FORCED UP ONTO THE NEEDLES.

18. Raise the sample bottle into position on the needles by moving the lift rod on the side of the cask.

19. Screw the lift rod in to hold the sample bottle in the engaged position. Note: The green light for the small volume sample should be on. If the light remains red, unscrew the lift rod, lower the bottle and reposition.

20. Turn HC-616-1 to the OFF position.

APPENDIX EP-231-4 (CONT'D)

PROCEDURE FOR OBTAINING A SMALL VOLUME LIQUID SAMPLE

21. Turn Liquid Sample Selector Switch HC-626 to position 1 (Jet Pump Line on Bypass) for a sample from the jet pump line or to position 5 (RPV or Sup'n Pool on Bypass) for a sample from the RHR line. Adjust PCV-627 so that the flow thru FCV-627 is between 0.5 gpm and 1 gpm. (See FI-664) Continue this flow thru bypass valve CV-626 for the appropriate length of time from the following table. Record the flow and flush time on the data sheet.

Sample	Flow Rate (gpm)	Flush Time (min)
Jet Pump	0.5	28
	0.6	23
	0.7	20
	0.8	17
	0.9	16
RHR 'A' Loop	0.5	13
	0.6	11
	0.7	10
	0.8	8
	0.9	8
RHR 'B' Loop	0.5	12
	0.6	10
	0.7	8
	0.8	7
	0.9	7

22. After flush is completed, turn Switch HC-626 to position 2 (for jet pump sample) or position 4 (for RHR sample). Note that the flow on Indicator FI-664 is greatly reduced. Adjust Valve FCV-627 for a flow of approximately 0.3 gpm, using PCV-627 (see FI-664).

APPENDIX EP-231-4 (CONT'D)

PROCEDURE FOR OBTAINING A SMALL VOLUME LIQUID SAMPLE

23. Record the following on the data sheet:

    Flow (FI-664)

    Pressure (PI-661)

    Temperature (TI-660)

    Conductivity (CI-663)

    Radiation (RI-665)

24. Turn Small Volume Liquid Selector HC-616-1 to "TAKE SAMPLE" position (position 1). Valve CV-616 will rotate and carry the sample into alignment with the line to the sample bottle. Wait for Valve CV-616 light to come on.

25. Open both stopcocks on the syringe and inject 10cc of water into the line. Close the syringe stopcocks. Remove the syringe with one stopcock. Attach the 60 cc plastic syringe and open the stopcock and inject the air, then close the stopcock. Repeat the air injection step with another 60 cc of air. Remove the plastic syringe and close the stopcock.

26. Unscrew the lift rod and lower the sample bottle.

27. Slide the lead shield drawer back into the enclosure to cover the opening for the needles.

28. Turn the Switch HC-616-1 (small volume sample sw) to the FLUSH LOOP position (3). Make sure there is enough flow by adjusting PCV-627 so that it is set to at least 15 psig (see FI-664). Flush for 5 minutes and/or until RI-665 reaches a minimum.

29. When the flush is complete, turn HC-625 (Liquid Sample Source Selector Switch) "OFF" FIRST and then HC-616-1 to "OFF" (position 2).

30. Verify Switch HV51-199A(299A) or HV51-199B(299B) is in the CLOSE position.

31. Unlock the arms of the cask holder and swing the cask out and immediately survey the vial and replace the lead stopper.

32. Transport the sample to the Hot Lab by removing both the positioner and cask and transporting together or if only the cask is desired, unscrew the lift rod out and transport only the cask.

APPENDIX EP-231-4 (CONT'D)

PROCEDURE FOR OBTAINING A SMALL VOLUME LIQUID SAMPLE

33. Turn Flush Sytem HC-628-1 counterclockwise to position 6 and HC-626 to position 1 and observe that approximately 0.3 gpm flow per FI-664 is occuring.

    a) The nitrogen bottle pressure regulators (PCV-30-073, 074) should be adjusted after the commencement of flush flow such that the outlet pressure gauge reads 100 psi. (The outlet pressure normally drops to about 70 psi after CV-628 opens and flush flow begins.)

    b) The piping station pressure control valve (PCV-627) should be fully open. Flush flow should now be approximately 0.5 gpm.

    c) Flush for at least 10 minutes and monitor the flow rate and adjust the nitrogen regulators as necessary during the course of the flush to ensure that 100 psig is maintained on the regulator output.

    d) Return the nitrogen regulator to its original setting prior to terminating the flush. This will prevent lifting of the nitrogen bottle discharge relief valve PSV-30-028.

    e) Adjust PCV-627 on the Control Panel to have a 15 psi reading on the gauge.

34. Drain Collector Tank, Trap and Sump by turning switch HC-715-1 clockwise through its eight positions pausing approximately 5 seconds at each position.

35. Turn HC-626 to "OFF" FIRST and then HC-628-1 to "OFF".

36. Close FCV-627 to 0 psig by turning counterclockwise.

APPENDIX EP-231-4 (CONT'D)

PROCEDURE FOR OBTAINING A SMALL VOLUME LIQUID SAMPLE

37. Close the nitrogen supply valves opened in Step No. 1: (Check-off required)

N2 Bottle 1			N2 Bottle 2	
Bottle Valve	_____	*OR*	Bottle Valve	_____
PCV-30-074	_____		PCV-30-073	_____
Isolation Valve	_____		Isolation Valve	_____
30-0022	_____		30-0023	_____

Unit 1			Unit 2	
30-1114	_____	*OR*	30-2114	_____

Demin Water Tank

30-0017 _____

38. Close the Demin Water Tank valves opened in Step No. 2: (Check-off required)

30-0014 _____

Unit 1			Unit 2	
30-1100	_____	*OR*	30-2100	_____

39. Close the damper.

40. Turn all switches (except for HC-723 which is left in position 4) to their "OFF" position.

APPENDIX EP-231-4 (CONT'D)

PROCEDURE FOR OBTAINING A SMALL VOLUME LIQUID SAMPLE

Data Sheet for Small Volume Liquid Sample

DESIRED ANALYSIS

A. _____

B. _____

C. _____

D. _____

E. _____

SAMPLE #

1. Sample Source _____ Date _____ Time _____
2. Bypass Flow _____ FI-664 (gpm)
3. Flush Time _____ Minutes
4. Sample Flow _____ FI-664 (gpm)
5. Pressure _____ PI-661 (psig)
6. Temperature _____ TI-660 (F)
7. Conductivity (CI-663)

   (_____ reading) (x 10) (_____ scale) = _____ micromhos/cm
8. Radiation _____ RI-665 (mR/hr)
9. Initial Contact Dose Rate _____(mR)

Name _____

APPENDIX EP-231-5

PROCEDURE FOR MONITORING TOTAL DISSOLVED GAS
(AND, IF DESIRED, OBTAINING A DISSOLVED GAS SAMPLE)
AND/OR OBTAINING A LARGE VOLUME LIQUID SAMPLE

IF A SAMPLE IS TO BE OBTAINED FROM THE JET PUMP (JET PUMP 4 SENSING LINE), THERE EXISTS THE POSSIBILITY OF EXCESS FLOW CHECK VALVE XV-42-1F059H TRIPPING WHICH WILL REQUIRE MANUAL RESETTING BY OPERATIONS. THE ALARMS ARE LOCATED ON LOCAL PANEL 10C228 AND MAIN CONTROL BOARD ANNUNCIATOR 1BC802-35 (EXCESS FLOW CHECK VALVE OPERATED PANEL C228). IF AT ANY TIME WHILE SAMPLING AN INDICATION OF DECREASING FLOW (FCV627 on FI-664) AND/OR DECREASING PRESSURE (PI661) IS NOTICED, CONTACT THE CONTROL ROOM AND REQUEST MONITORING OF THESE ANNUNCIATORS.

1. If Demin Tank is not at least half full, first ensure that valve 30-0017 is closed then vent the tank to relieve pressure and allow the tank to fill. Open valve 30-0010 enough to allow flow, then open and adjust valve 30-0011 to slowly fill the tank. When the tank is full, close valves 30-0011 and 30-0010 and the vent.

2. Ensure that the nitrogen supply valves are open and that the pressure is set at 100 psig by opening the following valves: (Check-off required)

N2 Bottle 1			N2 Bottle 2	
Bottle Valve	_____	*OR*	Bottle Valve	_____
PCV-30-074	_____		PCV-30-073	_____
Isolation Valve	_____		Isolation Valve	_____
30-0022	_____		30-0023	_____

Unit 1			Unit 2	
30-1114	_____	*OR*	30-2114	_____

Demin Water Tank

30-0017 _____

Ensure that the Demineralized Flush Water Tank OOT 945 is pressurized at 100 psig and the following valves are open to the sample station: (Check-off required)

30-0014 _____

Unit 1			Unit 2	
30-1100	_____	*OR*	30-2100	_____

APPENDIX EP-231-5 (CONT'D)

PROCEDURE FOR MONITORING TOTAL DISSOLVED GAS
(AND, IF DESIRED, OBTAINING A DISSOLVED GAS SAMPLE)
AND/OR OBTAINING A LARGE VOLUME LIQUID SAMPLE

3. Contact the Control Room and have shift verify a pressure difference of at least 0.25 inches of water on PDI-76-198A or PDI-76-198D located on MCR Panel 10C681, then open the damper (fully) to Secondary Containment.

