NMC
Committed to Nuclear Excellence

Nuclear Management Company, LLC
Point Beach Nuclear Plant
6610 Nuclear Road
Two Rivers, WI 54241

NRC 2002-0107

December 6, 2002

Document Control Desk
U.S. Nuclear Regulatory Commission
Mail Station P1-137
Washington DC 20555

Ladies/Gentlemen:

Dockets 50-266 and 50-301
Emergency Plan Implementing Procedure Revisions
Point Beach Nuclear Plant, Units 1 And 2

Enclosed are copies of revised procedures to the Point Beach Nuclear Plant Emergency Plan Implementing Procedures. The revised procedures dated October 25 and Nov 15, 2002, should be filed in your copy of the manual. We apologize for the delay.

Sincerely,

A.J. Cayia
Site Vice President

FAF/kmd

Enclosures

cc: NRC Resident Inspector (w/o/e)
Incident Response Center, Region III

A045

INDEX

PROCEDURE NUMBER	PROCEDURE TITLE	REVISION NUMBER		EFFECTIVE DATE	PERIODIC REVIEW DATE
EPIP 1.1	Course of Actions	42	C	10/25/02	08/09/01
EPIP 1.2	Emergency Classification	36	R	07/12/02	02/06/02
EPIP 1.3	Dose Assessment and Protective Action Recommendations	29	R	06/24/02	05/03/02
EPIP 1.4	Credible High or Low Security Threat	1	C	07/12/02	12/14/01
EPIP 2.1	Notifications - ERO, State & Counties, and NRC	25	R	06/25/02	02/06/02
EPIP 4.1	Technical Support Center (TSC) Activation and Evacuation	33	R	07/26/02	12/14/01
EPIP 4.2	Operations Support Center (OSC) Activation and Evacuation	15	R	12/14/01	12/14/01
EPIP 4.3	Emergency Operations Facility (EOF) Activation and Evacuation	27	R	07/26/02	12/14/01
EPIP 4.7	Offsite Radiation Protection Facility (OSRPF) Activation and Evacuation	3	R	07/12/02	12/14/01
EPIP 5.1	Personnel Emergency Dose Authorization	14	R	02/06/02	02/06/02
EPIP 5.2	Radioiodine Blocking and Thyroid Dose Accounting	13	R	03/20/01	02/06/02
EPIP 6.1	Assembly and Accountability, Release and Evacuation of Personnel	23	R	07/26/02	12/14/01
EPIP 7.3.1	Offsite Radiation Sampling and Survey	22	R	07/12/02	07/12/02
EPIP 7.3.2	Post-Accident Isokinetic Stack Sampling System	7	R	07/12/02	07/12/02
EPIP 7.3.7	Estimating Radioiodine Air Concentrations	5	R	07/12/02	07/12/02
EPIP 8.4.1	Post-Accident Sampling and Analysis of Potentially High Activity Reactor Coolant	16	C	10/25/02	07/12/02
EPIP 8.4.2	Post-Accident Sampling of Containment Atmosphere	11	C	09/13/02	07/12/02
EPIP 8.4.3	Emergency Containment Sump "A" Sampling	7		07/12/02	07/12/02
EPIP 10.1	Emergency Reentry	22	R	07/12/02	07/12/02
EPIP 10.2	Core Damage Estimation	19	R	07/26/02	01/30/01
EPIP 10.3	Post Accident Containment Hydrogen Reduction	5	R	05/19/00	05/19/00

(T - Temporary Change)

C = Continuous Use
R = Reference Use
I = Information Use

INDEX

PROCEDURE NUMBER	PROCEDURE TITLE	REVISION NUMBER		EFFECTIVE DATE	PERIODIC REVIEW DATE
EPIP 11.2	Medical Emergency	17	R	09/20/02	07/12/02
EPIP 12.1	Emergency Event De-Escalation, Termination, or Recovery Operations	8	R	07/12/02	07/12/02
EPIP 12.2	Recovery Implementation	14	R	07/12/02	07/12/02

(T - Temporary Change)

C = Continuous Use
R = Reference Use
I = Information Use

EPIP 1.1

COURSE OF ACTIONS

DOCUMENT TYPE:	Technical
CLASSIFICATION:	NNSR
REVISION:	42
EFFECTIVE DATE:	October 25, 2002
REVIEWER:	N/A
APPROVAL AUTHORITY:	Department Manager
PROCEDURE OWNER (title):	Group Head
OWNER GROUP:	Emergency Preparedness

List pages used for Partial Performance

_____

_____

_____

Controlling Work Document Numbers

_____ _____

_____ _____

_____ _____

TABLE OF CONTENTS

SECTION	TITLE	PAGE
1.0	PURPOSE	3
2.0	PREREQUISITES	3
3.0	PRECAUTIONS AND LIMITATIONS	3
4.0	INITIAL CONDITIONS	3
5.0	PROCEDURE	4
6.0	REFERENCES	9
7.0	BASES	9
ATTACHMENT A	ANNOUNCEMENT OF CLASSIFIED EVENT AND PROTECTIVE ACTION	10
ATTACHMENT B	NOTIFICATION OF PERSONNEL OUTSIDE THE PROTECTED AREA	12
ATTACHMENT C	ACTIVATION OF EMERGENCY RESPONSE DATA SYSTEM (ERDS)	15

1.0 PURPOSE

This procedure provides instructions for Control Room personnel responding to an off-normal event at the Point Beach Nuclear Plant (PBNP).

2.0 PREREQUISITES

2.1 Responsibilities

2.1.1 The Shift Manager (SM) is responsible for this procedure.

2.1.2 The SM is responsible for taking immediate actions to mitigate the consequences of the emergency.

2.1.3 The SM is responsible for implementing Emergency Plan Implementing Procedures (EPIPs) as referenced by this procedure until formally relieved by key personnel in emergency response facilities.

2.1.4 The SM may delegate assignments to qualified personnel as necessary.

2.2 Equipment

None

3.0 PRECAUTIONS AND LIMITATIONS

None

4.0 INITIAL CONDITIONS

An off-normal occurrence with the potential for an emergency classification exists (or has existed) at PBNP.

5.0 PROCEDURE

Date/Time entered	/
Reason entered	

	Initials	Time

NOTE 1: Steps may be completed out of sequence, as appropriate.

NOTE 2: Steps that do not apply, may be marked "not applicable."

NOTE 3: Steps already formally turned over to Emergency Response Facilities (per Step 5.19) may be marked "not applicable."

NOTE 4: Control Room is responsible for all steps prior to transfer of responsibility. Text in [ ]'s denotes the Emergency Response Facility responsible for implementation of that step AFTER the formal transfer of responsibilities from the Control Room.

NOTE 5: Classifications are to be made consistent with the goal of 15 minutes once plant parameters reach an Emergency Action Level (EAL). (Ref NEI 99-02)

5.1 Implement procedures, or take other actions as required, to place the affected unit(s) in a safe condition. [CR] _____ _____

5.2 Verify the on-shift Shift Technical Advisor (STA) is in the Control Room. [CR] _____ _____

5.3 IF a credible HIGH or LOW security threat, THEN go to EPIP 1.4. (N/A if attack in progress) [CR primary, EOF support] _____ _____

5.4 Direct the Security Shift Commander to report to the Control Room. [CR] _____ _____

5.5 Initiate EPIP 1.2, Emergency Classifications, to determine if an emergency classification is required. [EOF primary, TSC/CR support] _____ _____

WARNING

If event is security related, then discuss the consequences of conducting an assembly and accountability with Security prior to implementation.

5.6 Complete Attachment A, Announcement of Classified Event and Protective Actions, and make the plant Gai-Tronics announcement. [CR] _____ _____

Initials Time

5.7 IF normal working hours,
THEN implement EPIP 1.1, Attachment B, to notify personnel outside the protected area of the event,
ELSE implement EPIP 1.1, Attachment B, after notifications in Step 5.8 to notify personnel outside the protected area. [TSC] _____ _____

NOTE 1: IF the event is classified as a GENERAL EMERGENCY, THEN minimum protective action recommendations are required.

- **Evacuate 0-2 miles, all sectors**
- **Evacuate 2-5 miles, 3 or 4 downwind sectors**

**NOTE 2: IF wind speed is less than three (3) mph or lake breeze conditions exist,
THEN recommend protective actions for all sectors (360°F) 0-5 miles. Lake breeze conditions exist if the difference between actual wind direction values for inland and near shore meteorological towers is greater than 90°F.**

**NOTE 3: IF wind direction is on or near (~2°) the sector line,
THEN use 4 downwind sectors**

5.8 Initiate EPIP 2.1, "Notifications - ERO, State & Counties, and NRC." [EOF]

NOTE: Assign personnel to make each notification.

5.8.1 Emergency Response Organization (pager activation)
Use EPIP 2.1, Section 5.1. [CR] _____ _____

5.8.2 State & Counties (within 15 minutes of declaration)
Use EPIP 2.1, Section 5.2 and EPIP 2.1 Attachment B, Nuclear Accident Reporting Form. [EOF] _____ _____

5.8.3 KNPP Control Room.
Use EPIP 2.1, Section 5.3. [EOF] _____ _____

5.8.4 Nuclear Regulatory Commission (NRC)
(immediately after State & County notifications, NOT to exceed 60 minutes from declaration).
Use EPIP 2.1, Section 5.4. [TSC] _____ _____

		Initials	Time
5.9	IF emergency involves plant conditions which suggest a radioactive release is in progress or anticipated, THEN initiate EPIP 1.3, Dose Assessment and Protective Action Recommendations. [EOF]		
5.10	IF a backshift or weekend, THEN contact the onshift Radiation Protection Technologist and Radiochemical Technician to report to the Control Room for further instructions in support of the event. [CR] (Ref EPIP 10 1, Emergency Reentry)		
5.11	Dispatch and track reentry teams until this responsibility is assumed by the OSC. [OSC]		
5.12	IF the event is an Unusual Event and additional staff is desired, THEN call in personnel using the Emergency Response Organization (ERO) Call List, ETD 01. [CR]		
5.13	Implement the remaining sections of EPIP 6.1, Assembly and Accountability, Release and Evacuation of Personnel, for the following:		
5.13.1	Accountability (ref EPIP 6.1, Step 5.2.2). [TSC]		
5.13.2	Release of personnel (no radiological impediments) (ref EPIP 6.1, Step 5.3). [TSC]		
5.13.3	Evacuation of site to offsite assembly areas (includes radiological monitoring prior to leaving the plant site) (ref EPIP 6.1, Step 5.4). [TSC]		
5.14	IF Alert or higher, THEN:		
5.14.1	Activate Emergency Response Data System (ERDS) per EPIP 1.1, Attachment C, Activation of Emergency Response Data System (ERDS) (Within 60 minutes of declaration). [CR]		
5.14.2	Issue high range dosimetry to Control Room personnel. [CR]		
5.14.3	Ensure backshift RPTs and RCTs have high range dosimetry. [CR]		

		Initials	Time

5.15 IF the event is a General Emergency
AND ALL the following criteria are met,
THEN implement expanded PARS of evacuation for 0-5 miles all sectors and 5-10 miles downwind sectors. [EOF] (Ref Step 6 15)

5.15.1 Substantial core damage in progress or projected (>20%) (> 30,000 R/hr in containment high radiation monitors)

5.15.2 Large fission product inventory in containment (more than GAP) (LOSS criteria for RCS barrier in EPIP 1.2, Attachment C, exceeded)

5.15.3 Imminent projected containment failure or release underway (LOSS criteria for containment barrier in EPIP 1.2, Attachment C, exceeded) _____ _____

5.16 IF event involves a liquid release to the lake,
THEN notify local water utilities per Offsite Agency Call List, ETD 02. [EOF] _____ _____

5.17 IF TSC and/or EOF are NOT activated,
THEN ensure periodic status updates are provided to the State, Counties, and NRC per EPIP 2.1. [CR] _____ _____

5.18 IF activating the Emergency Response Facilities,
THEN provide a turnover briefing to TSC Manager upon arrival in the Control Room. [CR]

5.18.1 Plant status

5.18.2 Notifications status and current EPIP 2.1, Attachment B form

5.18.3 Protected Worker Status

5.18.4 Assembly and accountability status _____ _____

5.19 Conduct a formal turnover of responsibilities to Emergency Response Facilities as they are activated. [CR]

5.19.1 Technical Support Center (TSC)

a. Plant assessment on classification recommendations per EPIP 1.2 _____ _____

b. Onsite protective actions _____ _____

		Initials	Time
	c. Onsite radiological assessment		
	d. NRC Notifications per EPIP 2.1		
	e. Assembly and Accountability, Release and Evacuation of Personnel per EPIP 6.1		
5.19.2	Operations Support Center (OSC)		
	a. Tracking dispatched reentry teams (repair, fire, search and rescue)		
	b. Tracking of non-PBNP, We Energies personnel, Nuclear Management Company fleet personnel, or contractor teams that may be doing repairs inside and outside protected area (switchyard, etc.)		
	c. Medical emergencies per EPIP 11.2		
5.19.3	Emergency Operations Facility (EOF)		
	a. Classification of emergencies per EPIP 1.2		
	b. Offsite protective action recommendations per EPIP 1.3		
	c. State and County notifications per EPIP 2.1		
	d. Overall management of ERO activities		
	e. Request for Federal Assistance, if needed		
	f. Authorize the use of potassium iodide per EPIP 5.2		
	g. Authorize emergency radiation exposures in excess of 10 CFR 20 requirements per EPIP 5.1		
	h. Review and approval of news releases.		
5.20	Initiate an action request associated with the event and insert a copy in the Operations Notebook (reference Step 6.14) and exit this procedure, returning it to Emergency Preparedness. [CR]		

6.0 REFERENCES

6.1 EPIP 1.2, Emergency Classifications

6.2 EPIP 1.3, Dose Assessment and Protective Action Recommendations

6.3 EPIP 1.4, Credible High or Low Security Threat

6.4 EPIP 2.1, Notifications - ERO, State & Counties, and NRC

6.5 EPIP 4.1, Attachment E, Activation of Emergency Response Data System (ERDS)

6.6 EPIP 5.1, Personnel Emergency Dose Authorization

6.7 EPIP 5.2, Radioiodine Blocking and Thyroid Dose Accounting

6.8 EPIP 6.1, Assembly and Accountability, Release and Evacuation of Personnel

6.9 EPIP 10.1, Emergency Reentry

6.10 EPIP 11.2, Medical Emergency

6.11 ETD 01, Point Beach Emergency Response Organization (ERO) Call List

6.12 ETD 02, Offsite Agency Call List

6.13 NEI 99-02, Regulatory Assessment Performance Indicator Guideline

6.14 IR 94-013, NPNPD-94-014, Response to Notice of Violation, October 5, 1994

6.15 NUREG-0150, Volume 1, Revision 4, RTM-96, Response Technical Manual, Figures A-5 and A-6, March 1996

7.0 BASES

B-1 10 CFR 50.47(b), Emergency Plans

B-2 10 CFR 50.47, Appendix E.IV, Content of Emergency Plans

B-3 NUREG-0654, Criteria for Preparation and Evaluation of Radiological Response Plans and Preparedness in Support of Nuclear Power Plants, Revision 1, November 1980

ATTACHMENT A
ANNOUNCEMENT OF CLASSIFIED EVENT AND PROTECTIVE ACTION

SOUND THE FISHERMAN'S ALARM.
SOUND THE EVACUATION ALARM.
MAKE THE FOLLOWING ANNOUNCEMENT.

"ATTENTION ALL PERSONNEL. ATTENTION ALL PERSONNEL.

1.0 ☐ THERE ARE CONDITIONS AT THE PLANT THAT WARRANT A (AN)
- ☐ UNUSUAL EVENT
- ☐ ALERT
- ☐ SITE EMERGENCY
- ☐ GENERAL EMERGENCY
- ☐ TERMINATION OF CLASSIFIED EVENT

THESE CONDITIONS ARE (EAL chart classification/condition):

_____

_____

☐ ALL ERO PERSONNEL REPORT TO YOUR ASSIGNED EMERGENCY RESPONSE FACILITY.
(required at an ALERT or Higher, Optional Earlier)

☐ THESE CONDITIONS ALSO WARRANT A:

2.0 ☐ LIMITED PLANT EVACUATION OF THE FOLLOWING AREAS:

_____

ALL REMAINING PERSONNEL IN THESE AREA(S) REPORT TO THE:
- ☐ (In RCA) RP STATION
- ☐ (Outside RCA) NORTH SERVICE BUILDING CAFETERIA
- ☐ (Other)_____

AND AWAIT FURTHER INSTRUCTIONS."

3.0 ☐ FULL SITE ASSEMBLY AND ACCOUNTABILITY (Required at SITE EMERGENCY, Optional Earlier):

ALL REMAINING PERSONNEL REPORT TO:
- ☐ YOUR ASSIGNED ASSEMBLY AREA
  - ☐ NORTH SERVICE BUILDING CAFETERIA
  - ☐ ADMIN BUILDING EL 26' OFFICE AREA
  - ☐ ENGINEERING BUILDING CAFETERIA
  - ☐ TRAINING BUILDING NORTH FOYER
  - ☐ WAREHOUSE #4
  - ☐ (OTHER)_____

4.0 ☐ OFFSITE ASSEMBLY AND ACCOUNTABILITY (In lieu of Step 3.0):

ALL REMAINING PERSONNEL REPORT TO:
- ☐ TWO CREEKS TOWN HALL
- ☐ TWO RIVERS NATIONAL GUARD ARMORY

5.0 ☐ EXIT THROUGH
- ☐ THE SOUTH GATEHOUSE
- ☐ THE NORTH VEHICLE GATE (Only if the South Gatehouse Unavailable)

6.0 ☐ (IF filled in, THEN announce:) AVOID THE FOLLOWING AREA(S):

_____"

_____

REPEAT ALARMS AND ANNOUNCEMENT

Return the completed form to Emergency Preparedness or TSC Manager.

ATTACHMENT A
ANNOUNCEMENT OF CLASSIFIED EVENT AND PROTECTIVE ACTION
Page 2 of 2

NOTE: **Ensure each section that should be included in the announcement has a check in that check box. The individual making the announcement should read each of those sections when making the actual announcement.**

1.0 CLASSIFICATION

1.1 Check the appropriate event classification level box.

1.2 Log the EAL chart classification number and condition of the event.

1.3 Emergency Response Facilities must be activated at an Alert or higher classification.

NOTE: **Select Step 2.0, Step 3.0, or Step 4.0 based on the event in progress and the appropriate personnel protective actions required.**

2.0 LIMITED PLANT EVACUATION

2.1 Log the areas where a limited plant evacuation is required.

2.2 Check the appropriate location box(s) where the evacuated personnel should report. Use "other" if a different assembly area is needed due to the unavailability of the ones listed.

NOTE: **An evacuation of non-essential personnel to offsite assembly areas (Step 4.0) shall be conducted in lieu of Step 3.0 under emergency conditions that may endanger human life and health (i.e., fire, flooding, toxic gases, etc.) and the SM or TSC Manager has determined that non-essential personnel shall be evacuated to offsite assembly areas.**

3.0 FULL SITE ASSEMBLY AND ACCOUNTABILITY (Required at Site Emergency, Optional Earlier - Ref EPIP 6.1, Step 4.2)

3.1 Check "Your Assigned Assembly Area" if all locations are available.

3.2 Check the appropriate location box(s) where the personnel should assemble if any normal assembly areas are unavailable. Use "other" if a different assembly area is needed due to the unavailability of the ones listed.

4.0 OFFSITE ASSEMBLY AND ACCOUNTABILITY (In lieu of Step 3.0 – Ref EPIP 6.1, Step 4.3)

Check the appropriate offsite location box where personnel should assemble.

5.0 GATEHOUSE

Check the appropriate gatehouse that personnel should exit through.

6.0 AVOID AREAS

Log the hazardous area(s) that should be avoided by personnel assembling.

ATTACHMENT B
NOTIFICATION OF PERSONNEL OUTSIDE THE PROTECTED AREA
Page 1 of 3

1.0 PBNP AUTOMATED NOTIFICATION SYSTEM

NOTE 1: Listen carefully because the system will give you other options. To expedite the notification process, the following steps have been written to only list the specific voice prompt you need, at which time you can immediately respond without listening to the remaining prompt.

NOTE 2: If at any point you want to exit the system and start over, you should keep slowly pressing the "#" key until the system says "goodbye" and restart the entire process.

1.1 PBNP Automated Notification System is unavailable,
THEN go to Step 2.0 of this attachment.

1.2 From any on-site telephone, dial ext. **7158** to access the PBNP Automated Notification System.

1.3 When prompted "Please enter your scenario activation password," enter "**111222333#**" using the keypad on the telephone.

1.4 When prompted "To start a scenario enter the scenario ID...," enter "**700#.**"

1.5 Press "**2**" to select recording a new message. Other voice prompts will be given but you do not have to listen to the options.

1.6 When prompted "After the tone, speak the new message...," read Attachment A, Announcement of Classified Event, and Protective Actions, and press "#." (Your message will automatically play back).

1.7 Press "**3**" to start the scenario. Other voice prompts will be given if you want to replay your message or rerecord it.

1.8 When prompted, "The scenario is building," press "#", listen to "**good-bye**" and hang up.

1.9 IF normal working hours and Step 1.0 was successful,
THEN return to procedure Step 5.8.

1.10 IF outside normal working hours and Step 1.0 was successful,
THEN return to procedure Step 5.9.

1.11 IF Step 1.0 was NOT successful,
THEN go to next Step 2.0 of this attachment.

Completed By _____ Date/Time _____

ATTACHMENT B
NOTIFICATION OF PERSONNEL OUTSIDE THE PROTECTED AREA
Page 2 of 3

2.0 PBX Broadcast System

2.1 Notification of Personnel Outside Protected Area on South Side of Plant

From a touch-tone phone, dial

2.1.1 **7666** to access voice system

2.1.2 **5623#** when prompted for mailbox

2.1.3 **5623#** when prompted for password

2.1.4 **75** to compose message

2.1.5 **8003#** and **8004##** when prompted

2.1.6 **5** when prompted

2.1.7 Read Attachment A, Announcement of Classified Event and Protective Actions, and press # when done recording.

2.1.8 **79** to send message

2.1.9 **83** to exit PBX Broadcast System.

2.2 Notification of Personnel Outside Protected Area on North Side of Plant

From a touch-tone phone, dial

2.2.1 **6666** to access voice system

2.2.2 **5152#** when prompted for mailbox

2.2.3 **5152#** when prompted for password

2.2.4 **75** to compose message

2.2.5 **8003##** when prompted

2.2.6 **5** when prompted

ATTACHMENT B
NOTIFICATION OF PERSONNEL OUTSIDE THE PROTECTED AREA
Page 3 of 3

2.2.7 Read Attachment A, Announcement of Classified Event and Protective Actions, and press # when done recording.

2.2.8 **79** to send message

2.2.9 **83** to exit PBX Broadcast System.

2.3 IF normal working hours,
THEN return to procedure Step 5.8

2.4 IF outside normal working hours,
THEN return to procedure Step 5.9.

Completed By _____ Date/Time _____

Return the completed form to Emergency Preparedness or TSC Manager

ATTACHMENT C
ACTIVATION OF EMERGENCY RESPONSE DATA SYSTEM (ERDS)

NOTE 1: ERDS shall be activated within one hour of declaration of an Alert or higher emergency.

NOTE 2: ERDS must be activated and deactivated from the Control Room due to being a controlled environment and the TSC PPCS configuration.

NOTE 3: ERDS can be activated from terminals PPCS 101 or 102. Only one Unit can transmit data at a time through a connection. If one Unit is 'connected' through 179 then the other Unit to be 'connected' must be activated through 182. When both Units are inadvertently activated through a single line 179(182) then only one unit displays 'connected'. The other unit displays 'on line' with an 'error' message. The NRC receives alarms indicating validity of the data being transmitted should be checked. Both Units can transmit simultaneously by activating one Unit on each connection. The status displayed would be 'connected' in this case.

1.0 TO INITIATE THE ERDS

1.1 From Control Room drop PPCS 101 or 102, click on the MENU icon.

1.2 Click on Operator Station Programs.

1.3 Click on ERDS for the appropriate Unit.

1.4 Click on the Startup button.

NOTE: When ERDS is activated due to an Emergency the NRC must provide verbal concurrence before ERDS can be deactivated from PBNP.

2.0 TO DEACTIVATE THE ERDS

2.1 From Control Room drop PPCS 101 or 102, click on the MENU icon.

2.2 Click on Operator Station Programs.

2.3 Click on ERDS for the appropriate Unit.

2.4 Click on the Shutdown button.

EPIP 8.4.1

POST-ACCIDENT SAMPLING AND ANALYSIS OF POTENTIALLY HIGH ACTIVITY REACTOR COOLANT

DOCUMENT TYPE: Technical

CLASSIFICATION: Safety Related

REVISION: 16

EFFECTIVE DATE: October 25, 2002

REVIEWER: Qualified Reviewer

APPROVAL AUTHORITY: Department Manager

PROCEDURE OWNER (title): Group Head

OWNER GROUP: Emergency Preparedness

Verified Current Copy: _____ _____ _____
Signature Date Time

List pages used for Partial Performance

_____
_____
_____

Controlling Work Document Numbers

_____ _____
_____ _____
_____ _____

TABLE OF CONTENTS

SECTION	TITLE	PAGE
1.0	PURPOSE	4
2.0	PREREQUISITES	4
3.0	PRECAUTIONS AND LIMITATION	4
4.0	INITIAL CONDITIONS	5
5.0	PROCEDURE	6
5.1	Preliminary Evaluation	6
5.2	Preparation Of Sampling Equipment And Laboratory Setup	9
5.3	Approvals For Implementing Sampling And Analyses	13
5.4	Reactor Coolant Sampling	14
5.5	Collecting Gaseous Sample From Pressurized Sample Vessel	33
5.6	Analyzing Gaseous Sample	35
5.7	Collecting Liquid Sample From Sample Vessel	37
5.8	Analyzing Liquid Sample	38
5.9	Submittal Of Sampling/Analyses Documents	40
5.10	Sampling/Analysis Report And Continuation Of Procedure - Chemistry Supervision	40
5.11	Labeling Samples	40
5.12	Sample Storage	40
5.13	System Normal Valve Lineup	41
5.14	Re-Installation Of Shielded Sample Vessel	43
5.15	Preparation/Transfer Of Sample(S) To Off-Site Laboratory	46
5.16	Post-Analysis Documentation/Submittal	47
6.0	REFERENCES	48
7.0	BASES	48

TABLE OF CONTENTS

SECTION	TITLE	PAGE
ATTACHMENT A	PRIMARY COOLANT HIGH-LEVEL SAMPLING FLOW DIAGRAM	49
ATTACHMENT B	SETUP FOR TRANSFER OF SAMPLE FROM SAMPLE VESSEL	50
ATTACHMENT C	PBNP REACTOR COOLANT POST-ACCIDENT SAMPLING AND ANALYSIS REPORT	51

Reason for performance: ☐ Drill ☐ Training ☐ Fuel Failure

Unit Being Sampled: ☐ Unit 1 ☐ Unit 2

1.0 PURPOSE

This procedure provides instructions for collecting, handling, and analyzing a (potentially high radioactivity) reactor coolant sample with due to fuel failure.