4. Adjust PCV-627 on the control panel to have a 15 psi reading on the gauge.

5. Turn all control panel switches "OFF" (except HC-723, place in position 4 "SPARE") and then TURN the Control Panel Power Selector Switch HC-600 to "A" (Alternate "B").

6. Turn the Liquid or Gas Selector Switch to Liquid.

7. Turn Flush System Switch HC-628-1 counterclockwise to position 6 and HC-626 to position 1 (Jet Pump) or position 5 (RHR) and observe that approximately 0.3 gpm flow per FI-664 is occuring and providing a positive indication that the discharge line to the Suppression Pool is open.

   a) The nitrogen bottle pressure regulators (PCV-30-073, 074) should be adjusted after the commencement of flush flow such that the outlet pressure gauge reads 100 psi. (The outlet pressure normally drops to about 70 psi after CV-628 opens and flush flow begins.)

   b) The piping station pressure control valve (PCV-627) should be fully open. Flush flow should now be approximately 0.5 gpm.

   c) Flush for at least 10 minutes and monitor the flow rate and adjust the nitrogen regulators as necessary during the course of the flush to ensure that 100 psig is maintained on the regulator output.

   d) Return the nitrogen regulator to its original setting prior to terminating the flush. This will prevent lifting of the nitrogen bottle discharge relief valve PSV-30-028.

   e) Adjust PCV-627 on the Control Panel to have a 15 psi reading on the gauge.

8. After being assured that the discharge line to the suppression pool is open, drain Collector Tank, Trap and Sump by turning Switch HC-715-1 clockwise through its eight positions pausing approximately 5 seconds at each position.

APPENDIX EP-231-5 (CONT'D)

PROCEDURE FOR MONITORING TOTAL DISSOLVED GAS
(AND, IF DESIRED, OBTAINING A DISSOLVED GAS SAMPLE)
AND/OR OBTAINING A LARGE VOLUME LIQUID SAMPLE

9. Turn HC-626 to "OFF" FIRST and then HC-628-1 to "OFF".

10. Have a syringe carrying device ready to use.

11. Place a radiation monitor to measure the radioactivity of the syringe.

12. If you desire to obtain a large volume liquid sample, proceed to step 13, otherwise skip to step 20.

    USE APPROPRIATE ANTI-C CLOTHING AND GOGGLES IF DIRECTLY INSPECTING THE SAMPLE NEEDLES BELOW THE SAMPLE STATION. CAUTION: THE LEAD SHIELD DRAWER WEIGHS APPROXIMATELY 70 POUNDS.

13. Make certain the lead shield drawer is out and inspect the needles with a mirror and flashlight.

14. Remove lead stopper from large volume cask and attach with Velcro Tape a 15 ML sample bottle with an outer aluminum retainer ring and a neoprene cap into the large cask. With cask in fully lowered position, roll cask into position under the sample station.

15. Using the hydraulic pump slowly raise the cask, checking for proper alignment. Stop pumping when top cask ring inside and the large volume cask is just below the bottom of the sample station.

16. Turn HC-616-1 SMALL VOLUME SAMPLE switch to position 3 (FLUSH LOOP).

17. Set the Liquid Sample Selector Switch HC-626 to position 2 if a jet pump sample is desired or to position 4 if the Reactor valves were set for a RHR sample. Adjust PCV-627 so that the flow thru FCV-627 is approximately 0.3 gpm (see FI-664).

18. Push the plunger down which causes the sample bottle to be raised out of the cask and up onto the two needles. Note that the "bottle in" light will change from red to green. If the cask is not aligned properly, lower bottle and reposition cask.

19. Turn HC-616-1 (Small Volume Sample Switch) to the "OFF" position.

20. Check that the Control Panel Power is ON. Turn HC-700 to LIQUID if it is not already there.

APPENDIX EP-231-5 (CONT'D)

PROCEDURE FOR MONITORING TOTAL DISSOLVED GAS
(AND, IF DESIRED, OBTAINING A DISSOLVED GAS SAMPLE)
AND/OR OBTAINING A LARGE VOLUME LIQUID SAMPLE

21. Turn the Liquid Sample Source Selector Switch HC-626 to position 1 for Jet Pump bypass line sample or position 5 for RHR sample.

22. If RHR sample is desired, close the sample line valves to the normal sample station:

SAMPLE LOCATION	SWITCH NAME	POSITION
"A" RHR	RHR HX OUTLET NORMAL SAMPL ISLN LOOP A HV51-199A	CLOSE
"B" RHR	RHR HX OUTLET NORMAL SAMPL ISLN LOOP B HV51-199B	CLOSE

23. Adjust PCV-627 so that the flow on FI-664 is between 0.5 gpm and 1gpm. Continue this flow for the appropriate length of time from the following table. Record the flow from FI-664 and flush time on the Data Sheet.

Sample	Flow Rate (gpm)	Flush Time (min)
Jet Pump	0.5	28
	0.6	23
	0.7	20
	0.8	17
	0.9	16
RHR 'A' Loop	0.5	13
	0.6	11
	0.7	10
	0.8	8
	0.9	8
RHR 'B' Loop	0.5	12
	0.6	10
	0.7	8
	0.8	7
	0.9	7

24. When flush is completed, turn HC-626 Sample Source Selector Switch to position 2 for a jet pump sample or position 4 if Reactor valves were positioned for a RHR sample. Adjust FCV-627 for a flow of approximately 0.5 gpm (see FI-664).

APPENDIX EP-231-5 (CONT'D)

PROCEDURE FOR MONITORING TOTAL DISSOLVED GAS
(AND, IF DESIRED, OBTAINING A DISSOLVED GAS SAMPLE)
AND/OR OBTAINING A LARGE VOLUME LIQUID SAMPLE

25. Leave in these positions for at least 20 minutes. In the interim, proceed to step 26. Do not proceed to step 28 until this 20 minutes flushing time is completed.

26. Verify Leak Tight Dissolved Gas Chamber:

    a. Replace the septum in the gas collection chamber if it has been previously used for more than 15 times.

       NOTE: When replacing the septum, be sure the washers are in place.

    b. Turn the Dissolved Gas and Liquid Sample Switch HC-601 to position 1. Do not insert needle into the gas collection chamber. Observe that P-701 starts and valve CV-622 rotates.

    c. When PI-662 is stable, turn Switch HC-601 to "OFF".

    d. Confirm PI-662 does not rise more than 0.05 psia/min for at least three minutes.

       NOTE: i) If PI-662 increases more than 0.05 psia/min., this may indicate high air leak rate into the gas collection chamber. Tighten the septum first and repeat above steps.

       ii) If tightening the septum still yields high pressure increases, replace the septum and repeat above steps. If replacing the septum still yields high pressure increases, this indicates a leak in valve or fitting. Accuracy of monitoring dissolved gases may be degraded unless repairs are made at this time.

    e. Confirm PI-662 indicates 5.7 psia or lower.

       NOTE: If Dissolved Gas Collection Chamber can not be evaucated to below 5.7 psia, this usually indicates the vacuum pump P-701 requires rebuilding or replacement.

    f. Turn the Dissolved Gas and Liquid Sample Switch HC-601 to position 1.

27. Only if monitoring or sampling dissolved gas is required, insert an open end needle through the septum via needle guide into the gas collection chamber. This allows air to purge into the gas collection areas.

APPENDIX EP-231-5 (CONT'D)

PROCEDURE FOR MONITORING TOTAL DISSOLVED GAS
(AND, IF DESIRED, OBTAINING A DISSOLVED GAS SAMPLE)
AND/OR OBTAINING A LARGE VOLUME LIQUID SAMPLE

28. Turn Switch HC-601 to position 2. Observe that P-601 starts. Leave in this position for 20 minutes and record the following on the data sheet:

    Flow (FI-664)

    Pressure (PI-661)

    Conductivity (CI-663)

    Radiation (RI-665)

29. Isolate sample by turning HC-601 to position 3. Leave in that position for approximately 30 seconds.

30. Turn HC-601 to position 4. Remove needle (if inserted in step 27) and wait until PI-662 is stable and is less than 5.7 psia.

31. Turn HC-601 to position 5. Leave in this position for 5 seconds.

32. When PI-662 is stable, record value as P0 on the Data Sheet.

33. Begin collection of dissolved gas by turning switch HC-601 to position 6, for 5 seconds and record pressure of PI-662 on the Data Sheet (Cycle 1).

34. Turn switch HC-601 to position 7 (CIRCULATE AGAIN) for 10 seconds.

35. Turn switch HC-601 to position 8 (COLLECT DISSOLVED GAS AGAIN) for about 5 seconds. Record the pressure of PI-662 on the Data Sheet (Cycle 2).

36. Repeat steps 34 and 35 concurrently until successive readings of PI-662 differ by less than 0.15 psia (normally, this will be done at least 4 times) (Cycle 3, 4, etc.)

37. Turn switch HC-601 to position 9 (RELIEVE PRESSURE/TAKE GAS SAMPLE).

38. Record final pressure of PI-662 as PF on the Data Sheet.

39. Record water temperature from TI-660 on the Data Sheet.

40. If only a Large Volume Liquid sample is desired, proceed to step 45.

APPENDIX EP-231-5 (CONT'D)

PROCEDURE FOR MONITORING TOTAL DISSOLVED GAS
(AND, IF DESIRED, OBTAINING A DISSOLVED GAS SAMPLE)
AND/OR OBTAINING A LARGE VOLUME LIQUID SAMPLE

41. After final dissolved gas pressure measurement is made, a calculation must be done to determine if a grab sample must be taken. For this calculation, the following dissolved gas information is required, P0, PF, temperature of Liquid Loop and Vapor Pressure of Water at the temperature of the liquid loop, PV.

    Contact the Group Leader and have him determine the value of CT in the following equation:

    CT = 4.98 (PF - 1.05 PO - PV) (CT is in Scc/KG).

    PV is calculated from Table 1 in the Data Sheet for temperature indicated by TI-660, degrees F. Log CT on Item (13) of Data Sheet.
    Log PV on Item (12).

42. If CT is greater than 40 SCC/Kg, dissolved oxygen may be reported as less than 0.1 PPM and proceed to 45. If CT is less than 40 SCC/KG, a grab sample must be taken and analyzed on the gas chromatograph for oxygen and hydrogen.

43. Attach the long needle to the lcc gas-tight syringe. Dissolved gas sample can be taken by inserting the long needle attached to a gas-tight syringe through the septum via the needle guide into the gas collection chamber. Allow pressure indicated on PI-662 to stablize. During this time, the syringe may be supported by a mechanical support. Withdraw a lcc gas sample and lock syringe. DO NOT WITHDRAW NEEDLE.

    Immediately have the HP technician survey the syringe to determine whether the sample should be transported to the lab or injected back into the collection chamber.

    If PI-662 indicates greater than 14.7 psia, turn HC-652 to the left to relieve pressure in the gas collection chamber.

    WARNING: HAND CONTACT WITH SYRINGE WITH GAS SAMPLE IN IT SHOULD NOT EXCEED 30 SECONDS DUE TO POSSIBLE HIGH DOSE RATE.

    CAUTION: IF THE SAMPLE IS NOT TO BE TAKEN TO THE LAB, INJECT SAMPLE BACK INTO THE GAS COLLECTION CHAMBER. TURN SWITCH HC-652 TO LEFT TO RELIEVE PRESSURE AND THEN REMOVE NEEDLE. DISCARD NEEDLE AND SYRINGE AS HIGH LEVEL RADIATION WASTE. HIGH DOSE RATE WILL BE DUE TO WATER ACCUMULATED IN SYRINGE.

44. Remove needle and syringe and place in a shielded carrying device for transport to the laboratory.

APPENDIX EP-231-5 (CONT'D)

PROCEDURE FOR MONITORING TOTAL DISSOLVED GAS
(AND, IF DESIRED, OBTAINING A DISSOLVED GAS SAMPLE)
AND/OR OBTAINING A LARGE VOLUME LIQUID SAMPLE

45. If PI-662 indicates greater than 14.7 psia, turn HC-652 to the left to relieve pressure in the gas collection chamber.

46. If a large volume liquid sample is required, turn HC-601 to position 10. Push and hold in CH-629-1 so liquid will be drawn into sample bottle that was positioned earlier under the sample station. Hold pushbutton for at least 10 seconds.

    CAUTION: IF A LIQUID SAMPLE IS NOT REQUIRED, TURN SWITCH HC-601 TO THE OFF POSITION VERY QUICKLY SO THAT THE VALVES CV-620 WILL NOT HAVE A CHANCE TO ROTATE AND ALLOW HOT SOLUTION INTO THE LINE AHEAD OF CV-629.

47. Turn HC-601 to OFF.

48. Lower liquid sample bottle into large cask by pulling up on the plunger handle. NOTE: Do not turn or twist bottle while it is on the needles because the needles will bend.

49. Slide the lead shield drawer back into the enclosure to cover opening for the needles.

50. Lower the cask on the cart by relieving hydraulic oil pressure with the small petcock handle on the hydraulic cylinder.

51. Roll the cask out from under the sample station and immediately survey the liquid vial and record the Initial Contact Dose Rate on the Data Sheet. Quickly plug cask. Use RI-665 to determine Gross Activity of the sample.

52. Switch HC-626 (Liquid Sample Source Selector Switch) must be in position 2 (jet pump) or 4 (RHR) and HC-700 (Liquid or Gas Selector Switch) must be in the LIQUID position.

53. Adjust PCV-627 on the control panel to have a 15 psi reading on the gauge.

54. Turn the FLUSH SYSTEM SWITCH (HC-628-1) to position 2 (Start Flush) which will close the inlet sample lines and start the flush with demineralized water from 00T 945. Observe that there is a flow per FI-664.

55. After RI-665 shows radiation has decreased significantly, or after 5 minutes, turn Switch HC-628-1 to position 3 (Flush V-610 Loop) to flush the V-610 loop. Watch RI-665.

56. After a few minutes, turn Switch HC-628-1 to position 4 (Flush P-601 Loop) and flush the P-601 loop. Watch RI-665.

APPENDIX EP-231-5 (CONT'D)

PROCEDURE FOR MONITORING TOTAL DISSOLVED GAS
(AND, IF DESIRED, OBTAINING A DISSOLVED GAS SAMPLE)
AND/OR OBTAINING A LARGE VOLUME LIQUID SAMPLE

57. After a few minutes, turn Switch HC-628-1 to position 6 (Flush Piping Station) and flush the piping station for 3 minutes.

58. Turn Switch HC-628-1 to position 7 (Flush CV-622 Loop) for a few minutes to flush loop CV-622. Watch RI-665.

59. If RI-665 did not indicate an acceptable radiation level at any step of the operation, go back and repeat Steps 53 thru 60.

60. Turn HC-626 to "OFF" FIRST and then HC-628-1 to "OFF".

61. Turn Flush Sytem HC-628-1 counterclockwise to position 6 and HC-626 to position 1 and observe that approximately 0.3 gpm flow per FI-664 is occuring.

    a) The nitrogen bottle pressure regulators (PCV-30-073, 074) should be adjusted after the commencement of flush flow such that the outlet pressure gauge reads 100 psi. (The outlet pressure normally drops to about 70 psi after CV-628 opens and flush flow begins.)

    b) The piping station pressure control valve (PCV-627) should be fully open. Flush flow should now be approximately 0.5 gpm.

    c) Flush for at least 10 minutes and monitor the flow rate and adjust the nitrogen regulators as necessary during the course of the flush to ensure that 100 psig is maintained on the regulator output.

    d) Return the nitrogen regulator to its original setting prior to terminating the flush. This will prevent lifting of the nitrogen bottle discharge relief valve PSV-30-028.

    e) Adjust PCV-627 on the Control Panel to have a 15 psi reading on the gauge.

62. Drain Collector Tank, Trap and Sump by turning switch HC-715-1 clockwise through its eight positions pausing approximately 5 seconds at each position.

63. Turn HC-626 to "OFF" FIRST and then HC-628-1 to "OFF".

64. Close FCV-627 to 0 psig by turning counterclockwise.

APPENDIX EP-231-5 (CONT'D)

PROCEDURE FOR MONITORING TOTAL DISSOLVED GAS
(AND, IF DESIRED, OBTAINING A DISSOLVED GAS SAMPLE)
AND/OR OBTAINING A LARGE VOLUME LIQUID SAMPLE

65. Close the nitrogen supply valves opened in Step No. 1: (Check-off required)

N2 Bottle 1			N2 Bottle 2	
Bottle Valve	_____	*OR*	Bottle Valve	_____
PCV-30-074	_____		PCV-30-073	_____
Isolation Valve 30-0022	_____		Isolation Valve 30-0023	_____

Unit 1			Unit 2	
30-1114	_____	*OR*	30-2114	_____

Demin Water Tank

30-0017 _____

66. Close the Demin Water Tank valves opened in Step No. 2: (Check-off required)

30-0014 _____

Unit 1			Unit 2	
30-1100	_____	*OR*	30-2100	_____

67. Close the damper.

68. Turn all switches (except for HC-723 which is left in position 4) to their "OFF" position.

APPENDIX EP-231-5 (CONT'D)

PROCEDURE FOR MONITORING TOTAL DISSOLVED GAS
(AND, IF DESIRED, OBTAINING A DISSOLVED GAS SAMPLE)
AND/OR OBTAINING A LARGE VOLUME LIQUID SAMPLE

DATA SHEET

DESIRED ANALYSIS

A. _____

B. _____

C. _____

D. _____

E. _____

SAMPLE #

1. Sample Source _____ Date _____ Time _____
2. Bypass Flow _____ FI-664 gpm
3. Flush Time _____ Minutes
4. Sample Flow _____ FI-664 gpm
5. Pressure _____ PI-661 psig
6. Conductivity (CI-663)

   (_____ reading) (x 10) (_____ scale) = _____ micromhos/cm
7. Radiation _____ RI-665
8. Initial Pressure PO _____ PI-662 PSIA
9.