This procedure may also be used for training and drills or exercises. Chemistry supervision may exclude any section or step where performance may adversely affect operation of unit.

2.0 PREREQUISITES

2.1 Responsibilities

2.1.1 The Shift Manager (SM) Operations Support Center Coordinator if TSC is activated) is responsible for the management of the reactor coolant sample collection and analysis.

2.1.2 Radiation Protection (RP) Supervision (Rad/Chem Coordinator if TSC is activated) is responsible for the radiological monitoring controls.

2.1.3 Chemistry Supervision (Chemistry Leader is OSC is activated) is responsible for sample collection and analysis.

2.2 Equipment

2.2.1 Emergency Preparedness Radiation Protection Equipment maintained in OSC.

2.2.2 Refer to Step 5.2 for Chemistry equipment.

3.0 PRECAUTIONS AND LIMITATIONS

3.1 During performance of radiological sampling activities, personnel may be subjected to radiological hazards including high radiation, contamination, and airborne radioactivity.

3.2 Personnel shall wear prescribed protective clothing, dosimetry devices, and other protective equipment, as required by the applicable Radiation Work Permit (RWP) or Re-entry Permit, when performing radiological sampling.

3.3 Improper handling of radioactive material can result in personnel contamination, radioactive material uptake, and unplanned personnel exposure.

3.4 SM approval is required for connecting DI-148 (DI Header To High Radiation Sample System) to the DI (deionized) water manifold, and Unit Control Operator (Unit CO) shall be informed prior to initiating DI flush because flush will dilute reactor coolant and affect reactivity. Unit CO shall also be notified upon completion of flush.

3.5 Reactor Coolant system samples shall be taken within three (3) hours from the time a decision is made to dispatch a sample team.

NOTE: **SC-956C and SC-990 (Step 3.6) may be required for containment isolation should SC-955 or SC-959 (Step 3.7) fail to shut.**

3.6 SM approval is required for opening the following valves when they are being used for containment isolation (i.e., only one other valve operable upstream):

3.6.1 SC-946, HX-14C RC Hot Leg Sample HX DI Flush

3.6.2 SC-956C, HX-14C RC Hot Leg Sample HX Inlet

3.6.3 SC-990, HX-14C RC Hot Leg Sample HX Inlet RHR

3.7 Unit CO shall be notified immediately should the following containment boundary valves fail to SHUT within 15 seconds of moving valve switch to CLOSE position:

3.7.1 SC-955, RC Hot Leg Sample Isolation

3.7.2 SC-959, RHR Loop Sample Isolation

3.8 Sample vessel shall be re-installed with shielding upon completing training, drill, or exercise.

3.9 Flush and blow dry laboratory stripping apparatus upon completing training, drill, or exercise.

4.0 INITIAL CONDITIONS

Indications of fuel failure.

INITIALS

5.0 PROCEDURE

5.1 Preliminary Evaluation

NOTE: This section shall be completed prior to entering the Auxiliary Building OR Sample Room to obtain Reactor Coolant samples under emergency conditions.

NOTE: Equipment collection and laboratory setup (Section 5.2) may be performed concurrently with this section.

5.1.1 Indications of Possible Fuel Damage

NOTE: Fuel damage may be the cause when any of the conditions in Steps 5.11.a - 5.11.h exist.

Circle step number(s) and initial to indicate existing condition(s), and enter N/A for conditions that do NOT exist:

a. Letdown Valve Gallery Monitor (RE-116) reading is unusually high OR offscale high. (Containment isolation may invalidate readings.) _____

b. Post Accident Sample Line Monitor, 1(2)RE-109 reading is unusually high OR offscale high. (Containment isolation may invalidate readings.) _____

c. Containment Air Particulate Monitor, 1(2)RE-211 and Containment Noble Gas Monitor, 1(2)RE-212 readings are unusually high OR offscale high. (RE-211/212 readings may be invalid if containment is isolated.) _____

d. Containment Low-Range Monitor, 1(2)RE-102, and Seal Table Monitor, 1(2)RE-107 readings are unusually high OR offscale high. _____

e. Auxiliary Building Vent Stack Monitor, RE-214 is indicating a significant increase due to Auxiliary Building airborne activity from the Letdown and Charging Pump areas. _____

f. Charging Pump Room Low Range Monitor, 1(2)RE-104 is indicating increased radioactivity in the Auxiliary Building. _____

INITIALS

g. Sample Room Low Range Monitor, 1(2)RE-106 is indicating increased radioactivity in the Sample Room and Background Monitor, 1(2)RE-219B is indicating increased radioactivity outside Sample Room. _____

h. Chem Lab Low Range Monitor, RE-103 is indicating increased radioactivity in laboratory (prior to sample analysis). _____

5.1.2 Verification of Component Cooling and Instrument Air

NOTE: This section (5.1.2) is NOT required for training.

NOTE: Sample cannot be obtained without component cooling to Sample Room heat exchangers and instrument air for operating air operated sample valves.

Contact SM and confirm following (circle as appropriate):

a. Component Cooling In-Service in affected unit (Yes No) _____

b. Instrument Air In-Service in affected unit (Yes No) _____

5.1.3 Pre-Job Briefing and Evaluation of Potential Radiological Hazards for Sampling and Analysis Functions

Attend pre-job briefing which includes Chemistry supervision, Radiation Protection (RP) supervision (or designee), and affected Chemistry technicians to evaluate the following, based on Radiation Work Permit(s) OR reentry permit(s), radiological survey/monitor data, Calculation 98-0058 (Post-LOCA Reactor Coolant Sample System Dose Rate), AND Attachments A-B.

INITIALS

NOTE: RP determines radiological hazards in access and sampling/analysis areas, dosimetry/respiratory requirements, stay times, and dose estimates, based on radiation dose rate (area and contact), estimated time required for each task, and shielding/distance(s) indicated by chemistry.

a. Chemistry supervision:

1. Provide input as requested by RP and Chemistry Technician(s) regarding sampling and analysis functions. _____

2. Determine which valve/instrument/component position verification(s) OR other function(s) in procedure may be omitted as a means for minimizing radiation exposure, based on knowledge of pre-event lineups, laboratory readiness, historical data, value gained/lost by performing/NOT performing, etc., i.e.: _____

   (a) Omit section(s) NOT to be performed (e.g., If radiation dose from pre-sample flush may negate any reduction in over-all dose, then section should be omitted).

   (b) Omit steps NOT to be performed (e.g., sampling equipment Steps 5.2.1.b and 5.2.1.c may already be in location for use, AND Steps 5.4.2.i through 5.4.2.k should already be in desired position.

   (c) Choose flow path to be used, i.e., if SC-955/966C OR SC-959/990 used, omit steps/sub-steps for flow path NOT used.

3. Ensure N/A entered and initialed for any section/steps/data lines omitted AND affected selection boxes are checked. _____

4 Provide other suggestions for reducing exposure time and completing procedure in timely manner, as applicable. _____

INITIALS

5. Assign sampling/analysis functions among chemistry personnel, as necessary to maintain exposure ALARA. _____

b. Chemistry Technician(s): Provide input as requested by Chemistry supervision **OR** RP, **AND** ask questions, as necessary to ensure all concerns are adequately addressed. _____

5.2 Preparation Of Sampling Equipment And Laboratory Setup

5.2.1 Sampling Equipment List

a. Obtain the following equipment and supplies:

1. Two-way radio and spare battery _____

2. Waste container for collecting possible drips from High Rad Sampling Station (HRSS) sample vessel fittings _____

3. Polyethylene bags for trash, and large bag(s) to cover sample vessel during transport _____

4. Paper towels to control/contain potential leaks or spray during connection/disconnection of sample vessel _____

NOTE: **Items in Step 5.2.1.b AND 5.2.1.c are normally maintained for immediate use at locations specified in each step. Chemistry supervision may enter N/A for these steps when items are known to be positioned as indicated.**

b. Ensure the following equipment is positioned adjacent to Unit 1 Sample Room (normal location) **AND** ready for use:

1. Sample cart designated for transport of sample vessel _____

2. Wrenches, 5/8" and 11/16", open-end (or adjustable) for connecting and disconnecting sample vessel _____

3. Remote valve turning tool _____

4. Syringe for evacuating liquid from sample vessel fittings _____

5. Shielded waste bottle _____

INITIALS

c. Ensure the following are positioned for use in the Primary Sample Hood:

1. Equipment detailed in Attachment B, excluding sample vessel _____

2. Remote handling tools located in cabinet below the hood _____

NOTE: **Preparation of Laboratory Equipment can be completed in any logical sequence as deemed applicable by the performers.**

5.2.2 Laboratory (Analysis) Equipment

a. Gas Chromatograph (G.C.) _____

b. Ion Chromatograph (I.C.) _____

c. Multichannel Analyzer (MCA) _____

d. pH/mv meters (120v AC or battery powered) and pH probe _____

e. Magnetic stirrers; (120v AC, battery, or water/air powered), one 50 ml polyethylene beaker, and a 50 ml beaker _____

f. Piston burette; manual or auto _____

g. Automatic pipets; continuously adjustable through 5 ml, or equivalent _____

h. One, 1.0 liter sidearm flask with correctly sized solid stopper and rubber septum over sidearm _____

i. Gas Collection Vessel, glass _____

j. Gas syringe, pressure-lock, or equivalent _____

k. Beaker, 50 ml _____

l. Mini-lab analyzer, as required by Chemistry supervision _____

m. Lead brick barricade (wall) of sufficient size to temporarily shield sample in analytical hood _____

INITIALS

5.2.3 Reagents, Standards, and Bottled Gases

a. NaOH, 0.1N for boron (May be obtained from normal boron analysis reagents.) _____

b. Mannitol for boron analysis _____

c. Boron standard, appropriate for expected boron concentration _____

d. Calibration gases for G.C. _____

e. Carrier and valve gas (if applicable) _____

NOTE: Preliminary Equipment checks can be completed in any logical sequence as deemed applicable by the performers.

5.2.4 Preliminary Equipment Check and Preparation

NOTE: Chemistry supervision selects instruments to use. (Step 5.2.4.a)

a. Ensure current calibration on following instruments and startup instruments (if necessary), in accordance with applicable procedures, and as directed by Chemistry supervision:

1. G.C. _____
2. I.C. _____
3. MCA _____

b. Ensure daily QA check performed and results are within limits specified in applicable procedure for instrument selected (Step 5.2.4.b) and analysis parameters listed below:

1. G.C. for hydrogen analysis and hydrogen result _____
2. I.C. for chloride analysis and chloride result _____
3. MCA for noble gas and iodine analyses and results _____

INITIALS

NOTE: In the event of loss of AC power to laboratory, a battery-powered pH meter and a battery, air, OR water-powered magnetic stirrer may be used.

c. Standardize pH meter and ensure mid-point check within ± 0.1 su. _____

d. Check and prime piston burette with 0.1N NaOH solution. _____

e. Perform QA check on boron standard and ensure result within ± 1 ppm for 10 - 19 ppm standard
OR ± 1% or ± 1 ppm (whichever is greater) for 20 - 2000 ppm standard. _____

f. Organize equipment behind lead brick barricade to allow view of operations with aid of mirror. _____

g. Set up Gas Collection Vessel, ensuring the following:

1. New septum installed AND Valve 2 OPEN

2. Vacuum line attached to vessel at Valve 1

3. Valve 1 OPEN AND valve 3 SHUT

4. Outlet line to liquid sample vessel capped AND vacuum established

5. Valve 1 SHUT AND vacuum stable _____

6. IF vacuum decreases,
THEN ensure the following:

   (a) Valves SHUT
   (b) Rubber septum replaced
   (c) Fittings are tight
   (d) Vacuum re-applied AND
   Steps 5.2.4.g.3 - 5.2.4.g.5 repeated until vacuum stable _____

7. Remove valve 3 and from gas collection vessel to facilitate easier connection after sampling (N/A if not performed). _____

h. Rinse sample vessel drain tube, receiving beaker, and tips of transfer pipets with DI water to remove any chloride contamination. _____

INITIALS

i. Perform two-way radio check with Control Room AND Operation Support Center (OSC), as applicable. _____

j. IF DI water flush desired by Chemistry supervision, THEN obtain SM permission for connecting DI water to DI water manifold. _____

5.3 Approvals For Implementing Sampling And Analyses

NOTE: Steps 5.3.1 and 5.3.2 are NOT required for training.

Obtain verbal approval to implement sampling and analyses from:

5.3.1 Shift Manager (SM) (Operations Support Center Coordinator if TSC is activated). _____

5.3.2 Duty and Call Radiation Protection Supervisor (Rad/Chem Coordinator if TSC is activated) _____

INITIALS

5.4 Reactor Coolant Sampling

NOTE: **The terms, demineralized and deionized (DI) water are both used in CHAMP component names for the same water. The term DI is used in this procedure except when demineralized is used in the CHAMP name.**

NOTE: **For drills and training, DI water flush and sample dilutions are NOT to be performed unless otherwise directed by Chemistry supervision.**

CAUTION

Sampling (fuel failure only) shall NOT begin until preliminary evaluation is completed and all approvals for implementation have been received.

CAUTION

Performance of a DI water flush will dilute the reactor coolant, and affect reactivity.

5.4.1 Preparation for Collecting Pressurized Sample

a. Contact Unit CO AND perform following:

1. Inform Unit CO of following, as applicable: _____

(a) PASS sampling (including installation of shielded sample vessel, as applicable) to begin.

(b) RE-109, Post Accident Sample Line Monitor to be removed from service while sampling

(c) SC-955, RC Hot Leg Sample Isolation valve will be SHUT.

2. Have Unit CO SHUT SC- 966C, RC Hot Leg Sample (isolation valve), as applicable. _____

INITIALS

b. Proceed with sample cart (loaded with sampling equipment) to HRSS outside appropriate Sample Room, 26' elevation, Primary Auxiliary Building (PAB). _____

c. Ensure SC-955 SHUT. _____

d. IF shielded sample vessel installed, THEN enter N/A for Steps 5.4.1.e AND GO TO Step 5.4.1.f _____

e. IF shielded sample vessel NOT installed, THEN perform following:

1. Place a waste container under sample vessel fittings to collect potential drips. _____

CAUTION

System pressure shall be relieved by opening valves in Step 5.4.1.e.2 before loosening sample vessel fittings.

2. OPEN following valves to relieve possible pressure in system.

ID	Name	Initials
SC-939	Z-5E High Rad Sample Vessel Inlet	
SC-940	Z-5E High Rad Sample Vessel Bypass	
SC-941	Z-5E High Rad Sample Vessel Outlet	

3. Ensure the following valves are SHUT:

ID	Name	Initials
SC-939	Z-5E High Rad Sample Vessel Inlet	
SC-940	Z-5E High Rad Sample Vessel Bypass	
SC-941	Z-5E High Rad Sample Vessel Outlet	

INITIALS

CAUTION

Paper towel shall be used to contain potential spray when performing Step 5.4.1.e.4.

4. Disconnect (carefully) sample vessel fittings using care to contain potential spray and prevent possible contamination. _____

5. Allow any liquid in line to drain into waste container. _____

6. Install shielded sample vessel on HRSS sample vessel fittings. _____

f. Perform following:

1. Ensure the sample vessel fittings are tight. _____

2. Ensure the following valves are SHUT:

ID	Name	Initials
SC-939	Z-5E High Rad Sample Vessel Inlet	
SC-940	Z-5E High Rad Sample Vessel Bypass	
SC-941	Z-5E High Rad Sample Vessel Outlet	
8A	Sample Vessel Valve	
8B	Sample Vessel Valve	
9A	Sample Vessel Valve	
9B	Sample Vessel Valve	

INITIALS

NOTE: N/A Section 5.4.2 if NOT performing a presample flush.

5.4.2 Pre-Sampling Flush

a. Connect DI water line quick-connect from valve DI-148 to the DI water manifold, AND ensure the quick-connect is unlocked. _____

b. Ensure the following valves are SHUT:

ID	Name	Initials
DI-148	DI Header To High Radiation Sample System	
SC-946	HX-14C RC Hot Leg Sample HX DI Flush	
SC-947	Z-5E High Rad Sample Vessel DI Flush Inlet	
SC-948	Z-5E High Rad Sample Vessel DI Flush Outlet	

NOTE: Next step is performed only to determine if pump will energize. Pump is NOT to be left on after performance.

c. IF P-166, Demineralized Water Flush Pump to be used, THEN perform following:

1. Ensure the motor starter switch for P-166, is unlocked. _____

2. Check that P-166 is energized by momentarily switching pump ON, then OFF. _____

d. IF P-166 did NOT energize, THEN have Unit CO ensure Breaker No. 4 on Panel 1Y-114/2Y-113 (U1/2 Rod Drive Room) CLOSED, then repeat Step 5.4.2.c. _____

e. IF P-166 still did NOT energize, THEN discontinue effort to start pump. (DI water header pressure to be increased at later step.) _____

f. IF N/A entered by Chemistry supervision for all Steps 5.4.2.i through 5.4.2.k, THEN GO TO note/caution preceding Step 5.4.2.l. _____

INITIALS

g. IF Chemistry supervision did NOT omit all Sample Room valve position verifications,
THEN review Steps 5.4.2.i through 5.4.2.k for familiarization with valves needing verification. _____

h. Obtain SM approval to open SC-946/SC-956C, as applicable AND enter Sample Room. _____

NOTE: **Sign-offs (below) may be initialed after all positions verified.**

i. Ensure valves are positioned as indicated in position column, as follows:

ID	Name	Position	Initials
SC-961C	HX-14C RC Hot Leg Sample HX Outlet	SHUT	
SC-964C	RC Hot Leg Sample Throttle	SHUT	
SC-965C	Z-5C RC Hot Leg Sample Vessel Bypass	SHUT	
SC-971	RC Hot Leg Grab Sample	SHUT	
SC-968	Z-5C Sample Pressure Vessel Common Outlet	SHUT	
SC-938A	RE-109 Failed Fuel Monitor Inlet	SHUT	
SC-938B	RE-109 Failed Fuel Monitor Outlet	SHUT	
SC-938C	RE-109 Failed Fuel Monitor Flow Throttle	SHUT	
SC-938	HX-14C RC Hot Leg HX Out To High Rad Sample System	OPEN	
SC-969A	FI-903 Flow Indicator Purge Line To T-4 VCT Isolation	OPEN	
SC-956C	HX-14C RC Hot Leg Sample HX Inlet	OPEN	

j. Ensure component cooling flow to Sample Room Heat Exchangers by viewing FI-603, Sample System HX Shell Side Outlet Flow Indicator on Sample Panel. _____

CAUTION

SC-990 shall NOT be used for drill OR training.

k. Ensure SC-990, HX-14C RC Hot Leg Sample HX Inlet RHR Sample OPEN, then exit to low radiation area. _____

INITIALS

CAUTION

Unit CO shall be informed prior to initiating DI flush because this evolution can affect reactivity.

NOTE: **Steps 5.4.2.l - 5.4.2.x required only if DI water flush is performed, as directed by Chemistry supervision.**

l. Ensure the following valves OPEN:

ID	Initials
SC-939	
SC-940	
SC-941	
DI-144	

NOTE: **SM approval required to open SC-946 following containment isolation if SC-966C fails to shut.**

m. OPEN following valves:

ID	Initials
DI-140	
DI-145	
DI-148	
SC-946	

INITIALS

NOTE: To minimize radiation dose during an emergency event, Chemistry supervision may have omitted Step 5.4.2.n

n. IF N/A NOT entered by Chemistry supervision for Steps 5.4.2.n.1 - 5.4.2.n.2,
THEN check DI water system lineup for applicable unit, as follows:

1. Unit 1: Ensure DI flow by momentarily OPENING, checking flow, then SHUTTING DI water valve in Primary Sample Hood. _____

2. Unit 2: Ensure OPEN DI water valve (DI-57) located on east wall of Sample Room. _____

o. IF P-166 to be used,
THEN perform following:

1. Ensure valve DI-142 SHUT. _____

2. Ensure valve DI-143 OPEN. _____

3. Turn pump switch ON AND record time: _____

   Time: _____

4. Exit to low radiation area. _____

p. IF P-166 would NOT energize at Step 5.4.2.o,
THEN perform following:

1. Ensure OPEN DI-142, P-166 Flush Pump Bypass. _____

2. Ensure SHUT DI-143. _____

3. Record system pressure as indicated on PI-4145: _____

   _____ psi

4. Exit to low radiation area. _____

INITIALS

5. IF system pressure (Step 5.4.2.p.3) is less than 80 psi, THEN contact Unit CO, AND request that DI water header pressure be maximized and the time pressure maximized be provided. _____

6. Record time pressure maximized: _____

   Time: _____

q. Time flush, as follows:

   1. IF flushed using P-166, THEN wait approximately 2 minutes. _____

   2. IF flushed by maximized DI water header pressure, THEN wait approximately 15 minutes after header pressure maximized. _____

r. Return to HRSS AND measure radiation levels in Sample Room OR general area, as applicable. _____

s. Record data below AND exit to low radiation area: _____

   1. Time: _____

   2. Radiation Level: _____ mR/Hr;
      Location:_____

   3. PI-4145 pressure indication: _____ psi

t. Notify Chemistry supervision of radiation dose rate, AND wait for instructions on system flush. _____

u. IF Chemistry OR RP supervision directs discontinuation of flush,
   THEN N/A Step 5.4.2.v AND GO TO Step 5.4.2.w. _____

INITIALS

v. IF Chemistry OR RP supervision directs continuation of flush,
THEN repeat Steps 5.4.2.q - 5.4.2.t, AND record data in Table A (below) until Chemistry OR RP supervision directs discontinuation of flush, as applicable: _____

Table A

Flush #	PI-4145 psig	Time	mR/hr After Flush
2			
3			
4			

w. Secure flush according to following:

1. IF flushed by P-166,
THEN turn P-166 OFF AND record time flush STOPPED, AND total flush time: _____

   Time: _____ Total Flush Time: _____ minutes

2. IF flushed by maximized DI water header pressure,
THEN SHUT DI-142, AND record time flush STOPPED, AND total flush time: _____

   Time: _____ Total Flush Time: _____ minutes

3. SHUT following valves:

ID	Initials
SC-946	
SC-939	
SC-940	
SC-941	

x. Notify Unit CO DI water flush completed. _____

INITIALS

5.4.3 Pressurized Sample Collection

CAUTION

Valve SC-959 shall NOT be opened for drill OR training.

a. Contact Control Room AND perform following:

1. Obtain SM permission to OPEN one of following AND check block to indicate valve to be opened: _____

☐ SC-955, RC Hot Leg Sample Isolation
OR
☐ SC-959, RHR Loop Sample Isolation

NOTE: Cycling of Containment Isolation valves may be necessary to reset isolation signal to allow sampling.

2. Have Unit CO reset containment isolation signal on valve selected to enable sampling, OR N/A if NOT applicable. _____

NOTE: Valve positions are indicated on switch panels by green AND red lights, as follows:
- **Green light (only) lit = SHUT**
- **Red light (only) lit = OPEN**
- **Both lights lit = Intermediate Position**

b. OPEN isolation valve selected (Step 5.4.3.a.1), using local control switch on switch panel outside Sample Room, AND check block for valve OPENED: _____

☐ SC-955
OR
☐ SC-959

INITIALS

c. IF valve selected (Step 5.4.3.a.1) will NOT open because containment isolation signal NOT reset, THEN perform following: _____

1. Have Unit CO ensure the containment isolation signal for SC-955 OR SC-959 (as applicable) has been reset. _____

2. Ensure SC-955 OR SC-959, as applicable SHUT by placing applicable control switch on panel outside of Sample Room in CLOSE position, AND check block to indicate valve shut. _____

☐ SC-955
OR
☐ SC-959

3. Ensure SC-955 OR SC-959, as applicable OPEN by placing applicable control switch in OPEN position, AND check block to indicate valve opened. _____

☐ SC-955
OR
☐ SC-959

d. Ensure valve positions as indicated in position column, as follows:

ID	Name	Position	Initials
SC-961C	HX-14C RC Hot Leg Sample HX Outlet	SHUT	
SC-964C	RC Hot Leg Sample Throttle	SHUT	
SC-965C	Z-5C Hot Leg Sample Vessel Bypass	SHUT	
SC-971	RC Hot Leg Grab Sample	SHUT	
SC-968	Z-5C Sample Pressure Vessel Common Outlet	SHUT	
SC-938A	RE-109 Failed Fuel Monitor Inlet	SHUT	
SC-938B	RE-109 Failed Fuel Monitor Outlet	SHUT	
SC-938C	RE-109 Failed Fuel Monitor Flow Throttle	SHUT	
SC-938	HX-14C RC Hot Leg Hx out to High Rad Sample System	OPEN	
SC-969A	FI-903 Flow Indicator Purge Line to T-4 VCT Isolation	OPEN	
SC-956C	HX-14C RC Hot Leg Sample Hx Inlet	OPEN	

INITIALS

e. Ensure following valves OPEN:

ID	Name	Initials
9B	Sample Vessel Valve	
9A	Sample Vessel Valve	
8A	Sample Vessel Valve	
8B	Sample Vessel Valve	

CAUTION

For drill OR training exercises only. SC-941 shall be cracked OPEN slightly AND flow maintained at 0.5 - 1.0 gpm by THROTTLING SC-941 to minimize N-16 gamma.