CYCLE 1	CYCLE 2	CYCLE 3	CYCLE 4	CYCLE 5	CYCLE 6
P1 - PI662 PSIA	P1 - PI662 PSIA	P1 - PI662 PSIA	P1 - PI662 PSIA	P1 - PI662 PSIA	P1 - PI662 PSIA

10. Final P1 = PF = _____ PSIA
11. Temperature _____ TI-660
12. Vapor Pressure of Water (PV) = _____ PSIA
    (from Appendix EP-231-5, Table I)

APPENDIX EP-231-5 (CONT'D)

PROCEDURE FOR MONITORING TOTAL DISSOLVED GAS
(AND, IF DESIRED, OBTAINING A DISSOLVED GAS SAMPLE)
AND/OR OBTAINING A LARGE VOLUME LIQUID SAMPLE

13. CT _____ Scc/kg (from step 41)

14. If sample taken, fraction of sample H2 = _____ (from gas chromatograph) = NH

15. If sample taken, fraction of sample 02 = _____ (from gas chromatograph = NO

16. Liquid Sample Contact Dose _____ mR

17. Gas Sample Contact Dose _____ mR

18. CO2 = Concentration of 02 = (5.43 x NO x PF) - (0.81 x PO)

19. C02 = _____ Scc/Kg

20. CH2 = Concentration of H2 = 4.98 x NH x PF

21. CH2 = _____ Scc/Kg

Name _____
_____
_____
_____

APPENDIX EP-231-5 (CONT'D)

PROCEDURE FOR MONITORING TOTAL DISSOLVED GAS
(AND, IF DESIRED, OBTAINING A DISSOLVED GAS SAMPLE)
AND/OR OBTAINING A LARGE VOLUME LIQUID SAMPLE

TABLE 1

WATER VAPOR PRESSURE

The following water vapor pressure data is a function of liquid sample temperature and is used in the calculational method.

TL(Degrees F)	PV(psia)	TL(Degrees F)	PV(psia)
60	0.2561	102	1.008
62	0.2749	104	1.070
64	0.2950	106	1.135
66	0.3163	108	1.203
68	0.3389	110	1.275
70	0.3629	112	1.351
72	0.3884	114	1.430
74	0.4155	116	1.513
76	0.4442	118	1.601
78	0.4746	120	1.693
80	0.5068	122	1.789
82	0.5409	124	1.890
84	0.5770	126	1.996
86	0.6152	128	2.107
88	0.6555	130	2.223
90	0.6981	132	2.345
92	0.7432	134	2.472
94	0.7906	136	2.605
96	0.8407	138	2.744
98	0.8936	140	2.889
100	0.9492	142	3.041
		144	3.200
		146	3.365
		148	3.538
		150	3.718

Source: ASME Steam Tables, 1967

PHILADELPHIA ELECTRIC COMPANY
LIMERICK GENERATING STATION
EMERGENCY PLAN IMPLEMENTING PROCEDURE

EP-233 RETRIEVING AND CHANGING SAMPLE FILTERS AND CARTRIDGES FROM THE CONTAINMENT LEAK DETECTOR DURING EMERGENCIES

1.0 PARTICIPANTS

1.1 Chemistry Sampling and Analysis Team Leader shall obtain necessary information and permission to obtain sample.

1.2 Chemistry Sampling and Analysis Group Leader shall organize and brief the sampling group and have operations defeat isolations.

1.3 HP Technician shall provide radiological assessment of the task.

1.4 Chemistry Sampling and Analysis Group shall obtain the sample.

2.0 ACTIONS-IMMEDIATE

2.1 Chemistry Sampling and Analysis Team Leader shall:

2.1.1 After discussing the situation with the Emergency Director determine if a filter/cartridge sample from the Containment Leak Detector is required.

2.1.2 Check the Plant Radiation Level Status Board to forecast anticipated radiological conditions.

2.1.3 Contact the Personnel Safety Team Leader for the latest developments related to radiological conditions, inform him what sample(s) are to be taken and request Health Physics' coverage.

CAUTION
CONTINUOUS COVERAGE BY A HEALTH PHYSICS TECHNICIAN MAY SUBSTITUTE FOR THE RADIATION WORK PERMIT.

2.1.4 Request input from the Control Room (via Emergency Director) to ascertain desired sample system availability.

2.1.5 Determine what analyses are required, inform the Chemistry Sampling and Analysis Group Leader. If an iodine particulate sample is required, recommend sampling time.

2.1.6 Request Emergency Exposure Authorizations from the Emergency Director for Group Members (as required) and inform the Personnel Safety Team Leader of this development.

CAUTION
PLANNED RADIATION EXPOSURES SHOULD BE LIMITED TO THE ADMINISTRATIVE GUIDE LEVELS IN APPENDIX EP-230-1, EMERGENCY EXPOSURE GUIDELINES.

2.1.7 Direct the Chemistry Sampling and Analysis Group Leader to collect and analyze the filter/cartridge sample.

2.2 Chemistry Sampling and Analysis Group Leader shall:

2.2.1 Assign the appropriate number of group members to obtain the necessary equipment to collect and transport the sample to the Chemistry Hot Lab.

2.2.2 Contact the Chemistry Sampling and Analysis Team Leader (TSC) for an estimated sampling time and record this time on Appendix EP-233-1.

2.2.3 Brief the Technician and Chemistry Sampling and Analysis Group members on the following:

A. Communications equipment and channel

B. Type of sample(s) to be collected

C. Location of sample points. The Containment Leak Detector is located on elevation 283 area 16, behind the SLC tank.

D. Suggested routes to be taken. Suggested routes are shown in Appendices EP-233-2 and EP-233-3.

CAUTION
DO NOT USE ELEVATOR

E. Projected amount of time required to collect and transport the sample

F. Review of the procedures to be followed for sample collection, handling, preparation and analysis

G. Special tools and equipment required for sample handling and/or collection.

H. Proper completion of Data Sheets.

2.2.4 Contact Shift operations in the Control Room [redacted] to request system line up so that the selected sample can be taken from the desired Sample Station and sample point.

If the Containment Leak Detector is isolated (Group VI: HI D/W PRESS (1.68 psig), LO-LO Rx Level (-38"), REFUEL FLOOR HVAC HI RAD (2 mR/Hr) OR RX ENC. HVAC HI RAD (1.35 mR/Hr)), shift operations shall defeat the signal by placing jumpers across the following contacts:

DO NOT DEFEAT ISOLATION OF HIGH DRYWELL PRESSURE WHEN DRYWELL PRESSURE IS GREATER THAN 5 PSIG.

Valve	Panel	Terminals	Relay
SV-26-190A,C	10C609 (20C609)	HHH8-13 to HHH8-14	B21H-K101C (T4-M4)
SV-26-190B,D	10C611 (20C611)	HHH2-18 to HHH2-19	B21H-K120B (T4-M4)

2.2.5 Appoint Group member(s) to prepare the Hot Lab for receiving the sample.

USE THE FOLLOWING PROCEDURE AS A GUIDELINE FOR PREPARATION OF THE HOT LAB.

EP-242 Sample Preparation and Handling of Highly Radioactive Particulate Filters and Iodine Cartridges

2.2.6 Dispatch the Chemistry Sampling and Analysis Team Members to the OSC for Health Physics support if radiological conditions permit or other appointed location as determined by the Plant Survey Group Leader.

2.3 The Health Physics Technician shall:

2.3.1 Determine which route should be used for collecting and transporting the sample.

2.3.2 Take appropriate radiation survey equipment and ensure that equipment is functional and calibrated.

2.3.3 Provide Group Members with the appropriate dosimetry, protective clothing and respiratory equipment.

2.3.4 Perform a pre-job briefing with the Chemistry technicians assigned to obtain the sample to discuss the following:

A. RWP requirements

B. Routes to be used

C. Authorized doses

D. Radiological concerns and precautions

E. Review of procedure for obtaining and transporting sample to hot lab

F. Suggested methods to maintain exposures ALARA

G. Stay times and Abort Criteria

2.3.5 Provide constant coverage while obtaining, transporting and analyzing the sample filter and cartridges from the Containment Leak Detector.

CAUTION
DO NOT USE ELEVATORS

2.3.6 Monitor dose rates enroute and at the sample location. Upon entering the power block, the surveyors shall note trends in general radiation levels enroute to the Containment Leak Detector. If general area dose rates (unanticipated) exceed 5 R/hr gamma and/or beta prior to arriving at the door leading to Rx.283', exit immediately and report to Chemistry Sampling and Analysis Group Leader. If dose rates (unanticipated) exceed 5 R/hr at the door leading to Rx. 283', leave the area immediately and report to Chemistry Sampling and Analysis Group Leader, who will evaluate the situation with the Personnel Safety Team Leader.