NOTE: FI-903 (located inside Sample Room) can be used as aid for setting flow rate if dose rates permit.

NOTE: Observe pressure indication PI-995 when throttling SC-941 or opening SC-966C.

f. Ensure OPEN SC-939 AND throttle SC-941. _____

g. IF sample being taken off Hot Leg (i.e., only SC-955 being used)
THEN have Unit CO OPEN SC-966C. _____

h. Ensure sample flow by confirming one OR both of following indications, as desired (n/a if needed):

1. Increase in radiation level at Sample Vessel _____

2. Pressure increase/decrease indication on PI-995 when SHUTTING/OPENING Valve SC-941 _____

i. Exit to low radiation area. _____

INITIALS

NOTE: **Next step should be performed immediately before returning to HRSS to obtain sample.**

j. Contact Unit CO AND obtain/record following pressure indications, as applicable: _____

(RCS): ____ psig OR RHR: _____ psig VCT _____psig

k. WHEN sample has recirculated for 15 minutes, THEN return to HRSS to collect sample. _____

l. IF reading on PI-995 NOT between RCS AND VCT pressure,
THEN exit to low radiation area, notify Chemistry supervision, AND wait for instructions. _____

NOTE: **Use the remote valve operating tool only as needed to reduce dose.**

m. SHUT following valves IN EXACT ORDER listed.

ID	Name	Initials
9B	Sample Vessel Valve	
9A	Sample Vessel Valve	
8B	Sample Vessel Valve	
8A	Sample Vessel Valve	

n. Record sample time, AND check that PI-995 indicates less than 100 psig AND is NOT increasing: _____

Sample time: _____

o. IF PI-995 equal to or greater than 100 psig, OR is increasing,
THEN notify Chemistry supervision, AND wait for instructions. _____

INITIALS

NOTE: Sample vessel is NOT to be disconnected until sample flow is secured and DI flush (if being performed) is completed.

NOTE: Valve positions are indicated on switch panels by green and red lights, as follows:
- **Green light (only) lit = SHUT**
- **Red light (only) lit = OPEN**
- **Both lights lit = Intermediate Position**

p. SHUT isolation valve opened at Step 5.4.3.b OR 5.4.3.c.3, as applicable, using local control switch on switch panel outside Sample Room, AND check block for valve SHUT. _____

☐ SC-955
OR
☐ SC-959

q. IF valve SC-955 OR SC-959 (as applicable) did NOT SHUT (green light on panel lit) within 15 seconds, THEN notify Unit CO. _____

r. IF sample being taken off Hot Leg (i.e., only SC-955 being used)
THEN have Unit CO SHUT SC-966C. _____

s. IF DI flush NOT to be performed,
THEN perform following:

1. Ensure the following valves SHUT:

ID	Initials
SC-939	
SC-940	
SC-941	

2. Enter N/A for Steps 5.4.4.a - 5.4.4.p, AND GO TO Step 5.4.4.q. _____

INITIALS

NOTE: **Post-sampling flush to be performed only as directed by Chemistry supervision, OR N/A entered for sign-offs when NOT performed.**

5.4.4 Post-Sampling Flush

a. Ensure following valves OPEN:

ID	Initials
SC-940	
SC-941	
DI-144	

CAUTION

Unit CO shall be informed prior to initiating DI flush because this evolution can affect reactivity.

NOTE: **SM approval required to open SC-946 following containment isolation if SC-966C fails to shut.**

b. Ensure following valves OPEN:

ID	Initials
DI-140	
DI-145	
DI-148	
SC-947	
SC-948	

c. IF P-166 to be used,
THEN perform following:

1. Ensure valve DI-142 SHUT. _____

2. Ensure valve DI-143 OPEN. _____

INITIALS

3. Turn pump switch ON AND record time: _____

   Time: _____

4. Exit to low radiation area. _____

d. IF P-166 NOT to be used,
   THEN perform following:

   1. Ensure OPEN DI-142, P-166 Flush Pump Bypass. _____

   2. Ensure SHUT DI-143. _____

   3. Record system pressure as indicated on PI-4145: _____

      _____ psi

   4. Exit to low radiation area. _____

   5. IF system pressure (Step 5.4.4.d.3) is less than 80 psi, THEN contact Unit CO, AND request that DI water header pressure be maximized and the time pressure maximized be provided. _____

   6. Record time pressure maximized: _____

      Time: _____

e. Time flush, as follows:

   1. IF flushed by P-166,
      THEN wait approximately 2 minutes. _____

   2. IF flushed by maximized DI water header pressure, THEN wait approximately 15 minutes after header pressure maximized. _____

f. Return to HRSS AND measure radiation levels AND DI water pressure at Sample Vessel. _____

INITIALS

g. Record data below **AND** exit to low radiation area: _____

1. Time: _____

2. Radiation Level: _____ mR/Hr

3. PI-4145 pressure indication: _____ psi

h. Notify Chemistry supervision of radiation dose rate, **AND** wait for instructions on system flush. _____

i. **IF** Chemistry **OR** RP supervision directs discontinuation of flush,
THEN N/A Step 5.4.4.j **AND** GO TO Step 5.4.4.k. _____

j. **IF** Chemistry **OR** RP supervision directs continuation of flush,
THEN repeat Steps 5.4.4.e - 5.4.4.h **AND** record data in Table B (below) until Chemistry **OR** RP supervision directs discontinuation of flush: _____

Table B

Flush #	PI-4145 psig	Time	mR/hr After Flush
2			
3			
4			

k. **WHEN** directed by Chemistry **OR** RP supervision,
THEN STOP flush according to following:

1. OPEN valve SC-946. _____

2. SHUT following valves:

ID	Initials
SC-947	
SC-948	

3. OPEN valve SC-939, using remote valve tool. _____

INITIALS

l. Exit to low radiation area AND wait 5 minutes. _____

1. IF flushed by P-166,
THEN turn P-166 OFF, AND record time flush
STOPPED: _____

Time: _____

2. IF flushed by maximized DI water header pressure,
THEN SHUT DI-142 AND record time flush
STOPPED AND total flush time: _____

Time: _____ Total Flush Time: _____

m. SHUT following valves, using remote valve tool:

ID	Initials
SC-940	
SC-941	

n. SHUT following valves:

ID	Initials
DI-148	
DI-140	
DI-143	
DI-145	
SC-947	
SC-948	

o. Notify Unit CO DI water flush completed. _____

p. Disconnect quick-connect between Valve DI-148 AND the
DI water manifold, using a paper towel to prevent spraying. _____

INITIALS

NOTE: The bottom fitting (Step 5.4.4.q) to be loosened is the fitting closest to the tee.

NOTE: Disconnect the bottom fitting first and then the top fitting.

q. Disconnect sample vessel by loosening the top AND bottom fittings using appropriate wrench (5/8", 11/16", or adjustable) AND a paper towel to prevent spraying. _____

r. Ensure sample cart attached to sample vessel. _____

s. Remove shielded sample vessel (carefully) from support while ensuring vessel fittings are directly above catch basin. _____

NOTE: Any water remaining in fittings will dilute sample.

CAUTION

Approximately 4-5 mls of liquid will drip out when the syringe needle is inserted into the bottom of the vessel.

t. Remove liquid from top AND bottom vessel fittings with syringe (with long needle) AND EJECT liquid into shielded waste bottle. _____

u. Replace Swagelok plugs on Sample Vessel (finger tight). _____

v. Place large polyethylene bag over vessel for transport, AND back sample cart away from sample area. _____

w. Replace Swagelok plugs on wall fittings (for Sample Vessel), using appropriate tool. _____

x. IF directed by Chemistry supervision, THEN GO TO Section 5.13, restore system to normal valve lineup, AND RETURN TO Step 5.4.4. _____

INITIALS

y. Transport vessel, remote valve tool, AND wrenches to Chemistry laboratory on sample cart. _____

z. Record any unusual conditions observed OR conditions that interfered with sampling, including step number(s) AND affected component ID in comments block, below, AND notify Chemistry supervision of unusual condition(s): _____

COMMENTS (Sampling)

aa. Document completion of sampling on PBNP Reactor Coolant Post-Accident Sampling and Analysis Report, Attachment C, Section 3.0. _____

5.5 Collecting Gaseous Sample From Pressurized Sample Vessel

NOTE: A diagram of setup for collecting sample is provided on Attachment B.

5.5.1 If necessary, attach valve 3 and tubing to shielded sample vessel. (N/A if not performed). _____

5.5.2 Place shielded sample vessel in sample holder in Primary Sample Hood. _____

5.5.3 Obtain contact, radiation reading on sample vessel AND record reading for future reference in determining µCi content: _____

Dose Rate: _____ /Hr

NOTE: Sample vessel fittings should be cleaned, but only when radiation levels permit. Thread compounds are NOT to be used anytime.

5.5.4 Ensure sample vessel AND shielded gas collection vessel are adequately shielded. _____

INITIALS

NOTE: **If vacuum is still established in collection vessel, it will be lost when connecting the sample vessel in the following step. Vacuum will be reestablished by the procedure.**

5.5.5 Connect sample vessel to the shielded gas collection vessel by means of the fittings provided. _____

5.5.6 Connect drain tube to opposite end of sample vessel, AND ensure Valve 11 on drain tube is OPEN. _____

5.5.7 Ensure vacuum line is attached to gas collection vessel at valve 1 location. _____

5.5.8 Ensure Gas Collection Vessel valves (Attachment B), as follows:

a. Valves 1 AND 2 OPEN. _____

b. Valve 3 SHUT. _____

5.5.9 Evacuate Gas Collection Vessel and connecting lines. _____

5.5.10 SHUT valve 1 AND check stable vacuum. _____

5.5.11 IF vacuum unstable,
THEN perform following: _____

a. REPAIR leak(s).

b. OPEN valve 1, AND repeat Steps 5.5.9 AND 5.5.10 until stable.

5.5.12 Secure vacuum AND disconnect vacuum line. _____

NOTE: **Other methods of pressure adjustment (Step 5.5.13) may be used, as directed by Chemistry supervision.**

5.5.13 Adjust vacuum to 12-14" Hg, using valve 1. _____

NOTE: **Use the remote valve tool only as needed to reduce dose.**

5.5.14 OPEN valves 9A AND 9B. _____

INITIALS

5.5.15 OPEN valve 8B one-quarter turn. _____

NOTE: Vacuum drop should be no more than 5 inches Hg/min.

5.5.16 OPEN (crack slightly) valve 8A AND control rate of degassing by throttling valve 8A. _____

5.5.17 Allow system to degas for 2-4 minutes. _____

5.5.18 Ensure that the following sample vessel valves are OPEN.

ID	Initials
9A	
9B	
8A	
8B	

5.5.19 CLOSE valve 2. _____

5.6 Analyzing Gaseous Sample

NOTE: Steps 5.6.1 and 5.6.2 can be done concurrently OR in opposite order.

5.6.1 Hydrogen

a. Draw an appropriate size sample (typically 1cc) using a gas tight syringe AND inject sample through injection port of instrument designated by Chemistry supervision, AND perform analysis, in accordance with procedure for designated instrument. _____

b. Record percent (%) Hydrogen from instrument output in space provided on Attachment C, Table 1, Line A. _____

c. Record analysis data for Lines B, C, AND D in Attachment C, Table 1. _____

d. Calculate cc/Kg hydrogen in accordance with equation provided in of Attachment C, Section 1.0, AND record result in space provided on Table 1. _____

5.6.2 Radioactive Noble Gas

a. Draw 0.5 cc sample into gas tight syringe (1or 2 cc for drill/training). _____

NOTE: Dilution should be performed if contact reading on syringe is >5 mR/hour OR >10% detector spectroscopy amplifier dead time.

b. IF syringe contact radiation reading is >5 mR/hr OR >10% detector dead time, THEN dilute as follows:

1. Inject sample into side-arm flask prepared at Step 5.2.2.h, AND allow 15 minutes for thermal mixing. _____

2. Draw 1 cc of sample of dilution into syringe. _____

3. IF contact reading is still >5 mR/hr OR >10% detector dead time, THEN perform following:

(a) Repeat Step 5.6.2.b until reading is ≤5 mR/hr OR ≤10% detector dead time. _____

(b) Record number of dilutions performed below, AND label each side-arm flask as second, third, dilution, etc.: _____

Dilutions performed for this analysis: _____

c. IF syringe contact reading (original sample or dilution) is ≤5 mR/hr OR ≤10% detector dead time, THEN prepare sample (normally) for analysis, in accordance with procedure for instrument to be used. _____

d. Perform MCA analysis in accordance with procedure for instrument designated by Chemistry supervision, AND obtain MCA printout. _____

INITIALS

e. Perform MCA analysis in accordance with procedure for instrument designated by Chemistry supervision. _____

f. Record analysis data **AND** document noble gas results on Attachment C. _____

5.7 Collecting Liquid Sample From Sample Vessel

5.7.1 Ensure valve 2 SHUT. _____

5.7.2 OPEN (carefully), valve 3. _____

5.7.3 Allow liquid sample to drain into 50 ml beaker. _____

5.7.4 **IF** necessary to recover total liquid sample,
THEN direct a slow stream of air through vent line on valve 3. _____

5.7.5 **WHEN** all sample collected,
THEN SHUT following:

ID	Initials
8A	
8B	
9A	
9B	
3	

INITIALS

5.8 Analyzing Liquid Sample

5.8.1 pH and Boron Analysis

a. pH Measurement

1. Transfer approximately 2-5 mls of sample into an appropriate beaker for boron analysis. _____

2. Measure pH **AND** record pH in space provided in, Attachment C, Table 3 . _____

b. Boron Analysis

Perform boron analysis in accordance with applicable plant procedure; e.g. CAMP 205, **AND** record appropriate analysis parameters/results in Attachment C, Table 3. _____

5.8.2 Chloride Analysis

a. **IF** PBNP I.C. **OR** laboratory is **NOT** available, **THEN** perform following:

1. Obtain a suitable aliquot of sample (as directed by Chemistry supervision) for analysis by WE Laboratory Services (LS) using WE Laboratory Services I.C. _____

2. Store sample, as directed by Chemistry supervision in laboratory vent hood until other analyses are completed. _____

3. Contact TSC Manager to arrange for transport of necessary WE Laboratory Services personnel **AND** equipment to PBNP to perform Chloride analysis. _____

b. **IF** PBNP I.C. analyzer **OR** laboratory is available, **THEN** obtain a suitable aliquot of sample (as directed by Chemistry supervision) **AND** analyze for Chloride. _____

INITIALS

c. Record ppm chloride in space provided in Attachment C, Table 4, _____

5.8.3 Iodine Analysis and Gamma Scan

NOTE: More than 0.3 cc may be used for drill/training.

a. Transfer 0.3 cc (or less, based on activity) of sample from the beaker to appropriate container for iodine and gamma scan analysis. _____

b. **IF** the contact radiation reading is >5 mR/hr **OR** >10% detector dead time,
THEN dilute the sample as necessary to achieve a contact radiation reading <mR/hr **OR** detector dead time <10%.

c. **IF** reading (original sample **OR** dilution) is ≤5 mR/hr **OR** ≤10% detector dead time,
THEN count sample in accordance with procedure for instrument designated by Chemistry supervision. _____

d. Record necessary data and analysis results on Attachment C, Table 5. _____

5.9 Submittal Of Sampling/Analyses Documents

Remove (temporarily) Sections 1.0 - 5.10 **AND** submit to Chemistry supervision. _____

INITIALS

5.10 Sampling/Analysis Report And Continuation Of Procedure - Chemistry Supervision

5.10.1 Review/sign/date completed procedure and Sampling and Analysis Report (Attachment C), as applicable. _____

5.10.2 Forward completed sections of procedure (Sections 1.0- 5.10) AND Attachments A-C to the Rad/Chem Coordinator. _____

5.10.3 Direct completion of Sections 5.11- 5.16 of procedure, as appropriate. _____

NOTE: Sections 5.11- 5.16 may be performed in any order, as directed by Chemistry supervision.

5.11 Labeling Samples

Ensure chloride, noble gas, iodine AND gamma scan samples, including sample to be sent to Off-Site analysis laboratory are labeled with following information (as minimum):

5.11.1 Sample number

5.11.2 Name of sample

5.11.3 Date and time of sampling

5.11.4 Sample volume

5.11.5 Dilution

5.11.6 Technician initials

5.11.7 Contact radiation dose rate _____

5.12 Sample Storage

WHEN analysis completed AND samples have been properly labeled, THEN store all samples (liquid and gas) NOT to be transported to Off-Site Laboratory in the designated high level shielded storage area located in the Auxiliary Building area outside of Gas Decay Tank Room. _____

5.13 System Normal Valve Lineup

NOTE: This section is to be performed during training OR drill exercise, OR when directed by Chemistry supervision.

NOTE: Sign-offs (below) (5.13.1/5.13.2) may be initialed after all positions verified.

5.13.1 Ensure valves are positioned as indicated in position column, as follows:

ID	Name	Position	Initials
SC-961C	HX-14C RC Hot Leg Sample HX Outlet	SHUT	
SC-964C	RC Hot Leg Sample Throttle	SHUT	
SC-965C	Z-5C RC Hot Leg Sample Vessel Bypass	SHUT	
SC-971	RC Hot Leg Grab Sample	SHUT	
SC-938B	RE-109 Failed Fuel Monitor Outlet	SHUT	
SC-939	Z-5E High Rad Sample Vessel Inlet	SHUT	
SC-940	Z-5E High Rad Sample Vessel Bypass	SHUT	
SC-941	Z-5E High Rad Sample Vessel Outlet	SHUT	

NOTE: Step 5.13.2 can be omitted for training if no flushing evolutions performed. N/A in initials column.

5.13.2 Ensure DI water flush valves positioned as indicated in position column, as follows:

ID	Position	Initials
DI-148	SHUT	
SC-946	SHUT	
SC-947	SHUT	
SC-948	SHUT	
DI-140	SHUT	
DI-141	SHUT	
DI-142	SHUT	
DI-143	SHUT	
DI-145	SHUT	

5.13.3 IF DI water header pressure has been maximized OR is still maximized,
THEN have Unit CO return DI water header pressure to normal.

INITIALS

5.13.4 IF DI flush was performed,
THEN RED-LOCK P-166 switch AND DI water jumper to following, as applicable:

a. Unit 1: 1RE-219 SG Blowdown Liquid Monitor Demineralized Water Inlet" pipe _____

b. Unit 2: HX-14C RC Hot Leg Sample HX Demineralized Water Flush" pipe _____

NOTE: Sign-offs (below) may be initialed after all positions verified.

5.13.5 IF RE-109 is to be put in service,
THEN ensure valves are positioned as indicated in position column, as follows:

NOTE: Valves SC-955 AND SC-956C require SM approval to open following containment isolation AND SC-966C fails to shut.

ID	Name	Position	Initials
SC-938A	RE-109 Failed Fuel Monitor Inlet	OPEN	
SC-956C	HX-14C RC Hot Leg Sample HX Inlet	OPEN	
SC-968	Z-5C Sample Pressure Vessel Common Outlet	OPEN	
SC-969A	FI-903 Flow Indicator Purge Line To T-4 VCT Isolation	OPEN	

5.13.6 OPEN valve for SC-955, RC Hot Leg Sample Isolation OR SC-959, RHR Loop Sample Isolation, as applicable, using valve switch on switch panel outside Sample Room. _____

5.13.7 Have Unit CO OPEN SC-966C, RC Hot Leg Sample. _____

5.13.8 Establish 0.2 to 0.4 gpm flow through RE-109, Post Accident Sample Line Monitor by throttling SC-938C. _____

5.13.9 Notify Unit CO RE-109 back In-Service. _____

INITIALS

5.13.10 Record any unusual conditions observed OR conditions that interfered with restoring system to normal valve lineup, including step number(s) AND affected component ID in comments block, below, AND notify Chemistry supervision of unusual condition(s): _____

COMMENTS (Normal Valve Lineup)

5.13.11 Sign AND date in Section 5.16 for restoring system to normal valve lineup. _____

NOTE: **Section 5.16 to be performed during drill OR training, OR as directed by Chemistry supervision during post-accident conditions.**

5.14 Re-Installation Of Shielded Sample Vessel

NOTE: **The RP survey and release (Steps 5.14.1 and 5.14.2) may be omitted for drill OR training.**

5.14.1 Have RP perform radiological survey of sample vessel AND associated tools. _____

5.14.2 WHEN sample vessel AND tools have been released by RP, THEN perform following:

a. Notify Unit CO that RE-109 will be temporarily removed from service for installation of sample vessel. _____

b. Transport sample vessel AND tools to affected unit HRSS. _____

INITIALS

NOTE: **Valve positions are indicated on switch panels by green AND red lights, as follows:**
- **Green light (only) lit = SHUT**
- **Red light (only) lit = OPEN**
- **Both lights lit = Intermediate Position**

5.14.3 SHUT SC-955 AND ensure SC-959 SHUT. _____

5.14.4 IF SC-955 (OR SC-959) did NOT SHUT (green light on panel lit) within 15 seconds,
THEN notify Unit CO. _____

5.14.5 Place a waste container under sample vessel fittings to collect possible liquid when sample vessel fittings are removed. _____

CAUTION

System pressure shall be relieved by opening valves in Step 5.14.6 before removing sample vessel fittings.

5.14.6 OPEN following valves to relieve possible pressure in system.

ID	Name	Initials
SC-939	Rad Sample Vessel Inlet	
SC-940	Z-5E High Rad Sample Vessel Bypass	
SC-941	Z-5E High Rad Sample Vessel Outlet	

5.14.7 SHUT following:

ID	Initials
SC-939	
SC-940	
SC-941	

INITIALS

CAUTION

Paper towel shall be used to contain potential spray when performing Step 5.14.8.

5.14.8 Remove (carefully) Swaglok plugs from HRSS sample vessel inlet AND outlet lines, using care to contain potential spray AND prevent contamination. _____

5.14.9 Allow any liquid in line to drain into waste container. _____

5.14.10 Remove plugs from sample vessel, AND install sample vessel on HRSS fittings. _____

5.14.11 Ensure sample vessel fittings are tight. _____

5.14.12 Ensure following valves are SHUT:

ID	Name	Initials
SC-939	Z-5E High Rad Sample Vessel Inlet	
SC-940	Z-5E High Rad Sample Vessel Bypass	
SC-941	Z-5E High Rad Sample Vessel Outlet	
8A	Sample Vessel Valve	
8B	Sample Vessel Valve	
9A	Sample Vessel Valve	
9B	Sample Vessel Valve	

5.14.13 OPEN SC-955. _____

5.14.14 IF SC-955 did NOT OPEN (red light on panel lit) within 15 seconds, THEN notify Unit CO. _____

5.14.15 Notify Unit CO that RE-109 back In-Service. _____

5.14.16 Dispose of any liquid collected in waste container, as directed by Chemistry supervision. _____

INITIALS

5.14.17 Return sample cart AND tools to original storage location AND configuration, as directed by Chemistry supervision. _____

5.14.18 Flush and blow dry laboratory stripping apparatus upon completing training, drill or exercise. _____

COMMENTS (Sample Vessel Installation)

5.14.19 Sign AND date in Section 5.16 for sample vessel installation. _____

5.15 Preparation/Transfer Of Sample(S) To Off-Site Laboratory

NOTE: The Kewaunee Nuclear Plant, Chemistry laboratory is the Off-Site Laboratory that will perform analyses of the PBNP Post-Accident sample(s). Refer to Post-accident counting agreement with Wisconsin Public Service, Kewaunee Nuclear Plant.

NOTE: Kewaunee Nuclear Plant does NOT utilize the gas serum vial and 1 cc test tube geometries. Therefore, "normal" sample has to be diluted AND placed in one liter poly bottle for transport to Kewaunee Nuclear Plant.

5.15.1 IF 1-liter sample used for Iodine analysis AND Gamma scan is to be transferred to Kewaunee Nuclear Plant,
THEN enter N/A for Step 5.15.2 AND GO TO Step 5.15.3. _____

5.15.2 IF separate dilution to be prepared for Kewaunee Nuclear Plant,
THEN prepare dilution, as directed by Chemistry supervision,
AND label in accordance with Section 5.11. _____

5.15.3 Contact Radioactive Material Shipping personnel to ensure completion of any required shipping papers. _____

5.15.4 Complete documents, AND submit documents, sample, AND copies of all analysis data obtained for sample being shipped to Kewaunee to Radioactive Material Shipping personnel for transport to Kewaunee Nuclear Plant. _____

INITIALS

5.15.5 Sign AND date in Section 5.16 for preparation of sample for off-site analysis. _____

5.16 Post-Analysis Documentation/Submittal

5.16.1 Sign/date for task performed/completed below AND submit to Chemistry supervision:

Post-Sampling Normal Valve Lineup:

Performer: _____ (Printed Name) _____ (Signature) _____ (Date)

Sampling Vessel Installation:

Performer: _____ (Printed Name) _____ (Signature) _____ (Date)

Preparation of Sample(s) For Off-Site Analysis:

Performer: _____ (Printed Name) _____ (Signature) _____ (Date)

Approval:

Supervisor: _____ (Printed Name) _____ (Signature) _____ (Date)

5.16.2 Forward Sections 5.11 - 5.16 to Rad/Chem Coordinator for re-attachment to Sections 1.0- 5.10 (submitted to Chemistry supervision at Step 5.9). _____

6.0 REFERENCES

6.1 Calculation 98-0058, Post-LOCA Reactor Coolant Sampling System Dose Rates, 08/10/98

6.2 Calculation 98-0018, Evaluation of WEPCO PBNP Post Accident Sampling System

6.3 Calculation 98-0175, Post-LOCA Post-Accident Sampling System

6.4 NPM 94-0030, Compilation of WEPCO Commitments Associated with NUREG 0737, clarification of TMI Action Plan Requirements, 01/12/94.

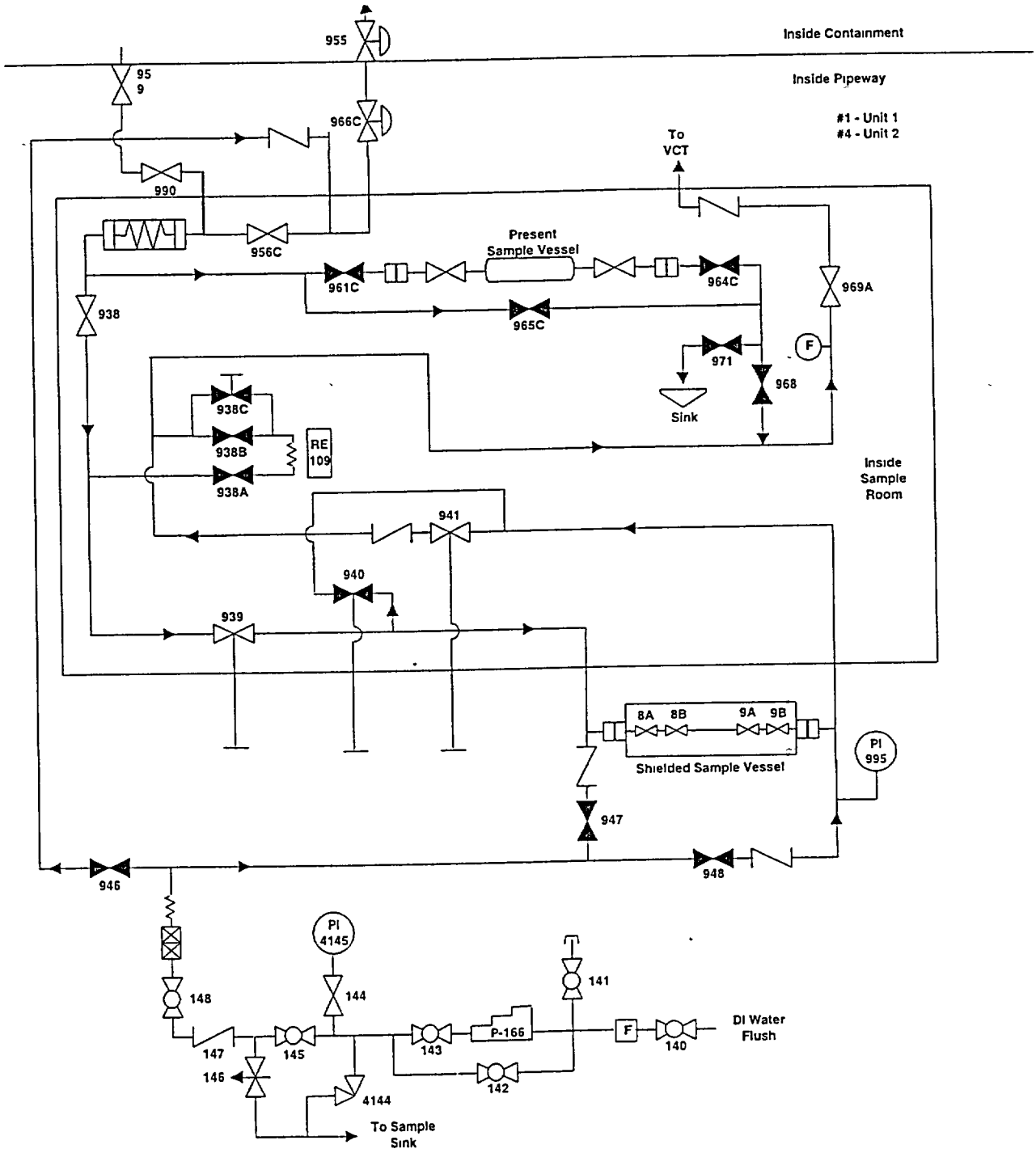
7.0 BASES

B-1 10 CFR 50.47, Code of Federal Regulations, Emergency Plans

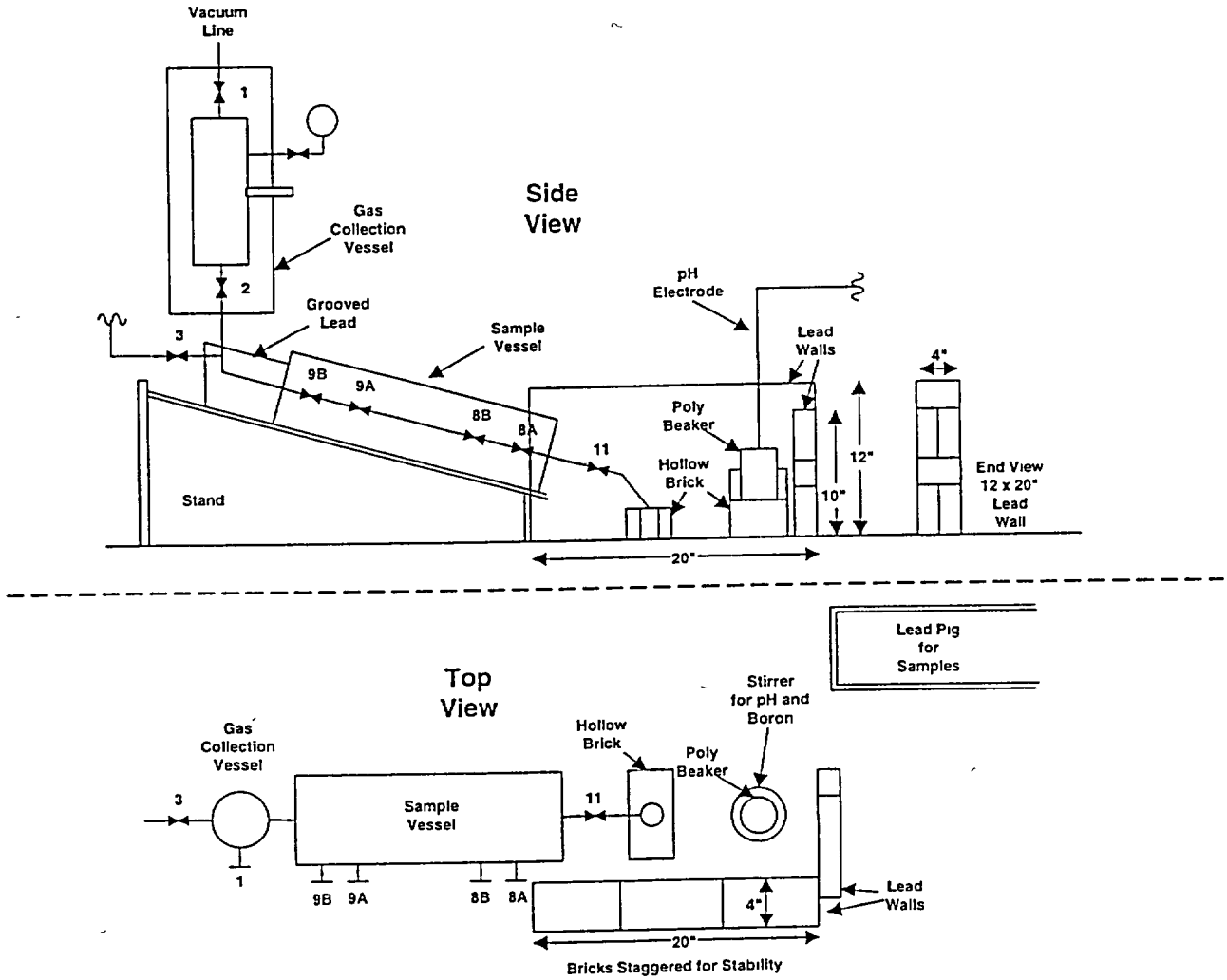
B-2 NUREG-0654, Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants, Rev. 1, November 1980

B-3 NUREG-0737, Clarification of TMI Action Plan Requirements, November 1980

ATTACHMENT A
PRIMARY COOLANT HIGH-LEVEL SAMPLING FLOW DIAGRAM



ATTACHMENT B
SETUP FOR TRANSFER OF SAMPLE FROM SAMPLE VESSEL



ATTACHMENT C
PBNP REACTOR COOLANT POST-ACCIDENT SAMPLING AND ANALYSIS REPORT
Page 1 of 4

1.0 ANALYSIS OF GASEOUS SAMPLE

1.1 Hydrogen Analysis

Hydrogen @ STP (using following equation with Table 1, Values A-D):

$$cc/Kg\ H_2\ @*STP = \frac{(A)}{100} \times \frac{280}{(B)} \times \frac{(C)}{1013} \times \frac{273}{(D)} \times 1000$$

Table 1: Hydrogen

A	Percent (%) hydrogen from instrument output	
B	Volume of sample bomb (ml)	
C	Atmospheric pressure (mbar)	
D	Laboratory temp (°C + 273)	
	cc/Kg hydrogen in coolant @ * STP	

1.2 Radioactive Noble Gases

Corrected volume used for MCA analysis = $\frac{A}{280} \times B \times \left(\frac{D}{C}\right) = E$

$\left(\frac{D}{C} = 1 \text{ if no dilutions are necessary}\right)$

Table 2: Radioactive Noble Gases

A. Analysis/Calculation Data			B. Noble Gases				
			Isotope	µCi/cc		Isotope	µCi/cc
A	Vol of Sample vessel (ml)		Xe-133			Xe-138	
B	Vol of original Sample removed with syringe (ml)		Kr-85m			Kr-87	
C	Vol of sidearm flask (ml)		Kr-88			Ar-41	
D	Number of dilutions performed		Xe-133m			Kr-85	
E	Corrected volume used for MCA analysis		Xe-135			Xe-131m	

ATTACHMENT C
PBNP REACTOR COOLANT POST-ACCIDENT SAMPLING AND ANALYSIS REPORT
Page 2 of 4

2.0 ANALYSIS OF LIQUID SAMPLE

2.1 pH and Boron

pH and Boron (with Boron calculated, using following equation with Table 3, Values A-C):

$$*\text{ppm Boron} = \frac{(B)}{(A)} \times (C) \times 10810$$

Table 3: pH and Boron

A	Sample volume (ml)	
B	Normality NaOH	
C	Volume NaOH used (ml)	
D	**Sample pH**	
E	*** ppm Boron**	

2.2 Chloride

Table 4: Chloride

Chloride concentration	**ppm**

ATTACHMENT C
PBNP REACTOR COOLANT POST-ACCIDENT SAMPLING AND ANALYSIS REPORT
Page 3 of 4

2.3 Iodine Analysis

NOTE: Isotopes in Table 5, Column C, are NOT required. However, if time permits, analysis results for as many as possible should be provided to aid in completing EPIP 10.2, "Core Damage Estimation."

Table 5: Iodine and Other Isotopes for EPIP 10.2

A. Analysis/Calculation Data			B. Iodine			C. Other (for EPIP 10.2)	
			Isotope	Mult. Fact.	Final Corrected µCi/cc	Isotope	µCi/cc
A	Volume of Original Sample (ml)		I-130	× 4.5 =		Rb-88	
B	Dilution factors (if dilution factors are required)		I-131	× 4.5 =		Cs-134	
C	Corrected volume used for MCA analysis (ml)		I-132	× 4.5 =		Cs-137	
D			I-133	× 4.5 =		Te-132	
E			I-134	× 4.5 =		Ba-140	
F			I-135	× 4.5 =		La-140	
G			Total			La-142	

ATTACHMENT C
PBNP REACTOR COOLANT POST-ACCIDENT SAMPLING AND ANALYSIS REPORT
Page 4 of 4

3.0 PERFORMANCE (SAMPLING and ANALYSES)

SAMPLING:

Performer: _____ (Printed Name) _____ (Signature) _____ (Date)

Verifier: _____ (Printed Name) _____ (Signature) _____ (Date)

ANALYSES (including calculations, as applicable)

Hydrogen: _____ (Performer Printed Name) _____ (Performer Signature) _____ (Date)

Noble Gas: _____ (Performer Printed Name) _____ (Performer Signature) _____ (Date)

pH/Boron: _____ (Performer Printed Name) _____ (Performer Signature) _____ (Date)

Chloride: _____ (Performer Printed Name) _____ (Performer Signature) _____ (Date)

Iodine/Other: _____ (Performer Printed Name) _____ (Performer Signature) _____ (Date)

4.0 ROUTING AND APPROVAL

Chemistry Leader _____ (Printed Name) _____ (Signature) _____ (Date)

Rad/Chem Coordinator: _____ (Printed Name) _____ (Signature) _____ (Date)

TSC Manager: _____ (Printed Name) _____ (Signature) _____ (Date)

EPIP 1.2

EMERGENCY CLASSIFICATION

DOCUMENT TYPE: Technical

CLASSIFICATION: NNSR

REVISION: 37

EFFECTIVE DATE: November 15, 2002

REVIEWER: Management Supervisory Staff

APPROVAL AUTHORITY: Department Manager

PROCEDURE OWNER (title): Emergency Preparedness

OWNER GROUP: Emergency Preparedness

Verified Current Copy: _____ _____ _____
Signature Date Time

List pages used for Partial Performance

_____
_____
_____

Controlling Work Document Numbers

_____ _____
_____ _____
_____ _____

TABLE OF CONTENTS

SECTION	TITLE	PAGE
1.0	PURPOSE	3
2.0	PREREQUISITES	3
3.0	PRECAUTIONS AND LIMITATIONS	3
4.0	INITIAL CONDITIONS	4
5.0	PROCEDURE	4
5.1	Classifying an Emergency	4
5.2	Terminating an Emergency	5
5.3	Missed Classifications	6
6.0	REFERENCES	6
7.0	BASES	7
ATTACHMENT A	EMERGENCY ACTION LEVEL (EAL) OVERVIEW MATRIX	8
ATTACHMENT B	EMERGENCY ACTION LEVELS (EALs)	9
ATTACHMENT C	FISSION PRODUCT BARRIER (FPB) MATRIX	84
ATTACHMENT D	SAFETY AND SAFETY-RELATED SYSTEMS	92

1.0 PURPOSE

This procedure provides instructions to classify off-normal occurrences at PBNP into one of four standardized emergency classes.

2.0 PREREQUISITES

2.1 Responsibilities

2.1.1 This procedure is intended for immediate use by the Shift Manager (SM). Following the activation of the Emergency Operations Facility (EOF) the overall responsibility for classification is assumed by the Emergency Director. He is supported in this effort by Control Room, TSC, and EOF personnel.

2.1.2 When relieved of Emergency Director duties by the Emergency Director, the Shift Manager shall no longer be responsible for performance of actions specified in this procedure, however as an NRC licensee the SM shall bring to the attention of the Emergency Director changing plant conditions which may affect the emergency classification.

2.1.3 Upon activation of the TSC, the Operations Coordinator shall monitor plant conditions and provide event classification recommendations to the Emergency Director.

2.2 Equipment

None

3.0 PRECAUTIONS AND LIMITATIONS

3.1 Notifications to state and local authorities must be made within 15 minutes of the declaration of an emergency. Notifications to the NRC must be made immediately following these, not to exceed one hour from declaration.

3.2 Category 8 EALs (Judgment) provide the ability to classify any set of plant conditions based on the Emergency Class definitions, derived from NUREG-0654.

3.3 Certain conditions or occurrences, while not meeting the threshold for classification as an emergency, may nonetheless be reportable to the NRC per 10 CFR 50.72. (Guidance on interpretation of the 10 CFR 50.72 criteria may be found in NUREG-1022.)

3.4 Continuously reference both plant conditions and the EALs in this procedure for potential re-classification.

3.5 When Emergency conditions exist on both Units due to separate events then each Unit should be classified according to the plant conditions and EALS. Units are independent of each other unless the event affects both units. If an event affects both units a single Emergency Classification is adequate.

4.0 INITIAL CONDITIONS

EPIP 1.1 has been initiated by the Control Room because an off-normal occurrence exists (or has existed) at PBNP.

5.0 PROCEDURE

5.1 Classifying an Emergency

5.1.1 Record the time this procedure is entered in the station log (Emergency Director should log subsequent use in his log).

NOTE: A large version of Attachment A is available in the Control Room, TSC, and EOF.

5.1.2 Determine the category (or categories) of the event. (Column 1 of Attachment A). The categories are:

1. Fission Product Barriers
2. System Malfunction
3. Electrical Power
4. Radiological
5. Internal Events
6. External Events
7. Fuel Handling/ISFSI Events
8. Emergency Director Judgment

5.1.3 Make an initial EAL selection from Attachment A.

If the EAL relates to Category 1 (Fission Product Barriers), Attachment C provides additional information on the CHALLENGE and LOSS criteria.

NOTE: Do not "anticipate" challenge or loss of a barrier unless the trend is rapid, and the values are close to the threshold/criteria.

5.1.4 Reference the individual EAL page(s) in Attachment B for the EAL(s) selected. Read all fields on the page to determine/confirm that the EAL applies.

5.1.5 Also reference the individual EAL pages for the next higher and lower emergency class – in that category- (if such EALs exist). This should further confirm the initial selection and specific EAL.

5.1.6 **IF** an event has been categorized on Attachment A, and the threshold of the EAL and surrounding conditions verified to have been met or exceeded (Attachments B and C),
THEN declare the emergency.

a. Record the time of declaration, the emergency classification, and the EAL number on EPIP 2.1, Attachment B.

b. Make an announcement to your facility of the emergency and that you are assuming the duties of Emergency Director.

NOTE: IF this procedure is being implemented from the EOF, THEN verify Control Room is assisting with Gaitronics announcements.

c. Return to EPIP 1.1, Step 5.6 to ensure all appropriate actions are taken and coordinated with actions of the other ERFs if activated.

5.1.7 **IF** it is determined that no EAL is met,
THEN review plant conditions against the criteria of 10 CFR 50.72 for one-hour and four-hour notifications to the NRC (Ref. NUREG-1022).
AND THEN return to EPIP 1.1, Step 5.20.

5.2 Terminating an Emergency

IF conditions have improved where an EAL is no longer met, and it is believed that the plant is stable, i.e., the EAL is not anticipated to be exceeded again,
THEN the emergency may be terminated per EPIP 12.1, WITH THE FOLLOWING CAVEATS:

5.2.1 **IF** Emergency Response Facilities have been activated, or personnel have been called to activate these facilities,
THEN the event shall **NOT** be terminated until the TSC and EOF have been activated, and the TSC Manager concurs with the assessment of plant conditions.

5.2.2 **IF** any General Emergency has been declared, or any Protective Action Recommendation made to or by off-site authorities,
THEN the emergency shall **NOT** be terminated until the NRC (for any General Emergency) and/or off-site authorities (for Protective Action Recommendations) concur.

5.3 Missed Classifications

A missed classification is defined as a set of circumstances or events, which although no longer existing, if recognized at the time of their existence would have resulted in an emergency classification (i.e., met or exceeded an EAL of this procedure). This definition does not include conditions described in EALs which are based on expected plant response which does not occur, but where operator action was successful- such as failure of RPS.

NOTE: **In ALL cases, the SM is vested with unilateral authority to classify an emergency and initiate any actions deemed appropriate to place the plant in a safe condition (per NUREG-0654, II.A.1.d, II.B.2).**

5.3.1 If the missed classification would have been one classification, but current plant conditions warrant a lower classification, the lower classification shall be declared, but parties notified shall be informed of the temporary higher classification during the notification process.

5.3.2 If NO current plant conditions meeting any EAL exist at the time of discovery of the missed classification, the actual declaration of the emergency is not required; however an ENS notification should be made within one hour of the discovery of the undeclared event. Notify the Emergency Preparedness staff to ensure courtesy calls are made to offsite agencies.

6.0 REFERENCES

6.1 Technical Specifications

6.2 Final Safety Analysis Report (FSAR) Chapter 14, Appendix A

6.3 Point Beach Nuclear Plant Emergency Plan

6.4 Point Beach Design Basis Document (DBDs)

6.5 Abnormal Operating Procedures (AOPs)

6.6 Emergency Operating Procedures (EOPs)

6.7 Emergency Contingency Actions (ECAs)

6.8 Critical Safety Procedures (CSPs)

6.9 Point Beach Setpoint Document (STPT)

6.10 Security and Safeguards Contingency Plan

6.11 WCAP 7525-L, Likelihood and Consequences of Turbine Overspeed at the Point Beach Nuclear Plant.

6.12 Reg Guide 1.115, Protection Against Low-Trajectory Turbine Missiles

6.13 EPRI Document, "Guidelines for Nuclear Plant Response to an Earthquake," dated October, 1989

6.14 Probabilistic Safety Assessment - High Winds, and Others Sec 9, Rev 0, Dated July 1995

6.15 Bechtel Corporation, "Westinghouse Electric Corporation-Wisconsin Michigan Power Company-Point Beach Atomic Power Station-Design Criteria for Nuclear Power Plants Against Tornadoes," March 12, 1970, B-TOP-3.

6.16 SOER 85-5, Internal Flooding of Power Plant Buildings

6.17 NUREG/CR-4982, "Severe Accident in Spent Fuel Pools in Support of Generic Safety Issue 82"

6.18 NRC Information Notice 90-08, "Kr-85 Hazards from Decayed Fuel"

6.19 NUREG-1022, Rev. 2, Event Reporting Guidelines 10CFR50.72 and 10CFR50.73.

7.0 BASES

B-1 Code of Federal Regulation, 10 CFR 50

B-2 NUREG-0654/FEMA-REP-1, Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Plants, Revision 1, published November, 1980.

B-3 NUMARC NESP-007, Methodology for Development of Emergency Actions Levels, Revision 2, January 1992.

B-4 U.S. Regulatory Commission Position Paper, Branch Position on Acceptable Deviations to Appendix 1 to NUREG-0654/FEMA-REP-1, dated July 11, 1994.