2.3.7 Survey the sample area and sample cask.

2.3.8 Document the sample cask survey results and give them to the Chemistry Sampling and Analysis Group Leader (or other designated group member) when arriving at the hot lab.

2.3.9 Provide constant coverage during sample preparation and handling as specified in EP-242.

2.4 Chemistry Sampling and Analysis Group Members shall:

2.4.1 Assemble for a pre-job briefing at the chemistry lab.

2.4.2 Inform the Group Leader if they are approaching the administrative exposure guidelines, or may not have sufficient exposure remaining to successfully complete the assigned task.

2.4.3 Obtain the necessary equipment to collect the sample and ensure that the hot lab is ready to accept the sample.

PROPERLY LABEL ALL SAMPLE CONTAINERS

CAUTION
EYE PROTECTION SHOULD BE WORN BY ALL PERSONNEL WHEN OBTAINING SAMPLES FROM THE SAMPLE STATIONS.

2.4.4 Once the group has been briefed and the appropriate equipment has been assembled, proceed to the OSC or other designated location for HP coverage. Once briefed by Health Physics, retrieve and change the sample filters and cartridges as follows:

2.4.4.1 The HP Technician shall survey the Containment Leak Detector concentrating especially on the particulate filter/iodine cartridge assembly and sample lines.

2.4.4.2 Obtain the sample. The time required to obtain a sample is approximately 10 minutes.

2.4.4.3 <u>FILTER/CARTRIDGE HOLDER ASSEMBLY CHANGE METHOD</u>

A. Verify that HS-26-190-1 (Pump 1 switch) is in the ON position. Turn switch HS-26-190-2 to OFF (pump 2 switch).

B. Verify Flow Indicator (FI-26-190) indicates flow.

C. Put switch HSS-26-190 (OPERATE/PURGE) in PURGE position.

D. Allow to purge for one minute.

E. Close valves V-2 and V-3.

F. Remove holder assembly, bag and place aside.

THIS ASSEMBLY MAY BE USED LATER. SEE STEP O.

G. Install a new filter/cartridge assembly back into the line.

H. Open valves V-2 and V-3.

I. Close valve V-8 (located behind the Control Panel).

J. Put switch HSS-26-190 in OPERATE position. Record the time as TIME-1 and flow as FLOW from FI-26-190 in Appendix EP-233-1.

K. Allow to flow for the desired amount of sample collection time and then turn HSS-26-190 to PURGE and record time as TIME-2.

L. Allow to purge for one minute.

M. Close valves V-2 and V-3.

N. Remove holder assembly and immediately have the Health Physics Technician Survey the sample and record the Initial Contact Dose Rate on Appendix EP-233-1 and bag and place the sample into an appropriate transport container.

O. Reinstall the holder assembly previously removed (Step F) if appropriate, or install a new holder assembly.

P. Open valves V-2, V-3 and V-8.

Q. Put switch HSS-26-190 in OPERATE position.

R. Turn HS-26-190-2 (pump 2 switch) to ON.

S. Return to the Chemistry Hot Lab with the sample.

2.4.5 Upon introduction of the sample into the hot lab, the sample will be handled and stored in a manner that personnel exposures are kept ALARA.

2.4.6 As soon as the sample reaches the hot lab, inform the Group Leader that sample collection has been completed and report the status of the sample.

3.0 ACTIONS - FOLLOW-UP

3.1 Chemistry Sampling and Analysis Group Members shall:

3.1.1 Complete Appendix EP-233-1

3.1.2 Prepare, handle and analyze the sample using EP-242 Sample Preparation and Handling of Highly Radioactive Particulate and Iodine Cartridges.

3.1.3 Report the results to the Chemistry Sampling and Analysis Group Leader.

3.1.4 Properly file the data sheets and report back to the Group Leader for reassignment.

3.1.5 Return all sampling equipment to the CHEMISTRY EMERGENCY CABINET.

3.2 Chemistry Sampling and Analysis Group Leader shall:

3.2.1 Notify Shift Supervision that a sample has been taken and the aligned valves may be returned to the "NORMAL" position (i.e., Remove Jumpers).

3.2.2 Ensure Group member(s) dose is monitored to ensure that exposure limits have not been exceeded.

3.2.3 Inform the Chemistry Sampling and Analysis Team Leader that the required sample is in the hot lab.

3.2.4 Direct group members to refer to EP-242 Sample Preparation and Handling of Radioactive Particulate and Iodine Cartridges for guidance for sample preparation and handling.

3.2.5 Obtain and review ALL Data Sheets, report the sample results to the Chemistry Sampling and Analysis Team Leader and attach all Data Sheets to Appendix EP-230-2.

3.3 Chemistry Sampling and Analysis Team Leader shall:

3.3.1 Report the results to the Emergency Director and the Health Physics and Chemistry Coordinator if the EOF has been activated.

4.0 APPENDICES

4.1 EP-233-1, Data Sheet

4.2 EP-233-2, Equipment Location Reactor Enclosure Unit 1 Elevation 283'

4.3 EP-233-3, General Arrangement Plan at Elevation 217'

5.0 SUPPORTING INFORMATION

5.1 Purpose

This procedure provides guidelines for retrieving and changing particulate filters and charcoal cartridges (or silver zeolite cartridges) located at the Containment Leak Detector following accident conditions.

5.2 Criteria for Use

This procedure shall be implemented when a Containment Filter/Cartridge sample is to be taken from the Containment Leak Detector during an Emergency.

5.3 Special Equipment

5.3.1 Transport container (shielded)

5.3.2 Combined Filter/Cartridge holder assembly

5.3.3 2-Extra particulate filters

5.3.4 2-Extra iodine cartridges

5.3.5 Plastic bags

5.4 References

5.4.1 EP-230 - Chemistry Sampling and Analysis Team Activation

5.4.2 EP-242 - Sample Preparation and Handling of Highly Radioactive Particulate and Iodine Cartridges

5.4.3 M-102 - General Arrangement Plan at El. 217'-0"

5.4.4 M-104 - General Arrangement Plan at El. 269'-0" & 283'-0"

5.4.5 M-26 - Sh. 1, Rev. 8; Sh. 2, Rev. 9; Sh. 3, Proposed Rev. 3; Sh. 4, Proposed Rev. 3 - Plant Process Radiation Monitoring P&ID