ATTACHMENT A
EMERGENCY ACTION LEVEL (EAL) OVERVIEW MATRIX

CATEGORY		UNUSUAL EVENT	ALERT	SITE EMERGENCY	GENERAL EMERGENCY
Fission Product Barriers	See Also Attachment C	**1.1.1.1** Reactor coolant sample activity greater than Technical Specification TS 3.4.16. **1.1.2.1** Fuel monitor [(2) RE-109] reading greater than 120 mRem/hr OR 2 of 3 containment high radiation monitors read greater than 1000 R/hr. **1.1.3.1** Primary to secondary leakage greater than Technical Specification Reference TS 3.4.13.c (500 gallons per day for either steam generator) **1.1.4.1** Unisolable primary system leakage greater than Technical Specification Reference TS 3.4.13.b (10 gallons per minute) **1.1.5.1** Excess RCS cooldown OR cold overpressurization of the RCS (ST-4 Integrity Orange path.)	**1.1.1.2** Exceeding the LOSS threshold of either Fuel Clad OR Reactor Coolant System (RCS) barrier based on FPB Matrix (See Attachment C for thresholds). **1.1.2.2** Unisolable steam line break outside containment with greater than 10 gpm, but less than 50 gpm, primary to secondary leakage.	**1.1.1.3** Exceeding the LOSS threshold of any 2 fission product barriers based on FPB Matrix (See Attachment C for thresholds).	**1.1.1.4** Exceeding the LOSS threshold of any 2 fission product barriers AND exceeding the loss or challenge threshold of the 3rd barrier based on FPB Matrix (See Attachment C for thresholds).
System Malfunctions	2.1 Failure to Trip		**2.1.1.2** Failure of the reactor protection system (automatic or manual) to initiate and complete a trip which brings the reactor subcritical	**2.1.1.3** Failure to rapidly bring the reactor subcritical from the Control Room (ST-1 Subcriticality Red Path)	
	2.2 Technical Specification Requirements	**2.2.1.1** Failure to reach Technical Specification required operating mode or condition within the specified time limit of the LCO action statement.			
	2.3 Loss of Indications / Communications	**2.3.1.1** Unplanned loss of most (approximately 75%) safety system annunciators or indications on Control Room Panels for greater than 15 minutes AND Increased monitoring is required for safe plant operation. **2.3.2.1** Loss of all communications capability affecting the ability to either: Perform routine operations. OR Notify offsite agencies or personnel.	**2.3.1.2** Unplanned loss of most (approximately 75%) safety system annunciators or indications on Control Room Panels for greater than 15 minutes AND Increased monitoring is required for safe plant operation. AND either: A significant plant transient in progress. OR Plant Process Computer is unavailable.	**2.3.1.3** Unplanned loss of most (approximately 75%) safety system annunciators or indications on Control Room Panels AND Loss of ability to monitor critical safety function status AND A significant plant transient in progress.	
	2.4 Safety System Performance		**2.4.1.2** Inability to maintain reactor coolant temperature less than or equal to 200°F.	**2.4.1.3** Primary to secondary leakage greater than 400 gpm. AND Inability to power BOTH buses A-05 AND A-06 from offsite sources.	
Electrical Power	3.1 Loss of Vital AC Power	**3.1.1.1** Loss of all offsite AC capability to vital buses as indicated by the inability to power BOTH buses A-05 AND A-06 of a given unit from offsite sources for greater than 15 minutes **3.1.2.1** Loss of all on-site AC power capability to power BOTH buses A-05 AND A-06 of a given unit from onsite sources (GO1 through GO4) for greater than 15 minutes.	**3.1.1.2** Loss of all safeguard bus AC power of a given unit as indicated by the inability to power BOTH buses A-05 AND A-06 OR B-03 AND B-04 AND Loss is for less than 15 minutes.	**3.1.1.3** Loss of all safeguard bus AC power of a given unit as indicated by the inability to power BOTH buses A-05 AND A-06 OR B-03 AND B-04 AND Loss is for greater than 15 minutes	**3.1.1.4** Loss of all safeguard bus AC power of a given unit as indicated by the inability to power BOTH buses A-05 AND A-06 OR B-03 AND B-04 AND Loss is greater than 15 minutes AND Both narrow range S/G level less than [51%] 29% AND total feedwater flow to S/Gs less than 200 gpm (ST-3 Heat Sink Red Path.)
	3.2 Loss of Vital DC Power		**3.2.1.2** Loss of all vital DC power as indicated by less than 105 vdc on all station battery buses (D01, D02, D03, D04) for less than 15 minutes.	**3.2.1.3** Loss of all vital DC power as indicated by less than 105 vdc on all station battery buses (D01, D02, D03, D04) for greater than 15 minutes.	
Radiological	4.1 Off-site Radiological Release	**4.1.1.1** Vent radiation reading(s) exceed the high alarm setpoints for greater than 60 minutes OR Liquid release in excess of alarm setpoints which cannot be isolated	**4.1.1.2** Vent radiation readings exceed ten times the high alarm setpoints for greater than 15 minutes. OR Liquid release in excess of ten times alarm setpoint which cannot be isolated	**4.1.1.3** Release of airborne radioactive material resulting in a dose projection at or beyond the site boundary (by any means) of either: Greater than or equal to 100 mRem Total Effective Dose Equivalent (TEDE) OR Greater than or equal to 500 mRem Committed Dose Equivalent (CDE) Thyroid OR Closed window dose rate exceeding 100 mRem/hr measured at or beyond the site boundary	**4.1.1.4** Release of airborne radioactive material resulting in a dose projection at or beyond the site boundary (by any means) of either: Greater than or equal to 1 Rem Total Effective Dose Equivalent (TEDE). OR Greater than or equal to 5 Rem Committed Dose Equivalent (CDE) Thyroid OR Closed window dose rate exceeding 1Rem/hr measured at or beyond the site boundary
	4.2 In-Plant Radiological Conditions		**4.2.1.2** Loss of control of radioactive material resulting in area radiation exceeding 1000X normal (or expected) levels within the Protected Area. Normal may be determined by trend recorder or other relevant data.		
Internal Events	5.1 Security Threats	**5.1.1.1** Bomb, credible bomb threat, indication of sabotage, or attempted entry into the Protected Area by a hostile force.	**5.1.1.2** Intrusion into the Protected Area by a hostile force.	**5.1.1.3** Intrusion into a plant vital Area by a hostile force.	**5.1.1.4** A Security Event which results in either: Loss of physical control of the Control Room OR Loss of remote shutdown capability.
	5.2 Control Room Habitability		**5.2.1.2** Evacuation of the Control Room has been initiated with control of shutdown systems established from local stations.	**5.2.1.3** Evacuation of the Control Room without establishment of plant control from remote shutdown stations within 15 minutes.	
	5.3 Fire / Explosion	**5.3.1.1** Explosion (sound or pressure) in the Protected Area affecting plant equipment or structures. **5.3.2.1** Fire within the Protected Area lasting more than 10 minutes after use of fire extinguishing equipment.	**5.3.1.2** Explosion affecting operability of one (1) train of safety systems. **5.3.2.2** Fire affecting operability of one (1) train of a safety system.	**5.3.1.3** Explosion affecting operability of two (2) trains of safety systems. **5.3.2.3** Fire affecting operability of two (2) trains of safety systems.	
	5.4 Turbine Rotating Component Failures	**5.4.1.1** Visual confirmation of turbine missile penetration of [1] blade or rotating component casing.			
External Events	6.1 Natural Destructive Phenomena	**6.1.1.1** Any earthquake felt by Control Room Operators. OR An indicator light on two or more of the following Seismic Event Monitors. SEI-6210, #3 Warehouse. SEI-6211, Unit 1 Façade. SEI-6212, Drum Prep Room. SEI-6213, EL 8' between vital switchgear room and Aux Feedwater tunnel. **6.1.2.1** Report by plant personnel that a tornado is within, or has been in, the Protected Area or Switchyard.	**6.1.1.2** Valid Seismic Event Monitor readings of an intensity greater than 0.04g vertical or 0.06g horizontal. **6.1.2.2** Indications or observations that a tornado has damaged a vital structure. OR Sustained winds greater than 90 MPH.	**6.1.1.3** Valid Seismic Event Monitor readings of an intensity greater than 0.06g vertical or 0.12g horizontal. **6.1.2.3** Sustained winds greater than 100 MPH. AND Reports or indications of damage to vital equipment or structures.	
	6.2 High Lake / Low Forebay Water Level	**6.2.1.1** Less than -11' forebay or pump bay level with one unit's CW pumps off. **6.2.2.1** Any flooding which precludes access to the site or areas of the plant.	**6.2.2.2** Flooding as indicated by greater than 6" of water in the 8' elevation of the Turbine Building.	**6.2.2.3** Greater than 2" of water in vital switchgear room OR Greater than 2" of water in auxiliary feedwater pump room.	
	6.3 Toxic / Flammable / Gas Intrusion	**6.3.1.1** A toxic or flammable gas release in or near the Protected Area.	**6.3.1.2** Entry of toxic or flammable gas into a plant building atmosphere affecting operation or access.	**6.3.1.3** Entry of toxic or flammable gas into a plant vital area affecting operation or personnel safety. AND Reactor coolant temperature greater than 200°F.	
	6.4 Vehicle / Missile Impacts	**6.4.1.1** Aircraft crash within the Protected Area or Switchyard.	**6.4.1.2** Aircraft crash affecting operability of one (1) train of a safety system. **6.4.2.2** Any missile impact affecting operability of one (1) train of a safety system.	**6.4.1.3** Aircraft crash affecting operability of two (2) trains of safety systems. **6.4.2.3** Any missile impact affecting operability of two (2) trains of safety systems.	
Fuel Handling/ISFSI Events	7.1 Fuel Handling Events		**7.1.1.2** Report of possible damage to irradiated fuel combined with an alarm on any of the following radiation monitors: RE-211, Containment air particulate monitor. RE-212 Containment noble gas monitor RE-221 Drumming Area Vent. Manipulator Area Monitor. Spent Fuel Bridge Area Monitor		
	7.2 Irradiated Fuel Events		**7.2.1.2** Indications of irradiated fuel uncovered		
	7.3 ISFSI Events	**7.3.1.1** A loaded spent fuel cask dropped or tipped	**7.3.1.2** Breach of a loaded spent fuel cask as indicated by a reading greater than 1000 mr/hr at 1 meter.		
Judgment		**8.1.1.1** Any event which in the judgement of the Shift Manager or the Emergency Director could lead to, or has led to, a potential degradation of the level of safety of the plant.	**8.1.1.2** Any event which in the judgement of the Shift Manager or the Emergency Director could cause or has caused actual or potential substantial degradation of the level of safety of the plant.	**8.1.1.3** Any event which in the judgement of the Shift Manager or the Emergency Director could indicate actual or likely major failures of plant functions needed to protect the public. Any releases are not expected to result in exposures in excess of EPA PAGs.	**8.1.1.4** Any event which in the judgement of the Shift Manager or the Emergency Director could lead to actual or imminent core damage and the potential for a large release of radioactive material (in excess of EPA PAGs) outside the site boundary.

ATTACHMENT B
EMERGENCY ACTION LEVELS (EALs)

Category: Fission Product Barriers

EAL 1.1.1.1

Sub-Category: None

Emergency Classification: **UNUSUAL EVENT**

Emergency Action Level:

Reactor coolant sample activity greater than Technical Specification TS 3.4.16.

Basis:

This EAL is related to a Fission Product Barrier challenge. See Attachment C for additional information.

Elevated reactor coolant activity represents a potential degradation in the level of safety of the plant and is a potential precursor of more serious problems. This EAL addresses reactor coolant samples exceeding coolant Technical Specifications.

Technical Specifications allow exceeding normal coolant activities for limited time periods. This EAL does not apply while operating within these allowances.

Because RCS leakage and coolant activity are considered precursors to more serious events, and because they should be treated alike (each relating to a Fission Product Barrier) declaration shall be upon validation and shall **NOT** be delayed until Technical Specification's actions are taken.

References:

NUREG 0654, Appendix 1 Initiating Condition: Unusual Event 3b

ATTACHMENT B
EMERGENCY ACTION LEVELS (EALs)

Category: Fission Product Barriers

EAL 1.1.1.2

Sub-Category: Loss of One Barrier

Emergency Classification: **ALERT**

Emergency Action Level:

Exceeding the LOSS threshold of either Fuel Clad OR Reactor Coolant System (RCS) barrier based on FPB Matrix (See Attachment C for thresholds).

Basis:

This Fission Product Barrier (FPB) EAL refers to exceeding the LOSS threshold of either the Fuel Cladding or Reactor Coolant System barrier by comparing plant conditions to the thresholds outlined in the FPB Matrix (Attachment C).

The FPB Matrix LOSS criteria indicate values at which either the Fuel Cladding or RCS barrier has been breached to the point that it no longer serves as an effective barrier to the travel of fission products. This value is not intended to represent total loss, however one of these two essential barriers is no longer serving its function. A substantial reduction in the level of safety at the plant exists, therefore an Alert classification is appropriate.

Loss of the Containment barrier (by itself) does not create an immediate transport of fission products as the Containment is designed to be a backup to the cladding and RCS barriers. Therefore, if only the Containment barrier is lost, it will be dealt with by Technical Specification action statements. However, if either the Fuel Cladding or RCS barrier is lost, the Containment barrier will be considered at the same level as these.

References:

NEI 97-03 Rev. 2

NUREG 0654, Appendix 1 Initiating Condition: Alert 1b,1c, 5

ATTACHMENT B
EMERGENCY ACTION LEVELS (EALs)

Category: Fission Product Barriers

EAL 1.1.1.3

Sub-Category: Loss of Two Barriers

Emergency Classification: **SITE EMERGENCY**

Emergency Action Level:

Exceeding the LOSS threshold of any 2 fission product barriers based on FPB Matrix (See Attachment C for thresholds).

Basis:

This Fission Product Barrier (FPB) EAL refers to exceeding the LOSS threshold of any two of the three fission product barriers; fuel cladding, reactor coolant system, or containment by comparing plant conditions to the thresholds outlined in the FPB Matrix (Attachment C).

The third barrier must remain INTACT. If challenged or lost, a General Emergency exists.

The FPB Matrix LOSS criteria indicate values at which barriers have been breached to the point that they no longer serve as effective barriers to the travel of fission products. These values are not intended to represent total loss, however two important barriers are no longer serving their function. This represents a major failure in plant systems needed to protect the public, therefore a Site Emergency classification is appropriate.

References:

NEI 97-03

NUREG 0654, Appendix 1 Initiating Condition: Site Emergency 5

ATTACHMENT B
EMERGENCY ACTION LEVELS (EALs)

Category: Fission Product Barriers

EAL 1.1.1.4

Sub-Category: Loss of Three Barriers

Emergency Classification: **GENERAL EMERGENCY**

Emergency Action Level:

Exceeding the LOSS threshold of any 2 fission product barriers AND exceeding the loss OR challenge threshold of the 3rd barrier based on the FPB Matrix (See Attachment C for thresholds).

Basis:

This Fission Product Barrier (FPB) EAL refers to exceeding the LOSS threshold of any TWO of the three fission product barriers; fuel cladding, reactor coolant system, or containment AND also exceeding EITHER the loss OR challenge threshold on the third barrier by comparing plant conditions to the thresholds outlined in the FPB Matrix (Attachment C).

The FPB Matrix LOSS criteria indicate values at which barriers have been breached to the point that they no longer serve as effective barriers to the travel of fission products. These values are not intended to represent total loss, however the barriers are no longer serving their function. The loss of two and a loss or challenge of the third available barrier represents major failures to plant systems needed to protect the public with the actual or potential release of significant amounts of radioactive materials offsite, therefore a General Emergency classification is appropriate.

References:

NEI 97-03 Rev.2

NUREG 0654, Appendix 1 Initiating Condition: General Emergency 2

ATTACHMENT B
EMERGENCY ACTION LEVELS (EALs)

Category: Fission Product Barriers

EAL 1.1.2.1

Sub-Category: None

Emergency Classification : **UNUSUAL EVENT**

Emergency Action Level:

Failed fuel monitor [1(2) RE-109] reading greater than 120 mRem/hr, or 2 of 3 containment high range monitors read greater than 1000 Rem/hr.

Basis:

This EAL is related to a Fission Product Barrier challenge. See Attachment C for additional information.

Other indications should accompany this indication, such as increased radiation on RE-106 or on hand-held instruments.

Elevated reactor coolant activity as indicated by the failed fuel monitor [1(2) RE-109] represents a potential degradation in the level of safety of the plant and is a potential precursor of more serious problems. This EAL addresses failed fuel monitor readings exceeding approximately 0.1% fuel clad failures.

Because RCS leakage and coolant activity are considered precursors to more serious events, and because they should be treated alike (each relating to a Fission Product Barrier) declaration shall be upon validation and shall **NOT** be delayed until Technical Specification's actions are taken.

References:

NUREG 0654, Appendix 1 Initiating Condition: Unusual Event 3c

ATTACHMENT B
EMERGENCY ACTION LEVELS (EALs)

Category: Fission Product Barriers

EAL 1.1.2.2

Sub-Category: Loss of One Barrier

Emergency Classification: **ALERT**

Emergency Action Level:

Unisolable steam line break outside containment with greater than 10 gpm , but less than 50 gpm, primary to secondary leakage.

Basis:

This EAL reflects a unique Initiating Condition from NUREG-0654. It does not meet the loss of one barrier criteria from Attachment C (Fission Product Barrier matrix), yet will be classified as an Alert.

Because an unisolable steam line break is evaluated under the *Containment* section of the Fission Product Barrier matrix, it would not result in an Alert by itself. Because the primary to secondary leakage rate (10 gpm) is less than the LOSS criteria for RCS, it would not result in an Alert. The 10 gpm *does* meet the CHALLENGE criteria therefore is an Unusual Event. However, there is no logic in the FPB matrix for combinations of LOSS of Containment with CHALLENGE of another barrier.

Due to the unique, specific criteria of NUREG-0654, Appendix 1 criteria, this EAL covers the unique condition of an unisolable steam line break, combined with a small primary to secondary leak.

If the steam line can be isolated, no emergency is warranted. If the steam line cannot be isolated, and the other Fission Product Barriers are INTACT (No leakage, or leakage below 10 gpm) then no emergency is applicable UNLESS the SM determines a potential degradation in the level of safety.

If the steam line cannot be isolated AND primary to secondary leakage is greater than 10 gpm, but less than 50 gpm, then this EAL applies and an Alert must be declared.

If the primary to secondary leak rate exceeds 50 gpm, then the LOSS criteria for RCS Fission Product Barrier has been met. This would constitute LOSS of two barriers, and would be a Site Emergency on EAL 1.1.1.3.

References:

NEI 97-03 Rev. 2

NUREG 0654, Appendix 1 Initiating Condition: Alert 4

ATTACHMENT B
EMERGENCY ACTION LEVELS (EALs)

Category: Fission Product Barriers

EAL 1.1.3.1

Sub-Category: None

Emergency Classification: **UNUSUAL EVENT**

Emergency Action Level:

Primary to secondary leakage greater than Technical Specification Reference TS 3.4.13.d (500 gallons per day in either steam generator).

Basis:

This EAL is related to a Fission Product Barrier challenge. See Attachment C for additional information.

Leakage from the RCS in excess of Technical Specifications is considered by the NRC to be a precursor to more serious events. Therefore, an Unusual Event must be declared even if Technical Specification actions are taken.

Because RCS leakage and coolant activity are considered precursors to more serious events, and because they should be treated alike (each relating to a Fission Product Barrier) declaration shall be upon validation and shall **NOT** be delayed until Technical Specification's actions are taken.

References:

NUREG 0654, Appendix 1 Initiating Condition: Unusual Event 5

ATTACHMENT B
EMERGENCY ACTION LEVELS (EALs)

Category: Fission Product Barriers

EAL 1.1.4.1

Sub-Category: None

Emergency Classification: **UNUSUAL EVENT**

Emergency Action Level:

Unisolable primary system leakage greater than Technical Specification Reference TS 3.4.13.c (10 gallons per minute).

Basis:

This EAL is related to a Fission Product Barrier challenge. See Attachment C for additional information.

Leakage from RCS in excess of Technical Specifications which cannot be isolated is considered by the NRC to be a precursor to more serious events. Therefore, an Unusual Event must be declared even if Technical Specification actions are taken.

Because RCS leakage and coolant activity are considered precursors to more serious events, and because they should be treated alike (each relating to a Fission Product Barrier) declaration shall be upon validation and shall **NOT** be delayed until Technical Specification's actions are taken.

References:

PBNP Technical Specifications

NUREG 0654, Appendix 1 Initiating Condition: Unusual Event 5

ATTACHMENT B
EMERGENCY ACTION LEVELS (EALs)

Category: Fission Product Barriers

EAL 1.1.5.1

Sub-Category: None

Emergency Classification: **UNUSUAL EVENT**

Emergency Action Level:

Excess RCS cooldown or cold overpressurization of the RCS (ST-4 Integrity Orange path)

Basis:

The following conditions meet ST-4 Integrity - Orange Path criteria. A challenge to the RCS barrier is present due to excessive cooldown or cold overpressurization as indicated below:

Decrease in temperature in either cold leg greater than 100°F in the last 60 minutes AND temperature in either cold leg less than 315°F.

OR

Temperature in either cold leg less than 315°F and RCS pressure greater than 425 psig.

Any actual loss of RCS barrier warrants declaration of an Alert per the FPB matrix, Attachment C.

References:

NUREG 0654, Appendix 1 Initiating Condition: Unusual Event 17

ATTACHMENT B
EMERGENCY ACTION LEVELS (EALs)

Category: System Malfunctions

EAL 2.1.1.2

Sub-Category: Failure to Trip

Emergency Classification: **ALERT**

Emergency Action Level:

Failure of the reactor protection system(automatic or manual) to initiate and complete a trip which brings the reactor subcritical.

Basis:

The reactor protection system may be actuated either by automatic means (exceeding pre-determined thresholds which result in trip signals) or by operator action (manual trip).

The failure of EITHER of these means to cause a trip with subsequent subcriticality meets this EAL (an Alert).

If BOTH these means AND all other means from the Control Room fail, see EAL 2.1.1.3 (a Site Emergency).

References:

NUREG 0654, Appendix 1 Initiating Condition: Alert 11

ATTACHMENT B
EMERGENCY ACTION LEVELS (EALs)

Category: System Malfunctions

EAL 2.1.1.3

Sub-Category: Failure to Trip

Emergency Classification: **SITE EMERGENCY**

Emergency Action Level:

Failure to rapidly bring the reactor subcritical from the Control Room. (ST-1 Subcriticality Red Path)

Basis:

CSFST Subcriticality - RED path is entered based on failure of power range indication (N-41, N-42, N-43, N-44) to decrease below 5% following a reactor trip. This EAL addresses any manual trip or automatic trip signal followed by a manual trip or other Control Room actions which fail to rapidly shut down the reactor.

If any actions must be taken outside the Control Room to effect a reactor trip this EAL is also met.

This condition indicates failure of both the automatic and manual protection systems to trip the reactor, to an extent that emergency boration is required: or actions are needed outside the Control Room to trip the reactor. The failure of both front line and backup protection systems to function in response to a plant transient, along with the continued production of heat, poses a direct threat to fuel clad and RCS integrity and thus warrants declaration of a Site Emergency.

This EAL is synonymous with entry into CSP S-1.

References:

NUREG 0654, Appendix 1 Initiating Condition: Site Emergency 9

ATTACHMENT B
EMERGENCY ACTION LEVELS (EALs)

Category: System Malfunctions

EAL 2.2.1.1

Sub-Category: Technical Specification Requirements

Emergency Classification: **UNUSUAL EVENT**

Emergency Action Level:

Failure to reach Technical Specification required operating mode or condition within the specified time limit of the LCO action statement.

Basis:

Limiting Conditions of Operation (LCOs) action statements require the plant to be brought to a required condition (often shutdown) when the Technical Specification required configuration cannot be restored. Depending on the circumstances, this may or may not be an emergency or precursor to a more severe condition. In any case, the initiation of plant shutdown required by the site Technical Specification requires a four hour report under 10 CFR 50.72 (b) non-emergency events. The plant remains within its evaluated safety envelope while changing conditions or being shut down so long as it is accomplished within the completion time for the required action in the Technical Specifications.

An immediate Unusual Event is required when the plant is not brought to the required operating mode or condition within the allowable action statement time of the Technical Specifications. Declaration of an Unusual Event is based on the time at which the LCO-specified action statement time period elapses under the site Technical Specifications and is not related to how long a condition may have existed.

If a Notice of Enforcement Discretion (NOED) is approved by the NRC prior to the LCO action statement time expiration an emergency need not be declared.

References:

NUREG 0654, Appendix 1 Initiating Condition: Unusual Event 15

ATTACHMENT B
EMERGENCY ACTION LEVELS (EALs)

Category: System Malfunctions

EAL 2.3.1.1

Sub-Category: Loss of Indications/Communications

Emergency Classification: **UNUSUAL EVENT**

Emergency Action Level:

Unplanned loss of most (approximately 75%) safety system annunciators or indications on Control Room Panels for greater than 15 minutes AND increased monitoring is required for safe plant operation.

Basis:

This EAL recognizes the difficulty associated with monitoring changing plant conditions without the use of a major portion of the annunciation or indication equipment. Recognition of the normal availability of computer based indication equipment is considered.

"Unplanned" loss of annunciators or indicators excludes scheduled maintenance and testing activities, which should not disable such large portions of the system(s).

It is not intended that personnel perform a count of the instrumentation or annunciation lost but use the judgment of the SM as the threshold for determining the severity of the plant condition. The increased monitoring portion of this EAL is met if the SM determines that additional personnel are required to provide increased monitoring of system operation to safely operate the plant.

It is recognized that most plant designs provide redundant safety system indication powered from separate uninterruptible power supplies. While failure of a large portion of annunciators is more likely than a failure of a large portion of indications, the concern is included in this EAL due to difficulty associated with assessment of plant conditions. The loss of specific safety system indicators should remain a function of that specific system or component operability status, and is addressed by the specific Technical Specifications.

Safety systems as used here designates systems with safety-related functions. Attachment D lists safety systems and systems with safety-related functions.

Fifteen minutes was selected as a threshold to exclude transient or momentary losses.

References:

NUREG 0654, Appendix 1 Initiating Condition: Unusual Event 14

ATTACHMENT B
EMERGENCY ACTION LEVELS (EALs)

Category: System Malfunctions

EAL 2.3.1.2

Sub-Category: Loss of Indications/Communications

Emergency Classification: **ALERT**

Emergency Action Level:

Unplanned loss of most (approximately 75%) safety system annunciators or indications on Control Room Panels for greater than 15 minutes
AND
Increased monitoring is required for safe plant operation
AND either:
A significant plant transient is in progress
OR
PPCS is unavailable.

Basis:

This EAL recognizes the difficulty associated with monitoring changing plant conditions without the use of a major portion of the annunciation or indication equipment during a transient. Recognition of the normal availability of computer based indication equipment is also considered.

"Unplanned" loss of annunciators or indicators excludes scheduled maintenance and testing activities, which should not disable such large portions of the system(s).

Safety systems as used here designates systems with safety-related functions. Attachment D lists safety systems and systems with safety-related functions.

It is not intended that personnel perform a count of the instrumentation or annunciation lost but the use the judgment of the SM as the threshold for determining the severity of the plant conditions. The increased monitoring portion of this EAL is met if the SM determines that additional personnel are required to provide increased monitoring of system operation to safely operate the plant.

It is recognized that most plant designs provide redundant safety system indication powered from separate uninterruptible power supplies. While failure of a large portion of annunciators is more likely than a failure of a large portion of indications, the concern is included in this EAL due to difficulty associated with assessment of plant conditions. The loss of specific, or several, safety system indicators should remain a function of that specific system or component operability status and is addressed by the specific Technical Specifications.

ATTACHMENT B
EMERGENCY ACTION LEVELS (EALs)

"Significant transient" includes response to automatic or manually initiated functions such as trips, runbacks involving greater than 25% thermal power change, ECCS injections, or thermal power ramps of 10% or greater.

If both a major portion of the annunciation system and all computer monitoring is unavailable to the extent that additional personnel are required to monitor indications, the Alert is required. If the operating crew cannot monitor the transient in progress this will be escalated to a Site Emergency.

References:

NUREG 0654, Appendix 1 Initiating Condition: Alert 14

ATTACHMENT B
EMERGENCY ACTION LEVELS (EALs)

Category: System Malfunctions

EAL 2.3.1.3

Sub-Category: Loss of Indications/Communications

Emergency Classification: **SITE EMERGENCY**

Emergency Action Level:

Unplanned loss of most (approx. 75%) safety system annunciators or indications on Control Room Panels.
AND
Loss of ability to monitor critical safety function status
AND
A significant plant transient in progress.

Basis:

This EAL recognizes the INABILITY of the Control Room staff to monitor the plant response to a transient. A Site Emergency is considered to exist if the Control Room staff cannot monitor safety functions needed for protection of the public.

"Significant transient" includes response to automatic or manually initiated functions such as trips, runbacks involving greater than 25% thermal power change, ECCS injections, or thermal power ramps of 10% or greater.

Safety systems as used here designates systems with safety-related functions. Attachment D lists safety systems and systems with safety-related functions.

"Unplanned" loss of annunciators or indicators excludes scheduled maintenance and testing activities, which should not disable such large portions of the system(s).

References:

NUREG 0654, Appendix 1 Initiating Condition: Site Emergency 12

ATTACHMENT B
EMERGENCY ACTION LEVELS (EALs)

Category: System Malfunctions

EAL 2.3.2.1

Sub-Category: Loss of Indications/Communications

Emergency Classification: **UNUSUAL EVENT**

Emergency Action Level:

Loss of all communications capability affecting the ability to either:
Perform routine operations
OR
Notify offsite agencies or personnel.

Basis:

The purpose of this EAL is to recognize a loss of communications capability that EITHER defeats the plant operation's or staff's ability to perform routine tasks necessary for plant operations OR the ability to communicate problems with offsite authorities. The loss of offsite communications ability anticipated by this EAL is expected to be significantly more comprehensive than the condition addressed by 10 CFR 50.72.

The onsite communications loss must encompass the loss of all means of routine communications (i.e., plant telephone system, Gaitronics page system, portable radios).

The offsite communications loss must encompass the loss of all means of communications with offsite authorities. This should include Emergency Notification System (ENS) for NRC, Microwave lines, and radio. This EAL is also met when extraordinary means are being utilized to make communications possible (relaying of information from radio transmissions, individuals being sent to offsite locations, etc.).

Procedure DCS 2.1.1 describes lesser communications losses which must be reported to the NRC within eight hours.

References:

NUREG 0654, Appendix 1 Initiating Condition: Unusual Event 11

ATTACHMENT B
EMERGENCY ACTION LEVELS (EALs)

Category: System Malfunctions

EAL 2.4.1.2

Sub-Category: Degradation of Safety System Performance

Emergency Classification: **ALERT**

Emergency Action Level:

Inability to maintain reactor coolant temperature less than or equal to 200°F.

Basis:

This EAL addresses complete loss of functions required for core cooling during refueling and cold shutdown modes. Escalation to Site Emergency or General Emergency would be through other EALs.

An uncontrollable reactor coolant temperature increase that approaches or exceeds the cold shutdown technical specification limit warrants declaration of an Alert. The concern of this EAL is the loss of control resulting in the loss of ability to maintain the plant in cold shutdown which is defined by reactor coolant temperature.

References:

NUREG 0654, Appendix 1 Initiating Condition: Alert 10

ATTACHMENT B
EMERGENCY ACTION LEVELS (EALs)

Category: System Malfunctions

EAL 2.4.1.3

Sub-Category: Degradation of Safety System Performance

Emergency Classification: **SITE EMERGENCY**

Emergency Action Level:

Primary to secondary leakage greater than 400 gallons per minute
AND
Inability to power BOTH buses A-05 AND A-06 from offsite sources.

Basis:

400 gpm is also the expected output from a single SI pump @ 1400 psia RCS pressure. (See DBD-09).

Loss of offsite power combined with an RCS leak (from Primary to Secondary) of this magnitude constitute several major challenges to the protection of the public:

1. Operating on diesel generators.

2. Leak (rupture) near the capacity of a single Safety Injection pump.

3. Transport of any fission products from Primary to Secondary.

Therefore, major plant functions needed for the protection of the public have been affected. A Site Emergency is warranted.

References:

NUREG 0654, Appendix 1 Initiating Condition: Site Emergency 3

ATTACHMENT B
EMERGENCY ACTION LEVELS (EALs)

Category: Loss of Electrical Power

EAL 3.1.1.1

Sub-Category: Loss of Vital AC Power

Emergency Classification: **UNUSUAL EVENT**

Emergency Action Level:

Loss of all offsite AC capability to vital buses as indicated by the inability to power BOTH buses A-05 AND A-06 of a given unit from offsite sources for greater than 15 minutes.

Basis:

Prolonged loss of offsite AC power reduces required redundancy and potentially degrades the level of safety of the plant by rendering the plant more vulnerable to a complete loss of AC power (station blackout). Fifteen minutes was selected as a threshold to exclude transient or momentary power losses.

Therefore, this condition (which is indicative of degraded conditions, but with no adverse consequences on the public health and safety) is classified as an UNUSUAL EVENT.

If primary to secondary leakage also exists, see EAL 2.4.1.3.

References:

FSAR Section 8, Electrical Systems

DBD-22, 4160 VAC System

NUREG 0654, Appendix 1 Initiating Condition: Unusual Event 7a

ATTACHMENT B
EMERGENCY ACTION LEVELS (EALs)

Category: Loss of Electrical Power

EAL 3.1.1.2

Sub-Category: Loss of Vital AC Power

Emergency Classification: **ALERT**

Emergency Action Level:

Loss of all safeguard bus AC power of a given unit as indicated by the inability to power BOTH buses A-05 AND A-06, OR B-03 AND B-04.
AND
Loss is for less than 15 minutes.

Basis:

Loss of all AC power safeguards buses compromises critical plant safety functions including RHR, ECCS, containment heat removal, and maintaining the ultimate heat sink. Prolonged loss of all AC power safeguards buses may result in uncovering the core and loss of containment integrity, thus this event can escalate to a General Emergency. The site blackout coping analysis assumes that AC power can be restored in one hour.

This condition is entered when there are indications of a total loss of power to the safeguards buses A-05 and A-06 OR B-03 and B-04 from any source (on or off-site) for less than 15 minutes.

This condition is indicative of actual or potential substantial degradation to plant systems with possible adverse consequences on the public health and safety. An ALERT is warranted and must be declared.

This EAL escalates to a SITE EMERGENCY if loss of AC power continues for greater than 15 minutes.

References:

FSAR Section 8, Electrical Systems

DBD-22, 4160 VAC System

NUREG 0654, Appendix 1 Initiating Condition: Alert 7

ATTACHMENT B
EMERGENCY ACTION LEVELS (EALs)

Category: Loss of Electrical Power

EAL 3.1.1.3

Sub-Category: Loss of Vital AC Power

Emergency Classification: **SITE EMERGENCY**

Emergency Action Level:

Loss of all safeguard bus AC power of a given unit as indicated by the inability to power BOTH buses A-05 AND A-06, OR B-03 AND B-04.
AND
Loss is for greater than 15 minutes.

Basis:

Loss of all AC power safeguards buses compromises critical plant safety functions including RHR, ECCS, containment heat removal, and maintaining the ultimate heat sink. Prolonged loss of all AC power safeguards buses may result in the uncovering core and loss of containment integrity, thus this event can escalate to a General Emergency. The site blackout coping analysis assumes that AC power can be restored in one hour.

This condition is entered when there are indications of a total loss of power to the safeguards buses A-05 and A-06 OR B-03 and B-04 from any source (on or off-site) for more than 15 minutes.

Therefore, this condition (which is indicative of serious plant system conditions with adverse consequences on the public health and safety) is classified as a SITE EMERGENCY.

References:

FSAR Section 8, Electrical Systems

DBD-22, 4160 VAC System

NUREG 0654, Appendix 1 Initiating Condition: Site Emergency 6

ATTACHMENT B
EMERGENCY ACTION LEVELS (EALs)

Category: Loss of Electrical Power

EAL 3.1.1.4

Sub-Category: Loss of Vital AC Power

Emergency Classification: **GENERAL EMERGENCY**

Emergency Action Level:

Loss of all safeguard bus AC power of a given unit as indicated by the inability to power BOTH buses A-05 AND A-06, OR B-03 AND B-04.
AND
Loss is greater than 15 minutes.
AND
Both narrow range S/G level less than [51%] 29% AND total feedwater flow to S/Gs less than 200 gpm. (ST-3 Heat Sink Red path)

Basis:

Loss of all AC power safeguards buses compromises critical plant safety functions including RHR, ECCS, containment heat removal, and maintaining the ultimate heat sink. Prolonged loss of all AC power safeguards buses may result in the uncovering core and loss of containment integrity, thus this event can escalate to a General Emergency. The site blackout coping analysis assumes that AC power can be restored in one hour.

This EAL assures that in the event of a prolonged station blackout, timely recognition of the loss of heat sink occurs.

Therefore, this condition is indicative of grave plant conditions with potential adverse consequences on the public health and safety. A GENERAL EMERGENCY is warranted and must be declared.

References:

FSAR Section 8, Electrical Systems

DBD-22, 4160 VAC System

NUREG 0654, Appendix 1 Initiating Condition: General Emergency 5d

ATTACHMENT B
EMERGENCY ACTION LEVELS (EALs)

Category: Loss of Electrical Power

EAL 3.1.2.1

Sub-Category: Loss of Vital AC Power

Emergency Classification: **UNUSUAL EVENT**

Emergency Action Level:

Loss of all onsite AC power capability to power BOTH buses A-05 AND A-06 of a given unit from onsite sources (GO1 through GO4) for greater than 15 minutes.

Basis:

Loss of onsite safety related AC power sources reduces required redundancy and potentially degrades the level of safety of the plant by rendering the plant more vulnerable to a complete loss of AC power (station blackout). Therefore, an Unusual Event is warranted and must be declared. Fifteen minutes was selected as a threshold to exclude transient losses.

This condition is entered when there are indications of the unavailability of all the emergency diesel generators (GO1 through GO4) or that none of these sources can be aligned to either A-05 or A-06 for greater than 15 minutes.

Therefore, this condition (which is indicative of degraded conditions, but with no adverse consequences on the public health and safety) is classified as an Unusual Event.

References:

FSAR Section 8, Electrical Systems

DBD-22, 4160 VAC System

NUREG 0654, Appendix 1 Initiating Condition: Unusual Event 7b

ATTACHMENT B
EMERGENCY ACTION LEVELS (EALs)

Category: Loss of Electrical Power

EAL 3.2.1.2

Sub-Category: Loss of Vital DC Power

Emergency Classification: **ALERT**

Emergency Action Level:

Loss of all vital DC power as indicated by less than 105 vdc on all station battery buses (D01, D02, D03, D04) for less than 15 minutes.

Basis:

Loss of all vital DC power compromises the ability to monitor and control plant safety functions. Prolonged loss of all DC power may result in uncovering the core and loss of containment integrity.

Loss of DC power to any AC bus creates the following conditions:

1. Associated breakers cannot be electrically opened or closed remotely or locally;

2. Electrical protection/interlock tripping of associated breakers is rendered inoperable including undervoltage stripping. The one exception is the 480 V individual breaker overloads which remain operable;

3. All associated breaker positions remain AS IS.

Loss of all vital onsite DC power may also be indicated by an "Annunciator Power Failure" alarm.

This EAL escalates to a SITE EMERGENCY if the power loss continues for greater than 15 minutes.

References:

FSAR Section 8, Electrical Systems

DBD-19, 125 VDC System

NUREG 0654, Appendix 1 Initiating Condition: Alert 8

ATTACHMENT B
EMERGENCY ACTION LEVELS (EALs)

Category: Loss of Electrical Power

EAL 3.2.1.3

Sub-Category: Loss of Vital DC Power

Emergency Classification: **SITE EMERGENCY**

Emergency Action Level:

Loss of all vital DC power as indicated by less than 105 vdc on all station battery buses (D01, D02, D03, D04) for greater than 15 minutes.

Basis:

Loss of all vital DC power compromises the ability to monitor and control plant safety functions. Prolonged loss of all DC power may result in uncovering the core and loss of containment integrity.

Loss of DC power to any AC bus creates the following conditions:

1. Associated breakers cannot be electrically opened or closed remotely or locally;

2. Electrical protection/interlock tripping of associated breakers is rendered inoperable including undervoltage stripping. The one exception is the 480 V individual breaker overloads which remain operable.

3. All associated breaker positions remain AS IS.

Loss of all vital onsite DC power may also be indicated by an "Annunciator Power Failure" alarm.

This condition (which is indicative of possible loss of control of the reactor coolant and containment barriers, with possible adverse consequences on the public health and safety) is classified as a SITE EMERGENCY.

References:

FSAR Section 8, Electrical Systems

DBD-19, 125 VDC System

NUREG 0654, Appendix 1 Initiating Condition: Site Emergency 7

ATTACHMENT B
EMERGENCY ACTION LEVELS (EALs)

Category: Radiological Conditions

EAL 4.1.1.1

Sub-Category: Off-site Radiological Release

Emergency Classification: **UNUSUAL EVENT**

Emergency Action Level:

Vent radiation reading(s) exceed the high alarm setpoints for greater than 60 minutes,
OR
Liquid release in excess of alarm setpoints which cannot be isolated.

Vent Radiation High Alarm Setpoints 9/99		Reference RMSARB for current setpoint values
1 RE 212	2.73 E-4 uCi/cc	if purging, 1.62E-2 if forced vent.
1 RE 215	2.71 E+0 uCi/cc	
RE 214	1.02 E–4 uCi/cc	
RE 221	1.58 E-4 uCi/cc	
RE 224	2.09 E-3 uCi/cc	
RE 225	1.36 E+0 uCi/cc	
2 RE 212	1.78 E-4 uCi/cc	if purging, 1.82E-2 if forced vent.
2 RE 215	2.71 E + 0 uCi/cc	

Liquid Release Limits		
Service Water Discharge 1(2) RE-229 **High Alarm AND:**		**Waste Water** Effluent RE-230 **High Alarm AND:**
1 Circ. Water pump **AND:**	**Release Limit** (uCi/cc):	**1** Circ. Water pump **Release Limit** (uCi/cc):
2 Service Water pumps	4.12 E-5	3.70 E-4
3 Service Water pumps	3.27 E-5	
4 Service Water pumps	3.03 E-5	
5 Service Water pumps	2.87 E-5	
6 Service Water pumps	2.78 E-5	
2 Circ. Water pump **AND:**	**Release Limit** (uCi/cc):	**2** Circ. Water pump **Release Limit** (uCi/cc):
2 Service Water pumps	7.00 E-5	6.29 E-4
3 Service Water pumps	5.56 E-5	
4 Service Water pumps	5.15 E-5	
5 Service Water pumps	4.88 E-5	
6 Service Water pumps	4.73 E-5	

Reference:
C.H. Onesti to G.J. Maxfield, 11/17/92, RE-229 and RE-230 Alarm Setpoints, NPM 92-1035.

ATTACHMENT B
EMERGENCY ACTION LEVELS (EALs)

Basis:

Unplanned airborne releases in excess of the site technical specifications, that cannot be reduced to within technical specifications within 60 minutes, represent an uncontrolled situation and hence, a potential degradation in the level of safety. The final integrated dose (which is very low in the Unusual Event emergency class) is not the primary concern here; it is the degradation in plant control implied by the fact that the release was not controlled to within Technical Specification limits within 60 minutes.

Therefore, it is not intended that the release be averaged over 60 minutes. For example, a release of 2 times Technical Specifications for 30 minutes, but which is terminated, does not exceed this EAL. However, the SM should not wait until 60 minutes has elapsed, but should declare the event as soon as it is determined that the release duration has or will likely exceed 60 minutes.

Likewise, liquid release values (which would result in very low integrated dose) are not the primary concern. Rather, the fact that the release cannot be isolated represents a potential degradation in the level of safety.

References:

STPT 13.4, Effluent Monitors

NUREG 0654, Appendix 1 Initiating Condition: Unusual Event 2

ATTACHMENT B
EMERGENCY ACTION LEVELS (EALs)

Category: Radiological Conditions

EAL 4.1.1.2

Sub-Category: Off-site Radiological Release

Emergency Classification: **ALERT**

Emergency Action Level:

Vent radiation readings exceed ten times the high alarm setpoints for greater than 15 minutes.
OR
Liquid release in excess of ten times alarm setpoint which cannot be isolated.

10 times Vent Radiation High Alarm Setpoints 9/99		Reference RMSARB for current setpoint values
1 RE 212	2.73 E-3 uCi/cc	if purging, 1.62E-1 if forced vent
1 RE 215	2.71 E+1 uCi/cc	
RE 214	1.02 E–3 uCi/cc	
RE 221	1.58 E-3 uCi/cc	
RE 224	2.09 E-2 uCi/cc	
RE 225	1.36 E+1 uCi/cc	
2 RE 212	1.78 E-3 uCi/cc	if purging, 1.82E-1 if forced vent
2 RE 215	2.71 E+1 uCi/cc	

Liquid Release Limits		
Service Water Discharge 1(2) RE-229 **High Alarm AND:**		**Waste Water** Effluent RE-230 **High Alarm AND:**
1 Circ. Water pump **AND:**	**Ten times Release Limit** (uCi/cc):	1 Circ. Water pump **Ten times Release Limit** (uCi/cc): 3.70 E-3
2 Service Water pumps	4.12 E-4	
3 Service Water pumps	3.27 E-4	
4 Service Water pumps	3.03 E-4	
5 Service Water pumps	2.87 E-4	
6 Service Water pumps	2.78 E-4	
2 Circ. Water pump **AND:**	**Ten times Release Limit** (uCi/cc):	2 Circ. Water pump **Ten times Release Limit** (uCi/cc): 6.29 E-3
2 Service Water pumps	7.00 E-4	
3 Service Water pumps	5.56 E-4	
4 Service Water pumps	5.15 E-4	
5 Service Water pumps	4.88 E-4	
6 Service Water pumps	4.73 E-4	

Reference:
C.H. Onesti to G.J. Maxfield, 11/17/92, RE-229 and RE-230 Alarm Setpoints, NPM 92-1035.

ATTACHMENT B
EMERGENCY ACTION LEVELS (EALs)

Basis:

Release rates in excess of ten times technical specifications which continue for 15 minutes or longer represent a serious situation. Ideally, most releases will begin small, then increase, hence will progress through the Unusual Event classification, allowing time to stop or mitigate them. Assuming this is the case, significant time has passed during which attempts to reduce or terminate the release have failed. Therefore the required release duration for meeting this EAL was reduced to 15 minutes in recognition of the increased severity.

The final integrated dose (which is still expected to be low at these release rates) is not the primary concern here; it is the degradation in plant control implied by the fact that the release cannot be controlled.

Likewise, liquid release values (which would result in very low integrated dose) are not the primary concern. Rather, the fact that the release cannot be isolated represents a potential degradation in the level of safety.

References:

STPT 13.4, Effluent Monitors

NUREG 0654, Appendix 1 Initiating Condition: Alert 15

ATTACHMENT B
EMERGENCY ACTION LEVELS (EALs)

Category: Radiological Conditions

EAL 4.1.1.3

Sub-Category: Off-site Radiological Release

Emergency Classification: **SITE EMERGENCY**

Emergency Action Level:

Release of airborne radioactive material resulting in a dose projection at or beyond the site boundary (by any means) of either:

Greater than or equal to 100 mRem Total Effective Dose Equivalent (TEDE)

OR

Greater than or equal to 500 mRem Committed Dose Equivalent (CDE) [thyroid]

OR

Closed window dose rate exceeding 100 mRem/hr measured at or beyond the site boundary.

Basis:

The 100 mR integrated dose is based on the 10 CFR 20 annual average population exposure. This value also provides a desirable gradient (one order of magnitude) between the Site Emergency and General Emergency classes. It is deemed that exposures less than this limit are not consistent with the Site Emergency class description. The 500 mR CDE thyroid dose was established in consideration of the 1:5 ratio of the EPA Protective Action Guidelines for whole body to thyroid.

Integrated doses are not monitored in real-time but are projected. In establishing the duration used for the projection, care should be exercised to ensure the time estimates are realistic. If no educated guess can be made regarding estimated duration, the default (4 hours) shall be used.

References:

NUREG 0654, Appendix 1 Initiating Condition: Site Emergency 13a

ATTACHMENT B
EMERGENCY ACTION LEVELS (EALs)

Category: Radiological Conditions

EAL 4.1.1.4

Sub-Category: Off-site Radiological Release

Emergency Classification: **GENERAL EMERGENCY**

Emergency Action Level:

Release of airborne radioactive material resulting in a dose projection at or beyond the site boundary (by any means) of either:

Greater than or equal to 1 Rem Total Effective Dose Equivalent (TEDE)

OR

Greater than or equal to 5 Rem Committed Dose Equivalent (CDE) [thyroid]

OR

Closed window dose rate exceeding 1 Rem/hr measured at or beyond the site boundary.

Basis:

The 1 REM TEDE and the 5 REM CDE thyroid integrated doses are based on the EPA protective action guidance which indicates that public protective actions are indicated. This is consistent with the emergency class description for a General Emergency.

Integrated doses are not monitored in real-time but are projected. In establishing the duration used for the projection, care should be exercised to ensure the time estimates are realistic. If no educated guess can be made regarding estimated duration, the default (4 hours) shall be used.

References:

NUREG 0654, Appendix 1 Initiating Condition: General Emergency 1a

ATTACHMENT B
EMERGENCY ACTION LEVELS (EALs)

Category: Radiological Conditions

EAL 4.2.1.2

Sub-Category: In-Plant Radiological Conditions

Emergency Classification: **ALERT**

Emergency Action Level:

Loss of control of radioactive material resulting in area radiation exceeding 1000X normal (or expected) levels within the Protected Area. Normal may be determined by trend recorder or other relevant data.

Basis:

By themselves indications of increased levels of radiation would only meet the Unusual Event class description (potential degradation in the level of safety). However, there is no specific Unusual Event EAL on increased radiation. This would be a judgment call by the SM. However, when increased radiation of *this* magnitude (1000x) is *combined* with "loss of control" a higher classification is warranted. Non-essential personnel should be assembled to ensure their safety. Additional manpower or other resources may be needed. The ALERT classification is appropriate.

The operative phrase in this EAL is "loss of control". Combined with this is the phrase "or expected levels". For most plant evolutions increases of radiation can be estimated, most within a factor of 1000. If, in the judgment of those concerned, control has been lost, AND radiation levels increase beyond 1000X normal or expected levels, this EAL is met.

References:

NUREG 0654, Appendix 1 Initiating Condition: Alert 6

ATTACHMENT B
EMERGENCY ACTION LEVELS (EALs)

Category: Internal Events

EAL 5.1.1.1

Sub-Category: Security Threats

Emergency Classification: **UNUSUAL EVENT**

Emergency Action Level:

Bomb, credible bomb threat, indication of sabotage, or attempted entry into the Protected Area by a hostile force.

Basis:

This EAL is based on the PBNP Security Plan/ISFSI Security Plan. An actual bomb, credible bomb threat, act of sabotage, or attempted entry into the Protected area by a hostile force indicates a potential degradation in the level of safety at the plant. Therefore an Unusual Event classification is warranted.

The Protected Area Physical Barrier is defined in the Security Plan/ISFSI Plan.

A bomb discovered in or near a Plant Vital Area which could affect Safety-Related Functions would result in escalation of the emergency classification. An actual explosion (of a bomb or other source) would be classified based on EALs 5.3.1.1 through 5.3.1.3 depending upon its effects.

Security events that do not represent at least a potential degradation in the level of plant safety are reported under either 10 CFR 73.71 or 10 CFR 50.72 and do not require implementation of the Emergency Plan. Accidental, non-hostile entry, although reportable as a security event, does not warrant declaration of an emergency. The operative consideration is 'intent'. If no malicious intent is determined the EAL does not apply.

References:

SSCP - Security and Safeguards Contingency Plan

NUREG 0654, Appendix 1 Initiating Condition: Unusual Event 12

ATTACHMENT B
EMERGENCY ACTION LEVELS (EALs)

Category: Internal Events

EAL 5.1.1.2

Sub-Category: Security Threats

Emergency Classification: **ALERT**

Emergency Action Level:

Intrusion into the Protected Area by a hostile force.

Basis:

For the purposes of this EAL, the intrusion into the Protected Area can be considered a significant security threat. An Alert classification is warranted. If entry is attempted, but not gained by a hostile force see the Unusual Event EAL.

The Protected Area Physical Barrier is defined in the Security Plan. Note: The Independent Spent Fuel Storage Installation (ISFSI) is a separate Protected Area.

Intrusion into a Plant Vital Area escalates this event to a Site Emergency.

Security events that do not represent at least a potential degradation in the level of plant safety are reported under either 10 CFR 73.71 or 10 CFR 50.72 and do not require implementation of the Emergency Plan. Accidental, non-hostile entry, although reportable as a security event, does not warrant declaration of an emergency. The operative consideration is 'intent'. If no malicious intent is determined the EAL does not apply.

References:

SSCP - Security and Safeguards Contingency Plan

NUREG 0654, Appendix 1 Initiating Condition: Alert 16

ATTACHMENT B
EMERGENCY ACTION LEVELS (EALs)

Category: Internal Events

EAL 5.1.1.3

Sub-Category: Security Threats

Emergency Classification: **SITE EMERGENCY**

Emergency Action Level:

Intrusion into a plant Vital Area by hostile force.

Basis:

Hostile takeover of Vital Areas could lead to loss of physical control of the plant. Therefore a Site Emergency classification is warranted. The Plant Vital Areas are defined in the Security Plan.

Security events that do not represent at least a potential degradation in the level of plant safety are reported under either 10 CFR 73.71 or 10 CFR 50.72 and do not require implementation of the Emergency Plan. Accidental, non-hostile entry, although reportable as a security event, does not warrant declaration of an emergency. The operative consideration is 'intent'. If no malicious intent is determined the EAL does not apply.

References:

SSCP - Security and Safeguards Contingency Plan

NUREG 0654, Appendix 1 Initiating Condition: Site Emergency 14

ATTACHMENT B
EMERGENCY ACTION LEVELS (EALs)

Category: Internal Events

EAL 5.1.1.4

Sub-Category: Security Threats

Emergency Classification: **GENERAL EMERGENCY**

Emergency Action Level:

A Security Event which results in either:

Loss of physical control of the Control Room

OR

Loss of remote shutdown capability.

Basis:

This EAL encompasses conditions under which unauthorized personnel have taken physical control of vital areas required to reach and maintain safe shutdown, with the potential that the intruders can cause a significant event with damage to plant systems, damage to the core, and ultimately a release of large amounts of radioactivity.

References:

SSCP - Security and Safeguards Contingency Plan

AOP-10A, Safe Shutdown - Local Control

NUREG 0654, Appendix 1 Initiating Condition: General Emergency 3

ATTACHMENT B
EMERGENCY ACTION LEVELS (EALs)

Category: Internal Events

EAL 5.2.1.2

Sub-Category: Control Room Habitability

Emergency Classification: **ALERT**

Emergency Action Level:

Evacuation of the Control Room has been initiated with control of shutdown systems established from local stations.

Basis:

AOP-10A directs shutdown activities performed outside the Control Room.

This EAL does not imply that all actions associated with Alternate Shutdown shall be completed in order to avoid the higher EAL pertaining to Control Room evacuation (EAL 5.2.1.3). If the reactor successfully trips, if level, pressure, temperature, etc., are being controlled, and no impediments to the associated Shutdown activities are being encountered, this emergency classification is appropriate. If impediments are being encountered in completing critical Shutdown functions, and more than 15 minutes expire, EAL 5.2.1.3 is met.

Located within the Control Room are the controls, indications, annunciators, and communications equipment necessary for the safe operation of the plant. The ability to assess and control plant conditions and abnormal situations is significantly degraded without access to the Control Room.

With the Control Room evacuated, additional support, monitoring, and direction through the resources of the TSC and/or other emergency facilities is assumed to be necessary - therefore, the declaration of an Alert is appropriate and required.