5.4.6 E-519, Sh. 1 of 2; Proposed Rev. 3

APPENDIX EP-233-1

DATA SHEET

Containment Leak Detector

Particulate/Iodine Grab Sample

ESTIMATED SAMPLING TIME: _____

DATE: _____

TIME: _____

TIME-1: _____

FLOW: _____ CFM

TIME-2: _____

INITIAL CONTACT DOSE RATE: _____

ANALYSIS REQUIRED: _____

_____

NAME: _____

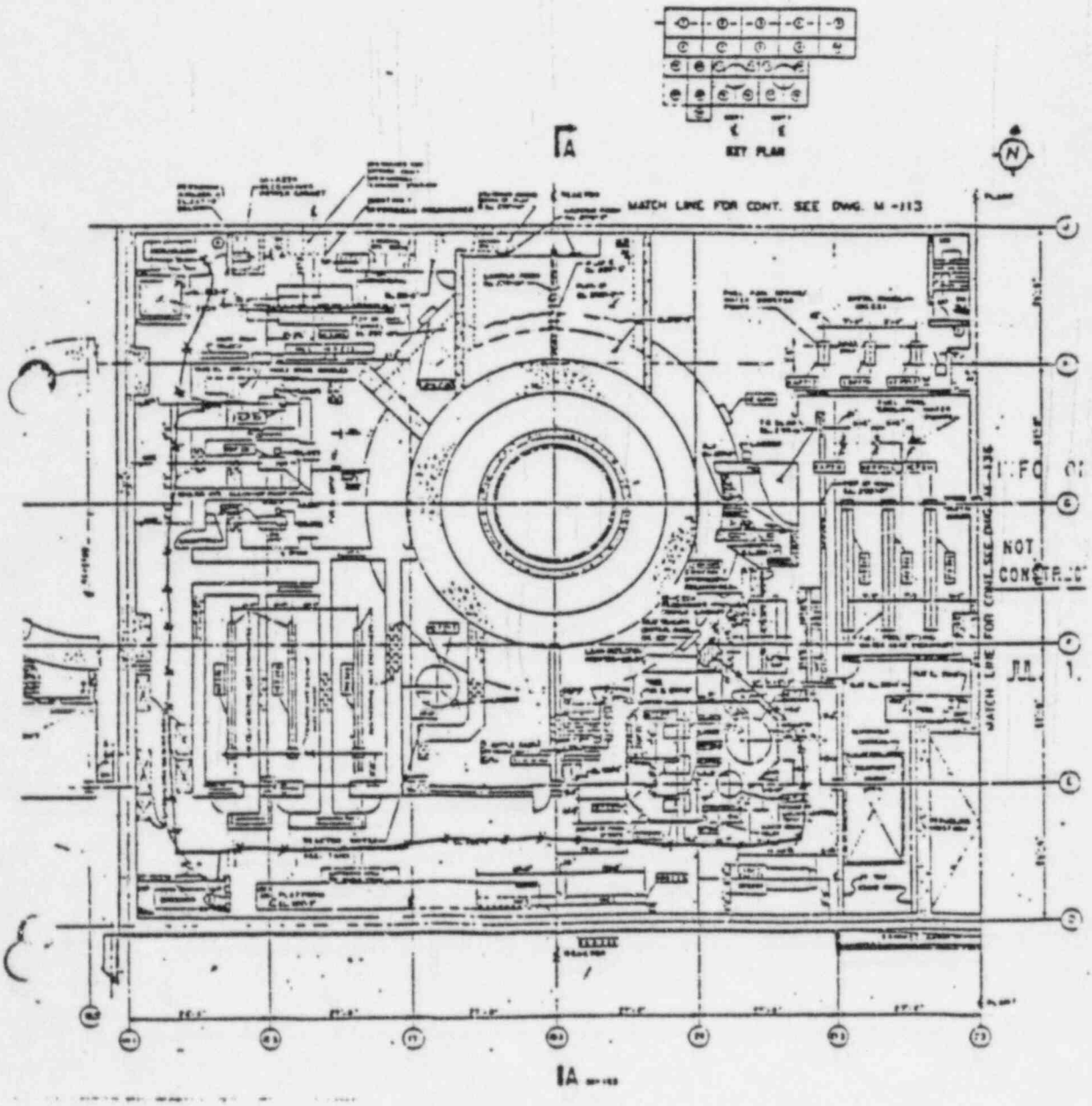
_____

_____

APPENDIX EP-233-2

EQUIPMENT LOCATION REACTOR ENCLOSURE

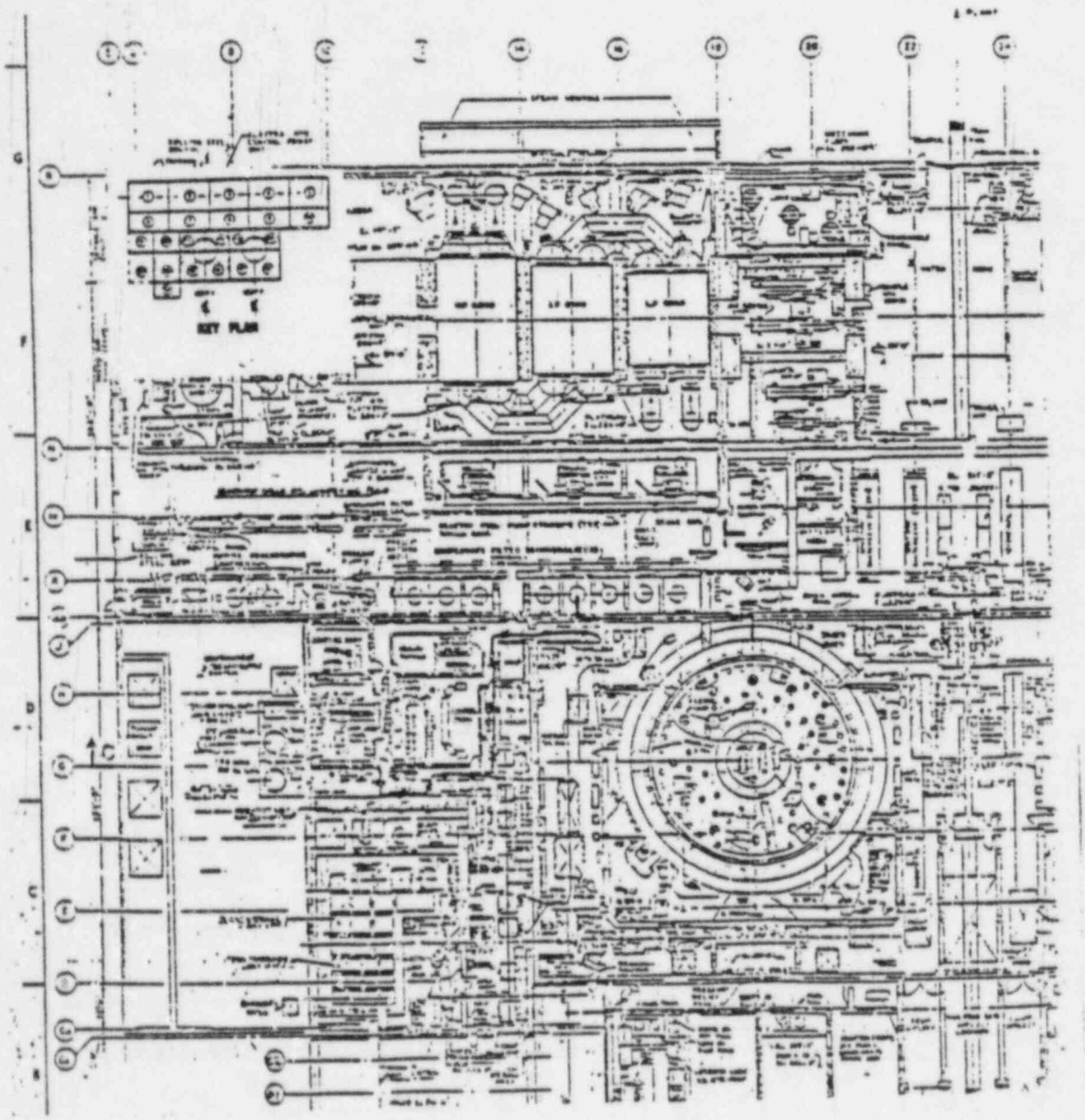
UNIT 1, ELEVATION 283



APPENDIX EP-233-3

GENERAL ARRANGEMENT PLAN

AT ELEVATION 217



PHILADELPHIA ELECTRIC COMPANY
LIMERICK GENERATING STATION
EMERGENCY PLAN IMPLEMENTING PROCEDURE

EP-251 PLANT SURVEY GROUP

1.0 PARTICIPANTS

1.1 Plant Survey Group Leader shall direct the Plant Survey Squads.

1.2 Plant Survey Squads shall conduct surveys and provide health physics coverage.

2.0 ACTIONS-IMMEDIATE

2.1 Plant Survey Group leader shall:

2.1.1 Report to the Operations Support Center (OSC).

2.1.2 Report to the OSC Coordinator and inform him of the proposed course of action. Determine if any entries to affected areas are planned.

2.1.3 Establish communication with the Personnel Safety Team Leader and discuss plant radiological conditions, actual and projected.

2.1.4 Dispatch a HP Technician to the ARM panel in the Auxiliary Equipment room and direct him to establish a telephone line with the OSC and TSC and provide ARM readings.

2.1.5 Assign an individual to man the phone to the auxiliary equipment room and record ARM readings as transmitted from the technician in the Aux Equipment Room.

2.1.6 Determine the type(s) of survey information needed, the type(s) of surveys to be conducted, and specify the instrumentation to be used.

2.1.7 Assign a Health Physics Technician to accompany each team entering an area of unknown or suspected adverse radiological conditions.

2.1.8 Form Plant Survey Squads as required.

2.1.9 Entries into high radiation areas or areas suspected to have high radiation within them require at least two persons, one of which is an HP.

2.1.10 Prepare ERWP per EP-401 if required and brief the technician/team.

2.1.11 Planned radiation exposures should be limited to the administrative guide levels in Appendix EP-251-1, Emergency Exposure Guidelines.

2.1.12 Unless specific needs dictate, in-plant radiation surveys should be conducted in conjunction with entries performed for other purposes. ARM readings should be used in lieu of pre-entry surveys whenever possible.

2.1.13 Unless information or data is available (eg. recent samples from other entries, process radiation monitor data, vent stack readings, etc.), airborne radioactive materials are presumed to be present in all affected areas of the plant. Respiratory protection requirements are to be based on available information.

2.2 Plant Survey Squad Members shall:

2.2.1 Check that all squad members are properly clothed and equipped with appropriate dosimetry and respiratory protection per the Emergency Radiation Work Permit (ERWP) contained in EP-401 when applicable.

2.2.2 Question that all squad members know where they are going, how to get there, and what they are expected to do.

2.2.3 Check that at least one squad member is equipped with an operating, calibrated lapel air sampler or obtain air sample data using other types of sampling equipment.

2.2.4 Check that the squad is equipped with any needed tools or equipment, e.g., shielded container for samples, reach rods, etc.

2.2.5 Check that the maximum allowable exposures are known and understood by the team members.

2.2.6 Obtain the survey instruments specified by the Plant Survey Group Leader and check that they are calibrated and operable.

2.2.7 Estimate exposure accumulation for the job including transit time to and from the work area.

DO NOT PROCEED IF ENTRY PLUS EXIT EXPOSURES WOULD EXCEED THE ALLOWABLE EXPOSURE. CONTACT THE PLANT SURVEY GROUP LEADER FOR INSTRUCTIONS.