References:

AOP-10A, Safe Shutdown - Local Control

NUREG 0654, Appendix 1 Initiating Condition: Alert 20

ATTACHMENT B
EMERGENCY ACTION LEVELS (EALs)

Category: Internal Events

EAL 5.2.1.3

Sub-Category: Control Room Habitability

Emergency Classification: **SITE EMERGENCY**

Emergency Action Level:

Evacuation of the Control Room without establishment of plant control from remote shutdown stations within approximately 15 minutes.

Basis:

Located within the Control Room are the controls, indications, annunciators, and communications equipment necessary for the safe operation of the plant. The ability to assess and control plant conditions and abnormal situations is significantly degraded without access to the Control Room.

Once the Control Room is evacuated, if control is not established from remote shutdown stations within a reasonable amount of time (approximately 15 minutes), a significant threat to multiple fission product barriers exists should a plant transient or other emergency condition occur. If plant control cannot be established within this time frame, declaration of a Site Emergency is warranted due to extended lack of control of the plant.

Escalation to a higher classification, if appropriate, will be based on system malfunctions, fission product barrier degradation, radiation levels, or Emergency Director judgment.

References:

AOP-10A, Safe Shutdown - Local Control

NUREG 0654, Appendix 1 Initiating Condition: Site Emergency 18

ATTACHMENT B
EMERGENCY ACTION LEVELS (EALs)

Category: Internal Events

EAL 5.3.1.1

Sub-Category: Fire / Explosion

Emergency Classification: **UNUSUAL EVENT**

Emergency Action Level:

Explosion near or in the Protected Area affecting permanent plant equipment or structures.

Basis:

Only those explosions of sufficient force to damage permanent plant structures or equipment within the Protected Area meet the threshold of this EAL. Other minor explosions should be evaluated for reportability 10 CFR 50.72. No attempt is made in this EAL to assess the magnitude of damage. Reports of any damage to permanent structures or equipment is sufficient for declaration.

Specifically excluded from this EAL are stored equipment or non-permanent structures such as trailers, Sea Vans, or skids which are not being relied upon to perform the function of installed plant equipment.

The Protected Area Physical Barrier is defined in the Security Plan. Note: The Independent Spent Fuel Storage Installation (ISFSI) is a separate Protected Area.

As used here, an explosion is a rapid, violent, unconfined combustion or a catastrophic failure of pressurized equipment imparting significant energy to nearby structures and materials. If the explosion damages Safety Systems the event escalates to an Alert or Site Emergency.

The security aspects of the explosion should be considered.

References:

NUREG 0654, Appendix 1 Initiating Condition: Unusual Event 14c

SSCP - Security and Safeguards Contingency Plan

ATTACHMENT B
EMERGENCY ACTION LEVELS (EALs)

Category: Internal Events

EAL 5.3.1.2

Sub-Category: Fire / Explosion

Emergency Classification: **ALERT**

Emergency Action Level:

Explosion affecting operability of one (1) train of safety systems.

Basis:

Safety systems as used here designates systems with safety-related functions. Attachment D lists safety systems and systems with safety-related functions.

Only explosions that actually cause damage to equipment required for safe operation **AND** only damage that renders a single train of a safety system unable to perform its intended safety function meet the threshold of this EAL. A lengthy damage assessment should not be performed. The occurrence of the explosion with evidence of damage likely to prevent one train from performing its intended safety function is sufficient for declaration.

As used here, an explosion is a rapid, violent, unconfined combustion, or catastrophic failure of pressurized equipment that imparts significant energy to nearby structures and equipment.

If the explosion damages more than one train of a Safety System the event escalates to a Site Emergency.

The security aspects of the explosion should be considered.

References:

NUREG 0654, Appendix 1 Initiating Condition: Alert 18c

ATTACHMENT B
EMERGENCY ACTION LEVELS (EALs)

Category: Internal Events

EAL 5.3.1.3

Sub-Category: Fire / Explosion

Emergency Classification: **Site Emergency**

Emergency Action Level:

Explosion affecting operability of two (2) trains of safety systems.

Basis:

Safety systems as used here designates systems with safety-related functions. Attachment D lists safety systems and systems with safety-related functions.

Only explosions that actually cause damage to equipment required for safe operation of more than one safety system train **AND** only damage that affects the systems' ability to perform intended functions meet the threshold of this EAL. A lengthy damage assessment should not be performed. An immediate assessment of the probability of damage making multiple trains incapable of performing their safety function is all that is required. The occurrence of the explosion with evidence of damage likely to prevent the equipment in more than one train of a safety system from performing intended safety functions is sufficient for declaration.

As used here, an explosion is a rapid, violent, unconfined combustion, or catastrophic failure of pressurized equipment that imparts significant energy to nearby structures and equipment.

If only one train of a safety system is affected, see ALERT classification EAL.

The security aspects of the explosion should be considered.

References:

NUREG 0654, Appendix 1 Initiating Condition: Alert 18c

ATTACHMENT B
EMERGENCY ACTION LEVELS (EALs)

Category: Internal Events

EAL 5.3.2.1

Sub-Category: Fire / Explosion

Emergency Classification: **UNUSUAL EVENT**

Emergency Action Level:

Fire within the Protected Area lasting more than 10 minutes after use of fire extinguishing equipment.

Basis:

The purpose of this EAL is to address fires which are potentially significant precursors to damage to safety systems. This condition applies to buildings or areas contiguous to plant vital areas or other significant buildings or areas.

Specifically excluded are small fires within administration buildings, wastebasket fires, or fires in areas of no safety consequence.

Escalation to a higher emergency class occurs if the fire affects one or more train(s) of a Safety System(s).

References:

NUREG 0654, Appendix 1 Initiating Condition: Unusual Event 10

ATTACHMENT B
EMERGENCY ACTION LEVELS (EALs)

Category: Internal Events

EAL 5.3.2.2

Sub-Category: Fire / Explosion

Emergency Classification: **ALERT**

Emergency Action Level:

Fire affecting operability of one (1) train of a safety system.

Basis:

Safety systems as used here designates systems with safety-related functions. Attachment D lists safety systems and systems with safety-related functions.

This condition is entered when the Fire Brigade Leader reports a fire affects one train of a safety system or if Control Room Operators become aware of indications of impact to a safety system after a fire has been reported.

Only those fires that actually cause damage to equipment as reported by the Fire Brigade Leader or as noted by Control Room operators meet this EAL.

Escalation to a higher emergency class, if appropriate, is based on further system malfunctions, fission product barrier degradation, abnormal radiation levels, or Emergency Director judgment.

References:

NUREG 0654, Appendix 1 Initiating Condition: Alert 13

ATTACHMENT B
EMERGENCY ACTION LEVELS (EALs)

Category: Internal Events

EAL 5.3.2.3

Sub-Category: Fire / Explosion

Emergency Classification: **SITE EMERGENCY**

Emergency Action Level:

Fire affecting operability of two (2) trains of safety systems.

Basis:

Safety systems as used here designates systems with safety-related functions. Attachment D lists safety systems and systems with safety-related functions.

This condition is entered when the Fire Brigade Leader reports a fire that affects more than one train of a safety system or if Control Room Operators become aware of indications of impact on more than one train of a safety system after a fire has been reported.

Only fires that actually cause damage to equipment required for safe operation of more than one safety system train **AND** only damage that affects the systems' ability to perform intended functions meet the threshold of this EAL. A lengthy damage assessment should not be performed. An immediate assessment of the probability of damage making multiple trains incapable of performing their safety function is all that is required. The occurrence of a fire with evidence of damage likely to prevent the equipment in more than one train of a safety system from performing intended safety functions is sufficient for declaration.

This condition is indicative of severe degradation of the level of safety at the plant with possible adverse consequences on the public health and safety. A Site Emergency is warranted.

Escalation to a higher emergency class, if appropriate, will be based on fission product barrier degradation or emergency management judgment.

References:

NUREG 0654, Appendix 1 Initiating Condition: Site Emergency 11

ATTACHMENT B
EMERGENCY ACTION LEVELS (EALs)

Category: Internal Events

EAL 5.4.1.1

Sub-Category: Turbine Rotating Component Failures

Emergency Classification: **UNUSUAL EVENT**

Emergency Action Level:

Visual confirmation of turbine housing penetration by a blade or rotating component.

Basis:

This initiation condition addresses the consequences of turbine failure and turbine missile effects.

Analyses documented in the FSAR on the consequences of turbine overspeed indicate that there would be only a low energy missile generated external to the low pressure turbine casing in the event of a turbine overspeed.

The study determined that the following components are subject to the possible effects of a turbine missile: one main steam line, the condensate storage tanks, reactor makeup water storage tanks, the reactor makeup water storage tank pumps, the refueling water storage tank, diesel generator fuel oil line, and the service water pump electrical leads. These components should be evaluated for damage.

Escalation to a higher emergency classification, if appropriate, is based on further missile damage from any source, system malfunctions, fission product barrier degradation, abnormal radiation levels, or emergency management judgment.

References:

WCAP 7525-L, Likelihood and Consequences of Turbine Overspeed at the Point Beach Nuclear Plant.

Reg Guide 1.115, Protection Against Low-Trajectory Turbine Missiles

FSAR 14.1.12, Likelihood of Turbine-Generator Unit Overspeed

NUREG 0654, Appendix 1 Initiating Condition: Unusual Event 14e and Alert 18e

ATTACHMENT B
EMERGENCY ACTION LEVELS (EALs)

Category: External Events

EAL 6.1.1.1

Sub-Category: Natural Destructive Phenomena

Emergency Classification: **UNUSUAL EVENT**

Emergency Action Level:

Any earthquake felt by Control Room Operators.

OR

An indicator light on two or more of the following Seismic Event Monitors

SEI-6210	*#3 Warehouse*
SEI-6211	*Unit 1 Facade*
SEI-6212	*Drum Prep Room*
SEI-6213	*El. 8'between vital switchgear room and aux feedwater tunnel*

Basis:

As defined in the EPRI sponsored "Guidelines for Nuclear Plant Response to an Earthquake," dated October 1989, a "felt earthquake" is:

An earthquake of sufficient intensity such that: (a) the ground motion is felt at the nuclear plant site and recognized as an earthquake based on a consensus of control room operators on duty at the time, and (b) for plants with operable seismic instrumentation, the seismic detectors of the plant are activated.

The seismic event monitors are set to alarm at 0.01g. Minor damage to some portions of the site may occur at these levels but should not affect the ability to safely operate the plant. Additional inspections may be desired to determine the extent of any damage. Therefore an Unusual Event classification is warranted.

This EAL requires two valid seismic alarms to eliminate classification due to plant operations or maintenance activities, such as heavy equipment moving near the monitor or an accidental impact to a monitor. Further validation may be accomplished by contacting the University of Wisconsin - Milwaukee Seismic Center.

ATTACHMENT B
EMERGENCY ACTION LEVELS (EALs)

References:

PBNP FSAR, Appendix A

Setpoint Document STPT 22.1, Seismic Event Monitoring

EPRI Document, "Guidelines for Nuclear Plant Response to an Earthquake," dated October, 1989

NUREG 0654, Appendix 1 Initiating Condition: Unusual Event 13a

ATTACHMENT B
EMERGENCY ACTION LEVELS (EALs)

Category: External Events

EAL 6.1.1.2

Sub-Category: Natural Destructive Phenomena

Emergency Classification: **ALERT**

Emergency Action Level:

Valid Seismic Event Monitor readings of an intensity greater than 0.04g vertical or 0.06g horizontal.

Basis:

This EAL addresses events that may have resulted in the plant's vital equipment being subjected to forces beyond operational limits. Therefore an Alert classification is warranted. Classification should occur prior to a detailed damage assessment.

Values in this EAL are based on the Operating Basis Earthquake (OBE) limits (ground accelerations of .04g vertical and .06g horizontal) as defined by the FSAR.

Validation of seismic activity would be by severe ground shaking or by contacting University of Wisconsin - Milwaukee Seismic Center (Emergency Telephone Directory).

References:

PBNP FSAR, Appendix A

Setpoint Document STPT 22.1, Seismic Event Monitoring

EPRI Document, "Guidelines for Nuclear Plant Response to an Earthquake," dated October 1989

NUREG 0654, Appendix 1 Initiating Condition: Alert 17a

ATTACHMENT B
EMERGENCY ACTION LEVELS (EALs)

Category: External Events

EAL 6.1.1.3

Sub-Category: Natural Destructive Phenomena

Emergency Classification: **SITE EMERGENCY**

Emergency Action Level:

Valid Seismic Event Monitor readings of an intensity greater than 0.08g vertical or 0.12g horizontal.

Basis:

This EAL addresses events that may have resulted in the plant's vital equipment being subject to forces that may prevent safe shutdown and cooldown of the plant. Therefore a Site Emergency classification is warranted. Classification should occur prior to a detailed damage assessment.

Values in this EAL are based on the Safe Shutdown Earthquake (SSE) limits (ground accelerations of .08g vertical and .12g horizontal) as defined by the FSAR.

Validation of seismic activity would be by severe ground shaking or by contacting University of Wisconsin - Milwaukee Seismic Center (Emergency Telephone Directory).

References:

PBNP FSAR, Appendix A

Setpoint Document STPT 22.1, Seismic Event Monitoring

EPRI Document, "Guidelines for Nuclear Plant Response to an Earthquake," dated October 1989

NUREG 0654, Appendix 1 Initiating Condition: Site Emergency 15a

ATTACHMENT B
EMERGENCY ACTION LEVELS (EALs)

Category: External Events

EAL 6.1.2.1

Sub-Category: Natural Destructive Phenomena

Emergency Classification: **UNUSUAL EVENT**

Emergency Action Level:

Report by plant personnel that a tornado is within, or has been in, the Protected Area or Switchyard.

Basis:

This EAL is based on the assumption that a tornado within the Protected Area may potentially damage plant structures containing functions or systems required for the safe shutdown of the plant. Due to the rapid transient nature of tornadoes only those which actually occur within the Protected Area are considered, as these have the potential of actually damaging plant structures. An Unusual Event classification is warranted.

If damage to safety-related equipment is confirmed (either by observation or plant instrumentation) the event may be escalated to an Alert. Other EALs should also be considered such as loss of electrical power.

The Protected Area Boundary is defined in the Security Plan. Note: The Independent Spent Fuel Storage Installation (ISFSI) is part of the site Protected Area.

References:

AOP-13C, Severe Weather Conditions

Probabilistic Safety Assessment -- High Winds, and Others Sec 9, Rev 0, Dated July 1995

NUREG 0654, Appendix 1 Initiating Condition: Unusual Event 13c

SSCP - Security and Safeguards Contingency Plan

ATTACHMENT B
EMERGENCY ACTION LEVELS (EALs)

Category: External Events

EAL 6.1.2.2

Sub-Category: Natural Destructive Phenomena

Emergency Classification: **ALERT**

Emergency Action Level:

Indications or observations that a tornado has damaged a vital structure

OR

Sustained winds greater than 90 MPH.

Basis:

This EAL addresses events that may have resulted in a plant vital area being subjected to forces approaching or beyond design limits. It is assumed that damage may have occurred to plant safety systems. Therefore an Alert classification is warranted. Classification should occur prior to a detailed damage assessment.

The 90 MPH sustained wind speed was chosen as a value approaching the design basis for non-Class 1 metal structures at the plant. Although no damage to permanent plant structures should occur at this level, non-permanent structures (trailers, work shacks, temporary storage, etc.) could have significant damage and impact plant operations. Winds at this level would also impact personnel movement within and to the plant.

References:

AOP-13C, Severe Weather Conditions

FSAR 5.1, Containment System Structure

Probabilistic Safety Assessment -- High Winds, and Others Sec 9, Rev 0, Dated July 1995

Bechtel Corporation, "Westinghouse Electric Corporation--Wisconsin Michigan Power Company--Point Beach Atomic Power Station--Design Criteria for Nuclear Power Plants Against Tornadoes," March 12, 1970, B-TOP-3.

NUREG 0654, Appendix 1 Initiating Condition: Alert 17c

ATTACHMENT B
EMERGENCY ACTION LEVELS (EALs)

Category: External Events

EAL 6.1.2.3

Sub-Category: Natural Destructive Phenomena

Emergency Classification: **SITE EMERGENCY**

Emergency Action Level:

Sustained winds greater than 100 MPH

AND

Reports or indications of damage to vital equipment or structures.

Basis:

This EAL addresses events that have resulted in plant areas being subjected to forces beyond design limits. It is assumed that substantial damage has occurred to plant structures with probable damage to safety systems.

It is inferred from Section 5.1 in the FSAR that the design straight wind speed of 108 mph was used in the design of the non-Class 1 metal structures. This is consistent with the Bechtel topical report. 100 mph was used in this EAL due to limitations of available instrumentation.

Therefore, this condition is indicative of serious plant system conditions with possible adverse consequences on the public health and safety. A Site Emergency is warranted.

Emergency classifications under other EALs may also be appropriate due to offsite effects caused by high winds, particularly status of offsite power lines.

References:

AOP-13C, Severe Weather Conditions

FSAR 5.1, Containment System Structure

Probabilistic Safety Assessment -- High Winds, and Others Sec 9, Rev 0, Dated July 1995

Bechtel Corporation, "Westinghouse Electric Corporation--Wisconsin Michigan Power Company--Point Beach Atomic Power Station--Design Criteria for Nuclear Power Plants Against Tornadoes," March 12, 1970, B-TOP-3.

NUREG 0654, Appendix 1 Initiating Condition: Site Emergency 15c

ATTACHMENT B
EMERGENCY ACTION LEVELS (EALs)

Category: External Events

EAL 6.2.1.1

Sub-Category: High Lake/Low Forebay Water Level

Emergency Classification: **UNUSUAL EVENT**

Emergency Action Level:

Less than -11' forebay or pump bay level with one unit's CW pumps off.

Basis:

This condition is considered a potential degradation in the level of safety of the plant due to Circulating Water Pumps and/or Service Water losing suction. Water levels at or below these levels impairs the ability of these pumps to provide water to their loads, and may result in subsequent loss of the safety function of the ultimate heat sink. Therefore, an Unusual Event classification is warranted.

References:

AOP-5A, Loss of Condenser Vacuum

AOP-13A, Circulating Water System Malfunction

NUREG 0654, Appendix 1 Initiating Condition: Unusual Event 13b

ATTACHMENT B
EMERGENCY ACTION LEVELS (EALs)

Category: External Events

EAL 6.2.2.1

Sub-Category: High Lake/Low Forebay Water Level

Emergency Classification: **UNUSUAL EVENT**

Emergency Action Level:

Any flooding which precludes access to the site or areas of the plant.

Basis:

This condition is considered to be a potential degradation in the level of safety of the plant due to limited access to the site or potential safety concerns for onsite personnel. Therefore an Unusual Event classification is warranted.

References:

NUREG 0654, Appendix 1 Initiating Condition: Unusual Event 13b

ATTACHMENT B
EMERGENCY ACTION LEVELS (EALs)

Category: External Events

EAL 6.2.2.2

Sub-Category: High Lake/Low Forebay Water Level

Emergency Classification: **ALERT**

Emergency Action Level:

Flooding as indicated by greater than 6" of water in the 8 foot elevation of the Turbine Bldg.

Basis:

This EAL addresses an event that may result in a plant vital area being subjected to conditions beyond design limits adversely affecting plant safety systems. Therefore, this condition is indicative of abnormal plant conditions with possible adverse consequences on plant safety and is classified as an Alert.

This condition is entered when there is greater than six inches of water in the turbine hall. Although this EAL is in the category High Lake/Low Forebay, the cause of the flooding is not a factor. A broken Service Water or Circulating Water pipe could also create this condition.

The Turbine Building would flood before other plant areas, therefore it provides a representative indication of other possible problem areas. The feedwater pumps each sit on a base that is eight inches above the floor. The turbine seal oil pumps are approximately ten inches above the floor.

Escalation to a higher emergency class, if appropriate, will be based on Flooding in Vital Equipment Areas.

References:

NUREG 0654, Appendix 1 Initiating Condition: Alert 17b

ATTACHMENT B
EMERGENCY ACTION LEVELS (EALs)

Category: External Events

EAL 6.2.2.3

Sub-Category: High Lake/Low Forebay Water Level

Emergency Classification: **SITE EMERGENCY**

Emergency Action Level:

Greater than 2' of water in vital switchgear room

OR

Greater than 2' of water in auxiliary feedwater pump room.

Basis:

This EAL addresses conditions where plant vital equipment may be subjected to conditions beyond design limits, and damage may be assumed to have occurred to plant safety systems. Therefore, this condition is indicative of serious plant system conditions with possible adverse consequences on the public health and safety. A Site Emergency is warranted.

Plant vital area designations are contained in the PBNP Security Plan.

Water levels in excess of two feet in the vital switchgear room severely threaten safe plant operations. Several 125-volt DC station batteries are installed in the vital switchgear room. The bottom and top of these batteries are 6 and 36 inches above the floor, respectively. Numerous electrical cabinets containing electrical components for the safety injection pumps, the station service transformers, and the 4.16 kV electrical system are also located in the room.

Water levels in excess of two feet in the auxiliary feedwater pump room threatens operation of the feedwater system and ultimately the ability to cool the reactor core. The turbine-operated auxiliary feedwater pumps are located approximately 18 inches above the floor and the motor operated auxiliary feedwater pumps are located approximately two feet above the floor. Additionally, the Source Range Output Expansion Control Panel is approximately two feet above the floor.

This EAL used to also contain criteria of greater than three feet of water in both EDG rooms, however this was before G03 and G04 were installed, hence spoke of G01 and G02 only. Due to the electrical arrangement of G03 and G04 as backups to G01 and G02 and the fact that G03 and G04 are at a significantly higher elevation, they have been removed from this EAL.

Emergency classifications under other EALs may be appropriate due to offsite effects caused by severe weather, particularly the status of offsite power lines.

ATTACHMENT B
EMERGENCY ACTION LEVELS (EALs)

References:

SOER 85-5, Internal Flooding of Power Plant Buildings

NUREG 0654, Appendix 1 Initiating Condition: Site Emergency 15b

ATTACHMENT B
EMERGENCY ACTION LEVELS (EALs)

Category: External Events

EAL 6.3.1.1

Sub-Category: Toxic/Flammable Gas Intrusion

Emergency Classification: **UNUSUAL EVENT**

Emergency Action Level:

A toxic or flammable gas release in or near the Protected Area.

Basis:

The release of toxic or flammable gas in or near the Protected Area may pose a potential threat to reactor plant and personnel safety. It is the potential threat to normal operation or hazard to personnel which must be evaluated. If no such threat exists, the EAL is not met. If, however, personnel safety or plant operation is threatened, an Unusual Event is warranted.

For the purpose of this EAL, 'in or near' is considered to include those owner-controlled areas immediately surrounding the Protected Area and all areas within the Protected Area.

Flammable gases are typically more limiting than toxic gases. Although an SCBA could protect from toxicity, detonation of a flammable gas could be immediately hazardous to personnel.

The Plant Protected Area Boundary is defined in the Security Plan. Note: The Independent Spent Fuel Storage Installation (ISFSI) is part of the site Protected Area.

References:

NUREG 0654, Appendix 1 Initiating Condition: Unusual Event 14d

SSCP Security and Safeguards Contingency Plan

ATTACHMENT B
EMERGENCY ACTION LEVELS (EALs)

Category: External Events

EAL 6.3.1.2

Sub-Category: Toxic/Flammable Gas Intrusion

Emergency Classification: **ALERT**

Emergency Action Level:

Entry of toxic or flammable gas into a plant building atmosphere affecting operation or access.

Basis:

The release of toxic or flammable gas significant enough to affect plant operation (i.e., initiate a plant transient or preclude access to plant equipment) warrants declaration of an Alert:

Flammable gases are typically more limiting than toxic gases. Although an SCBA could protect from toxicity, detonation of a flammable gas could be immediately hazardous to personnel. An area where access is not required for plant operation, which could be evacuated, does not warrant an Alert, but may warrant an Unusual Event if the potential exists to affect operation or personnel.

Any affected area normally accessed for plant operation (PAB, Turbine hall, etc.) meets the Alert level. If vital areas are affected, see EAL 6.3.1.3.

The primary flammable gases considered are acetylene, propane and the hydrogen.

References:

NUREG 0654, Appendix 1 Initiating Condition: Alert 18d

ATTACHMENT B
EMERGENCY ACTION LEVELS (EALs)

Category: External Events

EAL 6.3.1.3

Sub-Category: Toxic/Flammable Gas Intrusion

Emergency Classification: **SITE EMERGENCY**

Emergency Action Level:

Entry of toxic or flammable gas into a plant vital area affecting operation or personnel safety

AND

Reactor coolant temperature greater than 200°F.

Basis:

The release of toxic or flammable gas into a plant vital area poses a significant threat to plant safety by precluding access to plant vital equipment which may be needed for Safe Shutdown. Therefore this condition warrants declaration of a Site Emergency.

Flammable gases are typically more limiting than toxic gases. Although an SCBA could protect from toxicity, detonation of a flammable gas could be immediately hazardous to personnel.

This EAL does not apply in cold shutdown or refueling modes due to the significantly reduced probability that the loss of access would result in fuel failure and/or a release.

References:

NUREG 0654, Appendix 1 Initiating Condition: Site Emergency 16c

ATTACHMENT B
EMERGENCY ACTION LEVELS (EALs)

Category: External Events

EAL 6.4.1.1

Sub-Category: Vehicle/Missile Impacts

Emergency Classification: **UNUSUAL EVENT**

Emergency Action Level:

Aircraft crash within the Protected Area or Switchyard.

Basis:

This event may warrant the prompt notification of state and local authorities and perhaps a precautionary notification of Emergency Response Organization personnel. This event could pose a potential threat to plant operation or personnel safety and therefore warrants declaration of an Unusual Event.

The Protected Area Physical Barrier is defined in the PBNP Security Plan. Note: The Independent Spent Fuel Storage Installation (ISFSI) is a separate Protected Area.