2.2.8 Make entry and perform continuous dose rate surveys.

IF RADIATION LEVELS EXCEED THE RANGE OF THE SURVEY INSTRUMENT, DO NOT PROCEED.

2.2.9 Upon arrival at the area of interest, conduct rapid surveys and exposure estimates. Based on estimated exposures determine a maximum stay time.

2.2.10 Continue to monitor area radiation dose rates during the conduct of activities with particular interest in operations that could result in changed conditions, e.g., sample collection.

2.2.11 Frequently communicate dose rates to the Plant Survey Group Leader.

3.0 ACTIONS FOLLOW-UP

3.1 Plant Survey Squad members shall, after completing the entries into affected areas:

3.1.1 Record the results of all surveys on a Survey Data Sheet or equivalent.

3.1.2 Record exposures received by team members.

3.1.3 Record all observations and conditions.

3.1.4 Report survey results and personnel exposures to the Plant Survey Group Leader.

3.1.5 Collect and turn in team dosimetry for processing if directed by the Plant Survey Group Leader.

3.1.6 Analyze air sample media in accordance with HP-214.

3.1.7 Provide copies of all survey records to the Plant Survey Group Leader.

3.2 Plant Survey Group Leader shall:

3.2.1 Report radiological and personnel exposure status to the Personnel Safety Team Leader.

3.2.2 Provide the plant survey squads and OSC Coordinator with status updates as to changes in plant conditions.

3.2.3 Direct the plant survey squads to other locations as necessary.

3.2.4 Inform the Personnel Safety Team Leader of the need for additional personnel, if necessary.

4.0 APPENDICES

4.1 EP-251-1, Emergency Exposure Guidelines

5.0 SUPPORTING INFORMATION

5.1 Purpose

The purpose of this procedure is to provide guidelines for the actions of the Plant Survey Group.

5.2 Criteria For Use

5.2.1 Entry is authorized by the Emergency Director.

5.2.2 Personnel Safety Team Leader directs a specific survey or health physics activity to be performed.

5.3 Special Equipment

Plant Survey Kit

5.4 References

5.4.1 Limerick Generating Station Emergency Plan

5.4.2 NUREG 0654, Criteria for Preparation and Evaluation of Radiological Emergency Response Plans in Support of Nuclear Power Plants.

5.4.3 HP-214 Air Sample Analysis and Evaluation.

5.4.4 EP-401 Entry for Emergency Repair and Operations.

5.4.5 EP-101 Classification of Emergencies.

APPENDIX EP 251-1 Emergency Exposure Guidelines

Function	Projected Whole Body Dose	Thyroid Dose	Authorized By
1. Life Saving and Reduction of Injury	75 rem*	375 rem	Emergency** Director
2. Operation of Equipment to Mitigate an Emergency	25 rem*	125 rem	Emergency** Director
3. Protection of Health and Safety of the Public	5 rem	25 rem	Emergency** Director
4. Other Emergency Activities	10 CFR 20 limits	10 CFR 20 limits	Emergency Director
5. Re-entry/Recovery Activities	Station Administrative Guidelines	Station Administrative Guidelines	N/A

* Reference: EPA-520/1-75-001 Table 2.1
** Such exposure shall be on a voluntary basis

PHILADELPHIA ELECTRIC COMPANY
LIMERICK GENERATING STATION
EMERGENCY PLAN IMPLEMENTING PROCEDURE

EP-401 ENTRY FOR EMERGENCY REPAIR AND OPERATIONS

1.0 PARTICIPANTS

1.1 Personnel Safety Team Leader shall ensure that this procedure is implemented.

1.2 Plant Survey Group Leader shall implement this procedure.

2.0 ACTIONS - IMMEDIATE

2.1 Personnel Safety Team Leader shall:

2.1.1 Provide radiological conditions information to the Emergency Director as an aid in planning emergency operations and maintenance activities.

2.1.2 Inform the Plant Survey Group Leader of planned emergency activities, the associated plant conditions and protective requirements and the priority of the activity as it affects mitigation of the emergency condition.

2.1.3 Determine emergency exposure limitations for emergency activities.

CAUTION

PLANNED RADIATION EXPOSURES SHOULD BE LIMITED TO THE ADMINISTRATIVE GUIDE LEVELS IN APPENDIX EP-401-1 EMERGENCY EXPOSURE GUIDELINES. PERFORMANCE OF A TASK INVOLVING EXPOSURE ABOVE 10CFR 20 LIMITS REQUIRES EMERGENCY DIRECTOR'S AUTHORIZATION

2.1.4 Provide emergency exposure limits to the Plant Survey Group Leader for entry into affected areas (for anticipated exposures greater than 10CFR20 use EP-314, Emergency Exposure Authorization).

2.1.5 Provide guidelines for TLD evaluations to the Plant Survey Group Leader.

2.1.6 Determine resource support requirements from the Plant Survey Group Leader and provide that support from available on-site resources or identify that need to the Emergency Operations Facility (EOF).

2.1.7 Inform the Emergency Director of significant exposures, uptakes or skin contamination problems which have occurred during entries into affected areas.

2.2 Plant Survey Group Leader shall:

2.2.1 Utilize Emergency Radiation Work permits (an example provided in Appendix EP-401-2) to specify entry requirements. Unless information is available to relieve specific requirements as specified below the recommended respiratory protection required to enter unknown areas or those areas suspected to have high concentrations of airborne radioactivity is SCBA.

A. A filter respirator may be substituted for an SCBA if it is known that high radioiodine levels are not present or the use of a SCBA would physically restrict entry into the area. Sources of information on the presence or absence of radioiodine include:

1. The Emergency Director's estimate of fuel damage.

2. Radioiodine concentrations from ventilation process monitors (Process Radiation Monitors) for the entry area.

3. Recent Survey data.

IF A SCBA IS NOT USED DUE TO PHYSICAL ACCESS RESTRICTIONS AND RADIOIODINE IS KNOWN OR SUSPECTED TO BE PRESENT, THYROID BLOCKING AGENT SHOULD BE EVALUATED IN ACCORDANCE WITH EP-313, DISTRIBUTION OF THYROID BLOCKING TABLETS.

B. Health Physics escort requirements may be waived if one of the entry team members (who will not be doing physical work) is a qualified self-monitor; alarming dosimeters are utilized by the team members; and the entry is of short duration and well defined in terms of location and work to be performed.

2.2.2 Determine the team member's current quarterly exposure by reviewing personnel exposure records or questioning the individuals.

2.2.3 Instruct the team members on their allowable exposure for the entry based upon a maximum quarterly exposure of 2500 mRem with approved dose extensions.

ALLOWABLE EXPOSURES ABOVE 2500 mRem/QUARTER MUST BE AUTHORIZED BY THE EMERGENCY DIRECTOR.

2.2.4 Review Appendix EP-401-3, Access Control Briefing Guide, with the team members prior to the entry.

CAUTION
NO ONE PERSON SHALL BE LEFT ALONE DURING THE ENTRY UNLESS AUTHORIZED BY THE PERSONNEL SAFETY TEAM LEADER

CAUTION
RADIATION EXPOSURES SHALL BE KEPT AS LOW AS REASONABLY ACHIEVABLE (ALARA). UNLESS REASONABLE DATA IS AVAILABLE (EG. RECENT SAMPLES FROM OTHER ENTRIES, PROCESS RADIATION MONITOR DATA, VENT STACK READINGS, ETC.) RADIOACTIVITY WILL BE ASSUMED TO BE PRESENT IN ALL AFFECTED AREAS OF THE PLANT. TO THE EXTENT PRACTICABLE, ROUTINE HEALTH PHYSICS PROCEDURES WILL BE UTILIZED.

2.3 After the emergency entry, the Plant Survey Group Leader shall:

2.3.1 Direct personnel to be monitored for contamination in accordance with HP-817, Personnel Contamination Monitoring.

2.3.2 Direct contaminated personnel to be detained until they can be decontaminated in accordance with HP-818, Personnel Decontamination.

2.3.3 Complete Appendix EP-401-3, Access Control Briefing Guide.

2.3.4 Document personnel exposures of team members on the R.W.P. Access and Exposure Control log sheets (HP-310).

IF A SIGNIFICANT EXPOSURE (ABOVE LEVELS IDENTIFIED BY THE PERSONNEL SAFETY TEAM LEADER) WAS RECEIVED BY A TEAM MEMBER(S), INFORM THEM THEY WILL NOT BE ALLOWED FURTHER ENTRY UNTIL A DOSIMETRY EVALUATION HAS BEEN COMPLETED.

2.3.5 Document survey results on Survey Data Sheet(s).

2.3.6 Direct air samples to be analyzed in accordance with HP-214, Air Sample Analysis.

2.3.7 Brief the Personnel Safety Team Leader on the results of the entry.

3.0 ACTIONS - FOLLOW-UP

3.1 Personnel Safety Team Leader shall:

3.1.1 Determine, in conjunction with the Emergency Director, when the plant situation has stabilized to the point where it is possible to establish the ongoing radiological controls program using the guidelines in Appendix EP-401-4, Health Physics Considerations During Emergencies. Where practical, normal Health Physics procedures should be used.

4.0 APPENDICES

4.1 EP-401-1, Emergency Exposure Guidelines

4.2 EP-401-2, Emergency Radiation Work Permit

4.3 EP-401-3, Access Control Briefing Guide

4.4 EP-401-4, Health Physics Considerations During Emergencies

5.0 SUPPORTING INFORMATION

5.1 Purpose

The purpose of this procedure is to provide guidelines for entering areas for emergency repair and operations that have become adversely affected by the emergency conditions.

5.2 Criteria for Use

5.2.1 The following criteria should be met prior to implementing this procedure:

5.2.1.1 The entry is authorized by the Personnel Safety Team Leader, and

5.2.1.2 Radiological conditions are unknown and suspected to be hazardous in an area to be entered, or

Conditions of time and/or the uncertainty or nature of various radiological conditions preclude the use of routine Health Physics procedures.

5.3 Special Equipment

None.

5.4 References

5.4.1 Limerick Generating Station Emergency Plan

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

5.4.3 EP-313 Distribution of Thyroid Blocking (KI) Tablets

5.4.4 NCRP Report No. 39 Basic Radiation Protection Criteria

5.4.5 HP-310, Radiation Work Permits

5.4.6 HP-817, Personnel Contamination Monitoring

5.4.7 HP-214, Air Sample Analysis

5.4.8 HP-818, Personnel Decontamination

5.4.9 EP-314, Emergency Exposure Authorization

APPENDIX EP-401-1
Emergency Exposure Guidelines

	Function	Projected Whole Body Dose	Thyroid Dose	Authorized By
1.	Life Saving and Reduction of Injury	75 rem*	375 rem	Emergency** Director
2.	Operation of Equipment to Mitigate an Emergency	25 rem*	125 rem	Emergency** Director
3.	Protection of Health and Safety of the Public	5 rem	25 rem	Emergency** Director
4.	Other Emergency Activities	10 CFR 20 limits	10 CFR 20 limits	Emergency Director
5.	Re-entry/Recovery Activities	Station Administrative Guidelines	Station Administrative Guidelines	N/A

* Reference: EPA-520/1-75-001 Table 2.1
** Such exposure shall be on a voluntary basis

APPENDIX EP-401-2

EMERGENCY RADIATION WORK PERMIT (ERWP)

ORIGINAL ( ) REVISE ( ) MRF NO.

RADIATION WORK PERMIT
196-21349 2/85
DOCTYPE 444

( ) ERWP ( )

STATION	R.W.P. NO.	APPARATUS or LOCATION	DATE
LGS			

PERMISSION IS HEREBY GIVEN TO

ANTI-CONTAMINATION CLOTHING AND MONITORING REQUIREMENTS

HOOD		FILTER RESPIRATOR		HI RANGE DRD @ 1500 mR (4)	X
SURGEON'S CAP		AIR LINE RESPIRATOR		EXTREMITY-HANDS	
GLOVE LINERS		SELF CONTAINED		EXTREMITY-FEET	
PLASTIC GLOVES	PR	GLASSES		TLD and DRD	X
RUBBER GLOVES					
COVERALLS	PR				
SHOE COVERS	PR	TAPED OPENINGS		ION CHAMBER REQUIRED FOR ENTRY	X
PLASTIC PANTS		TAPED ZIPPER / HOOD		ALARMING DOSIMETER	
PLASTIC SUIT				CONTINUOUS HP COVERAGE (1)	X
BOOTS / RUBBERS					
		SELF FRISK	X		

SPECIAL INSTRUCTIONS / REMARKS

(1) AT LEAST 2 PERSONS REQUIRED TO ENTER HIGH RADIATION AREAS ONE OF WHICH IS HP.

(2) OBTAIN READINGS OF ANY AREAS WITHIN THE AREA PRIOR TO ENTERING THE AREA

(3) KNOW & UNDERSTAND AUTHORIZED PERSONNEL EXPOSURES FOR ALL PERSONNEL ENTERING THE AREA. EXIT THE AREA IMMEDIATELY IF ANY INDIVIDUAL IN THE GROUP IS APPROACHING THE AUTHORIZED EXPOSURE LIMIT

(4) D-5R DOSIMETER REQUIRED IF EXPOSURES IN EXCESS OF 1000 mR ARE EXPECTED.

R.W.P. REQUESTED BY PERS. SFTY. TH. LDR. OF R.W.P. PREPARED BY:

R.W.P. ISSUED BY HEALTH PHYSICS BR. TECH. TIME DATE

SUPPLEMENTAL RADIATION SURVEYS REQUIRED EVERY

SURVEY NO.	HP	DATE TIME	SURVEY NO.	HP	DATE TIME	SURVEY NO.	HP	DATE TIME
INITIAL								

R.W.P. TERMINATED BY _____ TIME _____ DATE _____

ALARA REVIEW BY _____ DATE _____

APPENDIX EP-401-2

EMERGENCY RADIATION WORK PERMIT (ERWP)

RADIATION WORK PERMIT
M-2570M Rev 12/86

L G S R.W.P. ACCESS AND EXPOSURE CONTROL

LOCATION _____ R.W.P. NO. _____

JOB DESCRIPTION _____ PAGE _____ OF _____

YOUR NAME AND INITIALS INDICATE UNDERSTANDING AND COMPLIANCE WITH JOB REQUIREMENTS

R.W.P. Read by (Print Name)	Initials	Social Security Number	Date	Specific Reason For Entry (Task to be Performed)	Job Group Code (SEE BELOW)	Auth Exp. / Mask Code	Time In / Time Out	Exp. Time (Min.)	Dose In / Dose Out	Total Exp.	HP ONLY: MPC Hours	HP ONLY: Comp. By
Example Ed.	E. E.	123-45-6789	10/30/84	8400120-4	WE	300	0730	60	10	0		
						A	0830		10			

MASK CODE		JOB GROUP CODES					
FILTER RESPIRATOR	F	BALANCE GROUP	BA	INSTRUMENT LAB	IL	PIPEFITTER	PI
AIRLINE RESPIRATOR	A	BOILER GROUP	BO	INSERVICE INSPECTION	IS	QUALITY ASSURANCE	QA
SELF CONTAINED	S	CARPENTERS	CA	INSPECTOR	IN	RIGGERS	RI
NONE	NA	CHEMIST	CH	JANITOR	JA	SCAFFOLD CREW	SC
		ELECTRICIANS	EL	MACHINIST	MA	TEST ENGINEERS	TE
		HEALTH PHYSICS	HP	OPERATOR	OP	WELDERS	WE

APPENDIX EP-401-3

ACCESS CONTROL BRIEFING GUIDE

I. PRE-ENTRY BRIEFING

Team Members _____ _____

_____ _____

Date of Entry: _____ Time of Entry: _____ ERWP # _____

Purpose: _____

_____

CHECK

_____ 1. Potential hazards - radiological and non-radiological.
_____ 2. Dose rates and activity levels.
_____ 3. Dosimetry type (TLD, high range self-reading extremity, etc.) issued and use understood.
_____ 4. Respiratory protection - type, lapel sampler.
_____ 5. Protective clothing.
_____ 6. Stay times on exposure limit discussed and understood.
Initials of Entry Team: _____, _____, _____, _____, _____.
_____ 7. Instruments to be used.
_____ 8. Review documentation required for entry and personnel exposure records if time permits.
_____ 9. Define and explain as detailed any system malfunctions, breaks, or hazards from operating equipment.
_____ 10. Surveys to be performed (air, cont. rad.).

Briefing Performed By: _____

II. EXIT BRIEFING

_____ 1. Determine exposure and time in area.
_____ 2. Monitor for personnel contamination, document positive findings.
_____ 3. Determine approximate dose-rates from survey meter.
_____ 4. Document any noticeable radiological or operations concerns, i.e., gas leaks, liquid spills, alarms, equipment malfunction, etc.
_____ 5. Document recommended bioassay.
_____ 6. Take nasal swabs of persons in airborne contamination areas.
_____ 7. Obtain any survey data sheets.

Debriefing Performed By: _____
Time of Debriefing: _____
Comments: _____

_____

_____

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

May 22, 1986

50-352/353 Limerick

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.

Donnie H. Grimsley

Donnie H. Grimsley, Director
Division of Rules and Records
Office of Administration

Attachment: As stated

REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)

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AUTH. NAME AUTHOR AFFILIATION
DAVIS, S. L. Philadelphia Electric Co.
RECIP. NAME RECIPIENT AFFILIATION
MURLEY, T. E. Region 1, Office of Director

SUBJECT: Forwards Central Files version of revised emergency plan implementing procedures, including Rev 5 to EP-202, "Operations Support Ctr (OSC) Activation" & Rev 3 to EP-251, "Plant Surey Group." Withheld (ref 10CFR2.790).

DISTRIBUTION CODE: X005D COPIES RECEIVED: LTR 1 ENCL 1 SIZE: 6+101
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NOTES: LPDR 2cys Transcripts. 05000352
LPDR 2cys Transcripts. Application for permit renewal filed. 05000353

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