References:

NUREG 0654, Appendix 1 Initiating Condition: Unusual Event 14a

SSCP - Security and Safeguards Contingency Plan

ATTACHMENT B
EMERGENCY ACTION LEVELS (EALs)

Category: External Events

EAL 6.4.1.2

Sub-Category: Vehicle/Missile Impacts

Emergency Classification: **ALERT**

Emergency Action Level:

Aircraft crash affecting operability of one(1) train of a safety system.

Basis:

Safety systems as used here designates systems with safety-related functions. Attachment D lists safety systems and systems with safety-related functions.

This condition is entered when Control Room Operators become aware of impact on a safety function after an aircraft crash has been reported.

Only a crash that actually causes damage to equipment required for safe operation **AND** only damage that renders a single train of a safety system unable to perform its intended safety function meet the threshold of this EAL. A lengthy damage assessment should not be performed. The occurrence of a crash with evidence of damage likely to prevent one train from performing its intended safety function is sufficient for declaration.

This condition is indicative of abnormal plant system conditions with possible adverse consequences on the public health and safety is classified as an ALERT.

Escalation to a higher emergency class, if appropriate, will be based on further system malfunctions, fission product barrier degradation, abnormal radiation levels, or Emergency Director judgment.

References:

NUREG 0654, Appendix 1 Initiating Condition: Alert 18a

ATTACHMENT B
EMERGENCY ACTION LEVELS (EALs)

Category: External Events

EAL 6.4.1.3

Sub-Category: Vehicle/Missile Impacts

Emergency Classification: **SITE EMERGENCY**

Emergency Action Level:

Aircraft crash affecting operability of two (2) trains of safety systems.

Basis:

This condition is indicative of severe degradation of the level of safety at the plant and with possible adverse consequences on the public health and safety is classified as a Site Emergency.

Only crashes that actually cause damage to equipment required for safe operation of more than one safety system train **AND** only damage that affects the systems' ability to perform intended functions meet the threshold of this EAL. A lengthy damage assessment should not be performed. The occurrence of a crash with evidence of damage likely to prevent the equipment in more than one train of a safety system from performing intended safety functions is sufficient for declaration.

Safety systems as used here designates systems with safety-related functions. Attachment D lists safety systems and systems with safety-related functions.

References:

NUREG 0654, Appendix 1 Initiating Condition: Site Emergency 16a

ATTACHMENT B
EMERGENCY ACTION LEVELS (EALs)

Category: External Events

EAL 6.4.2.2

Sub-Category: Vehicle/Missile Impacts

Emergency Classification: **ALERT**

Emergency Action Level:

Any missile impact affecting operability of one(1) train of a safety system.

Basis:

Safety systems as used here designates systems with safety-related functions. Attachment D lists safety systems and systems with safety-related functions.

This condition is entered when Control Room Operators become aware of impact on a safety functions after a missile impact has been reported.

Only a missile that actually causes damage to equipment required for safe operation **AND** only damage that renders a single train of a safety system unable to perform its intended safety function meet the threshold of this EAL. A lengthy damage assessment should not be performed. The occurrence of a missile impact with evidence of damage likely to prevent one train from performing its intended safety function is sufficient for declaration.

This condition is indicative of abnormal plant system conditions with possible adverse consequences on the public health and safety is classified as an ALERT.

Escalation to a higher emergency class, if appropriate, will be based on further system malfunctions, fission product barrier degradation, abnormal radiation levels, or emergency management judgment.

References:

NUREG 0654, Appendix 1 Initiating Condition: Alert 18b

ATTACHMENT B
EMERGENCY ACTION LEVELS (EALs)

Category: External Events

EAL 6.4.2.3

Sub-Category: Vehicle/Missile Impacts

Emergency Classification: **SITE EMERGENCY**

Emergency Action Level:

Missile impact affecting operability of two (2) trains of safety systems.

Basis:

Safety systems as used here designates systems with safety-related functions. Attachment D lists safety systems and systems with safety-related functions.

Only missile impacts that actually cause damage to equipment required for safe operation of more than one safety system train **AND** only damage that affects the systems' ability to perform intended functions meet the threshold of this EAL. A lengthy damage assessment should not be performed. An immediate assessment of the probability of damage making multiple trains incapable of performing their safety function is all that is required. The occurrence of a missile impact with evidence of damage likely to prevent the equipment in more than one train of a safety system from performing intended safety functions is sufficient for declaration.

Major losses of plant safety systems, as defined by failure of the ability of two or more of the safety systems to perform their intended function, warrants declaration of a Site Emergency.

References:

NUREG 0654, Appendix 1 Initiating Condition: Site Emergency 16b

ATTACHMENT B
EMERGENCY ACTION LEVELS (EALs)

Category: Fuel Handling/ISFSI Events

EAL 7.1.1.2

Sub-Category: Fuel Handling Events

Emergency Classification: **ALERT**

Emergency Action Level:

Report of possible damage to irradiated fuel combined with an alarm on any of the following radiation monitors

RE-211, Containment air particulate monitor

RE-212 Containment noble gas monitor

RE-221 Drumming Area Vent

Manipulator Area Monitor

Spent Fuel Bridge Area Monitor.

Basis:

A report of possible damage to irradiated fuel, combined with an alarm on any of the radiation monitors indicates the probable damage to spent fuel.

NUREG/CR-4982 states that even if no corrective actions are taken, no prompt fatalities are predicted and the risk of injury is low. In addition, NRC Information Notice No. 90-08 presents the following clarifications:

"In the event of a serious accident involving decayed spent fuel, protective actions would be needed for personnel on site, while offsite doses (assuming an exclusion area radius of one mile from the plant site) would be well below the Environmental Protection Agency's Protective Action Guides. Accordingly, it is important to be able to properly survey and monitor for Kr-85 in the event of an accident with decayed spent fuel."

An Alert classification is appropriate for this event. Escalation would be based on actual radiological releases and/or SM judgment.

ATTACHMENT B
EMERGENCY ACTION LEVELS (EALs)

References:

NUREG/CR-4982, "Severe Accident in Spent Fuel Pools in Support of Generic Safety Issue 82"

NRC Information Notice No. 90-08, "Kr-85 Hazards from Decayed Fuel"

AOP-8B, Irradiated Fuel Handling Accident in Containment

AOP-8C, Fuel Handling Accident in Primary Auxiliary Building

NUREG 0654, Appendix 1 Initiating Condition: Alert 12

ATTACHMENT B
EMERGENCY ACTION LEVELS (EALs)

Category: Fuel Handling/ISFSI Events

EAL 7.2.1.2

Sub-Category: Irradiated Fuel Events

Emergency Classification: **ALERT**

Emergency Action Level:

Indications of irradiated fuel uncovered.

Basis:

This EAL applies to any area where irradiated fuel is located; reactor cavity, reactor vessel, or the spent fuel pool.

Any releases caused by uncovering the fuel are not generally the primary concern. The primary concern of this EAL is two-fold. First, is the evident loss of control of inventory. The second is the immediate, life threatening dose which could be present in the area due to loss of shielding.

An Alert classification is appropriate for this event. Escalation, if required, would be based on actual radiological releases or Emergency Director judgment.

This EAL applies to spent fuel requiring water coverage and is not intended to address spent fuel which is licensed for dry storage.

References:

NUREG/CR-4982, "Severe Accident in Spent Fuel Pools in Support of Generic Safety Issue 82"

NRC Information Notice No. 90-08, "Kr-85 Hazards from Decayed Fuel"

AOP-8F, Loss of Spent Fuel Pool Cooling

NUREG 0654, Appendix 1 Initiating Condition: Alert 12

ATTACHMENT B
EMERGENCY ACTION LEVELS (EALs)

Category: Fuel Handling/ISFSI Events

EAL 7.3.1.1

Sub-Category: ISFSI Events

Emergency Classification: **UNUSUAL EVENT**

Emergency Action Level:

A loaded spent fuel cask dropped or tipped.

Basis:

The Independent Spent Fuel Storage Installation (ISFSI) stores spent fuel in vertical casks outside the main Protected Area. Engineering safeguards and procedures insure these casks are not dropped or tipped for the duration of their expected lifetimes. If they should be dropped or tipped it is appropriate to declare an Unusual Event until the situation is analyzed and corrected.

References:

NUREG/CR-4982, "Severe Accident in Spent Fuel Pools in Support of Generic Safety Issue 82"

NRC Information Notice No. 90-08, "Kr-85 Hazards from Decayed Fuel"

AOP-8G, Ventilated Storage Cask (VSC) Drop or Tipover

NUREG 0654, Appendix 1 Initiating Condition: Alert 12

ATTACHMENT B
EMERGENCY ACTION LEVELS (EALs)

Category: Fuel Handling/ISFSI Events

EAL 7.3.1.2

Sub-Category: ISFSI Events

Emergency Classification: **ALERT**

Emergency Action Level:

Breach of a loaded spent fuel cask as indicated by a reading of greater than 1000 mRem/hr at 1 meter.

Basis:

The Independent Spent Fuel Storage Installation (ISFSI) stores spent fuel bundles in vertical cask in an area outside the main Protected Area. Engineering safeguards and procedures are in place to insure these casks are not subjected to forces that could breach their integrity. If a cask is breached it is appropriate to declare an Alert due to the potential threat to site personnel.

References:

NUREG/CR-4982, "Severe Accident in Spent Fuel Pools in Support of Generic Safety Issue 82"

NRC Information Notice No. 90-08, "Kr-85 Hazards from Decayed Fuel"

NUREG 0654, Appendix 1 Initiating Condition: Alert 12

ATTACHMENT B
EMERGENCY ACTION LEVELS (EALs)

Category: Emergency Management Judgment

EAL 8.1.1.1

Sub-Category: None

Emergency Classification: **UNUSUAL EVENT**

Emergency Action Level:

Any event which in the judgment of the Shift Manager or the Emergency Director could lead to, or has led to, a potential degradation of the level of safety of the plant.

Basis:

This EAL would pertain to conditions not explicitly addressed elsewhere in the EALs, but which warrant the declaration of an emergency due to the potential degradation of the level of safety of the plant. The Shift Manager or Emergency Director makes this determination.

References:

NUREG 0654, Appendix 1 Initiating Condition: Unusual Event 15

ATTACHMENT B
EMERGENCY ACTION LEVELS (EALs)

Category: Emergency Management Judgment

EAL 8.1.1.2

Sub-Category: None

Emergency Classification: **ALERT**

Emergency Action Level:

Any event which in the judgment of the Shift Manager or the Emergency Director could cause or has caused actual or potential substantial degradation of the level of safety of the plant.

Basis:

This EAL would pertain to conditions not explicitly addressed elsewhere in the EALs, but which warrant the declaration of an emergency due to the actual or substantial potential degradation of the level of safety of the plant. The Shift Manager or Emergency Director makes this determination.

In keeping with other EALs, generally events which challenge single (RCS or Fuel Cladding) barriers, or affect only single safety systems or functions fall in this category.

References:

NUREG 0654, Appendix 1 Initiating Condition: Alert 19

ATTACHMENT B
EMERGENCY ACTION LEVELS (EALs)

Category: Emergency Management Judgment

EAL 8.1.1.3

Sub-Category: None

Emergency Classification: **SITE EMERGENCY**

Emergency Action Level:

Any event which in the judgment of the Shift Manager or the Emergency Director could indicate actual or likely major failures of plant functions needed to protect the public. Any releases are not expected to result in exposures in excess of EPA PAGs.

Basis:

This EAL would pertain to conditions not explicitly addressed elsewhere in the EALs, but which warrant the declaration of an emergency due to the actual or likely failure of major plant functions needed for the protection of the public. The Shift Manager or Emergency Director makes this determination.

In keeping with other EALs, generally events which challenge two barriers (but not three), or affect more than one safety system or safety function, fall into this category.

References:

NUREG 0654, Appendix 1 Initiating Condition: Site Emergency 17

ATTACHMENT B
EMERGENCY ACTION LEVELS (EALs)

Category: Emergency Management Judgment

EAL 8.1.1.4

Sub-Category: None

Emergency Classification: **GENERAL EMERGENCY**

Emergency Action Level:

Any event which in the judgment of the Shift Manager or the Emergency Director could lead to actual or imminent core damage and the potential for a large release of radioactive material (in excess of EPA PAGs) outside the site boundary.

Basis:

This EAL pertains to conditions not explicitly addressed elsewhere in the EALs but which warrant declaration of an emergency due to actual or imminent core damage and the potential exists for a release of large amounts of radioactive material. The Shift Manager or Emergency Director makes this determination.

In keeping with other EALs, generally events which challenge all three barriers, indicate the potential for core damage, or which reflect possible large releases fall into this category.

References:

NUREG 0654, Appendix 1 Initiating Condition: General Emergency 4 and 7

ATTACHMENT C
FISSION PRODUCT BARRIER (FPB) MATRIX

This attachment is used to determine the status of the three primary Fission Product Barriers as they relate to classification. Wherever possible existing well-known parameters have been selected as thresholds for determining the status of the barriers. This is to integrate setpoints and thresholds already in existence in EOPs and Critical Safety Status Trees into the classification process. The intended purpose is to minimize the number of separate limits and values that must be memorized.

NOTE: Do not "anticipate" challenge or loss of a barrier unless the trend is rapid, and the values are close to the threshold/criteria.

The table on the following page may be used to 'check off' the status of the three Fission Product Barriers. Next to each code (FC-1, RL-2, etc.) is an empty box. If the plant conditions meet the conditions in the box, the associated box may be checked, either in the Challenged or Loss column.

The number and status of Fission Product Barriers may then be compared to the EALs that specifically address Fission Product Barrier status (category 1 of Attachment A). Generally, one barrier LOST is an Alert (unless the barrier is Containment alone), two barriers LOST is a Site Emergency, and two barriers LOST, with a CHALLENGE or LOSS of the third barrier is a General Emergency.

The codes (FC-1, RL-2, etc.) may be used to obtain further explanation as to the basis of their development. Each initial code letter; 'F' for Fuel Cladding, 'R' for Reactor Coolant System, or 'C' for Containment is followed by either 'C' for Challenge or 'L' for Loss. (For example FL-# indicates a parameter for Fuel Cladding LOSS, RC-# indicates a parameter for Reactor Coolant System Challenge.) The bases are on the pages following the Table, arranged by barrier, Challenge then Loss.

ATTACHMENT C
FISSION PRODUCT BARRIER (FPB) MATRIX

		FUEL CLAD CHALLENGE			FUEL CLAD LOSS
	FC-1	ST-2 (Core Cooling) Orange Path. **Degraded** core cooling as indicated by ANY of the following: • CET <700°F AND reactor <25′ NR • CET >700°F AND reactor >25′ NR • Reactor vessel <[120]110′ WR with 2 RCPs OR <[60]50′ with 1 RCP.		FL-1	ST-2 (Core Cooling) Red Path. **Inadequate** core cooling as indicated by EITHER: • CETs >1200°F Also SAMG entry. • CETs > 700°F and reactor vessel level <25′ NR
	FC-2	Failed fuel monitor (RE-109) reading greater than 120 mRem/hr. **Unusual Event (1.1.2.1)**		FL-2	Failed fuel monitor (RE-109) reading greater than 600 mRem/hr.
	FC-3	2 of 3 containment high range monitors reading greater than 1000 Rem/hr. **Unusual Event (1.1.2.1)**		FL-3	2 of 3 containment high range monitors reading greater than 6000 Rem/hr.
	FC-4	Coolant activity greater than Technical Specification TS 3.4.16 **Unusual Event (1.1.1.1)**		FL-4	Coolant activity greater than 250 µCi/gram equivalent of I-131
	FC-5	Any condition which in the judgment of the Emergency Director is indicative of a challenge to the Fuel Cladding barrier.		FL-5	Any condition which in the judgment of the Emergency Director is indicative of a loss of the Fuel Cladding barrier.
		RCS CHALLENGE			**RCS LOSS**
	RC-1	RCS leak greater than 10 gpm or 500 gallons per day in either steam generator (Technical Specifications). **Unusual Event (1.1.3.1, 1.1.4.1)**		RL-1	RCS leak greater than 50 gpm. If greater than 400 gpm, see also EAL 2.4.1.3
	RC-2	ST-4 (Integrity) Orange Path. Excess RCS cooldown or cold overpressurization of the RCS **Unusual Event (1.1.5.1)**		RL-2	ST-4 (Integrity) Red Path. Temperature in either cold leg <285°F and cooldown >100°F in the last 60 minutes.
	RC-3	Any condition which in the judgment of the Emergency Director is indicative of a challenge to the Reactor Coolant System barrier.		RL-3	Any condition which in the judgment of the Emergency Director is indicative of a loss of the Reactor Coolant System barrier.
		CONTAINMENT CHALLENGE			**CONTAINMENT LOSS**
	CC-1	ST-5 (Containment) Orange Path. Containment pressure >25 psig and increasing following actuation of containment spray OR Sump 'B' >74"		CL-1	ST-5 (Containment) Red Path. Pressure >60 psig
	CC-2	Hydrogen concentration greater than 2%.		CL-2	Hydrogen concentration greater than 4%.
	CC-3	Atmospheric dump(s) or reliefs open and greater than 10 gpm Primary to Secondary leakage exists		CL-3	Unisolable steam line break outside containment. If primary to secondary leakage >10 gpm exists, see also EAL 1.1.2.2. If >50 gpm, see RL-1.
	CC-4	Any condition which in the judgment of the Emergency Director is indicative of a challenge to Containment barrier.		CL-4	Inability to isolate Containment.
				CL-5	Any condition which in the judgment of the Emergency Director is indicative of a loss of the Containment barrier.

ATTACHMENT C
FISSION PRODUCT BARRIER (FPB) MATRIX

Fuel Cladding - CHALLENGE

FC-1

ST-2 (Core Cooling) Orange Path indicates that RCS subcooling has been lost as well as loss of RCS inventory. RCS subcooling and reactor vessel level are fundamental indications of the assurance of adequate core cooling. These conditions indicate a challenge to the fuel cladding barrier due to **degraded** core cooling.

For the purposes of emergency classification, the barrier is to be considered CHALLENGED.

FC-2

The function of the failed fuel monitor is to monitor coolant activity. As the fuel cladding barrier degrades increasing amounts of activity are present in the coolant, and seen by this monitor. The value selected is approximately Technical Specifications, hence an Unusual Event must also be declared at this value, if this is the only fission product barrier affected. (1.1.2.1)

For the purposes of emergency classification, the barrier is to be considered CHALLENGED.

FC-3

In-containment high radiation monitors monitor activity in the coolant. As the fuel cladding barrier degrades increasing amounts of activity are present in the coolant, and seen by these monitors. This parameter may be the first indication of cladding degradation due to the location of the failed fuel monitor and possible containment isolation. The value is not correlated to a specific percentage of clad damage.

For the purposes of emergency classification, the barrier is to be considered CHALLENGED.

FC-4

Coolant activity greater than Technical Specifications is considered a precursor to loss of the fuel cladding barrier.

For purposes of emergency classification, the barrier is to be considered CHALLENGED.

FC-5

It is unlikely that any classification scheme can anticipate every circumstance. Therefore this 'threshold' criteria is based on an ad hoc judgment call. If the Emergency Director has reason to believe the integrity of this barrier is being challenged, he may declare it so.

He should have objective reason to believe the barrier is challenged. Simply not knowing (for example loss of indications) should not be used as a basis for declaring a barrier challenged or lost.

If the barrier is subsequently determined not to have been challenged, it may be declared intact.

If it is determined that the barrier was challenged, but is no longer challenged, the barrier must remain as challenged, until the Recovery phase of the emergency.

For the purposes of emergency classification, the barrier is to be considered CHALLENGED.

ATTACHMENT C
FISSION PRODUCT BARRIER (FPB) MATRIX

Fuel Cladding – LOSS

FL-1

ST-2 (Core Cooling) Red Path indicates that RCS subcooling has been lost as well as significant loss of RCS inventory. RCS subcooling and reactor vessel level are fundamental indications of the assurance of adequate core cooling. These conditions indicate the fuel cladding barrier has been subjected to conditions which may cause its failure due to **inadequate** core cooling.. For the purposes of emergency classification, the barrier is to be considered LOST.

Core exit thermocouple reading in excess of 1200°F is also an entry condition for Severe Accident Management Guidelines (SAMGs).

FL-2

The function of the failed fuel monitor is to monitor coolant activity. As the fuel cladding barrier degrades increasing amounts of activity are present in the coolant, and seen by this monitor. The value is not correlated to a specific percentage of clad damage, but is beyond Technical Specifications.

For the purposes of emergency classification, the barrier is to be considered LOST.

FL-3

In-containment high radiation monitors monitor activity in the coolant. As the fuel cladding barrier degrades increasing amounts of activity are present in the coolant, and seen by these monitors. This parameter may be the first indication of cladding degradation due to the location of the failed fuel monitor and possible containment isolation. The value is not correlated to a specific percentage of clad damage, but is beyond Technical Specifications.

For the purposes of emergency classification, the barrier is to be considered LOST.

FL-4

Coolant activity greater than this level is not correlated to a specific percentage of clad damage, but is beyond Technical Specifications.

For the purposes of emergency classification, the barrier is to be considered LOST.

FL-5

It is unlikely that any classification scheme can anticipate every circumstance. Therefore this 'threshold' criteria is based on an ad hoc judgment call. If the Emergency Director has reason to believe the integrity of this barrier is lost, he may declare it so.

He should have objective reason to believe the barrier is lost. Simply not knowing (for example loss of indications) should <u>not</u> be used as a basis for declaring a barrier challenged or lost.

If the barrier is subsequently determined not to have been lost, it may be declared intact, or challenged, as appropriate.

If it is determined that the barrier was lost, but is no longer lost, the barrier must remain as lost, until the Recovery phase of the emergency.

For the purposes of emergency classification, the barrier is to be considered LOST.

ATTACHMENT C
FISSION PRODUCT BARRIER (FPB) MATRIX

Reactor Coolant System - CHALLENGE

RC-1
These conditions represent minor leakage from the RCS. Because the source of the leak may not be known, and leaks can become worse, these conditions are considered precursors to more serious events. As such, an Unusual Event must be declared on these conditions, if the RCS is the only barrier affected. (1.1.3.1, 1.1.4.1) For the purposes of emergency classification, the barrier is to be considered CHALLENGED.
RC-2
Conditions of ST-4 (Integrity) Orange Path reflect an excessive cooldown of the vessel or cold overpressurization of the RCS. These conditions represent a challenge to the RCS barrier. An Unusual Event must be declared. (1.1.5.1) For the purposes of emergency classification, the barrier is to be considered CHALLENGED.
RC-3
It is unlikely that any classification scheme can anticipate every circumstance. Therefore this 'threshold' criteria is based on an ad hoc judgment call. If the Emergency Director has reason to believe the integrity of this barrier is being challenged, he may declare it so. He should have objective reason to believe the barrier is challenged. Simply not knowing (for example loss of indications) should not be used as a basis for declaring a barrier challenged or lost. If the barrier is subsequently determined not to have been challenged, it may be declared intact. If it is determined that the barrier was challenged, but is no longer challenged, the barrier must remain as challenged, until the Recovery phase of the emergency. For the purposes of emergency classification, the barrier is to be considered CHALLENGED.

ATTACHMENT C
FISSION PRODUCT BARRIER (FPB) MATRIX

Reactor Coolant System – LOSS

RL-1
This value is derived from NUREG-0654, Appendix 1. Although 50 gpm is well within the capacity of available pumps, this leak can be either into Containment or from Primary to Secondary systems. Thus, the RCS barrier is no longer serving its function of preventing the transport of fission products. For the purposes of emergency classification, the barrier is to be considered LOST.
RL-2
Conditions of ST-4 (Integrity) Red Path reflect an excessive cooldown of the vessel. These conditions indicate the RCS barrier has been subjected to conditions which may cause its failure For the purposes of emergency classification, the barrier is to be considered LOST.
RL-3
It is unlikely that any classification scheme can anticipate every circumstance. Therefore this 'threshold' criteria is based on an ad hoc judgment call. If the Emergency Director has reason to believe the integrity of this barrier is lost, he may declare it so. He should have objective reason to believe the barrier is lost. Simply not knowing (for example loss of indications) should not be used as a basis for declaring a barrier challenged or lost. If the barrier is subsequently determined not to have been lost, it may be declared intact, or challenged, as appropriate. If it is determined that the barrier was lost, but is no longer lost, the barrier must remain as lost, until the Recovery phase of the emergency. For the purposes of emergency classification, the barrier is to be considered LOST.

ATTACHMENT C
FISSION PRODUCT BARRIER (FPB) MATRIX

Containment - CHALLENGE

CC-1
ST-5 (Containment) Orange Path represent conditions beyond normal operating parameters due to either pressure or sump "B" level. For the purposes of emergency classification, the barrier is to be considered CHALLENGED
CC-2
Existence of hydrogen at these concentrations does not yet represent an explosive mixture, however, there are limited means to reduce hydrogen in containment, especially during an emergency. For the purposes of emergency classification, the barrier is to be considered CHALLENGED.
CC-3
This challenge threshold is designed to ensure that if Fuel Cladding **AND** RCS barriers are LOST, a General Emergency would be declared if the atmospheric dump valves or relief valves on the affected steam generator open (or are opened) and greater than 10 gpm Primary to Secondary leakage exists. If the Primary to Secondary leakage is less than 10 gpm the RCS barrier may be considered intact. This threshold is included to address NUREG-0654, Appendix 1 Initiating Condition A4. For the purposes of emergency classification, the barrier is to be considered CHALLENGED.
CC-4
It is unlikely that any classification scheme can anticipate every circumstance. Therefore this 'threshold' criteria is based on an ad hoc judgment call. If the Emergency Director has reason to believe the integrity of this barrier is being challenged, he may declare it so. He should have objective reason to believe the barrier is challenged. Simply not knowing (for example loss of indications) should not be used as a basis for declaring a barrier challenged or lost. If the barrier is subsequently determined not to have been challenged, it may be declared intact. If it is determined that the barrier was challenged, but is no longer challenged, the barrier must remain as challenged, until the Recovery phase of the emergency. For the purposes of emergency classification, the barrier is to be considered CHALLENGED.

ATTACHMENT C
FISSION PRODUCT BARRIER (FPB) MATRIX

Containment - LOSS

CL-1
ST-5 (Containment) Red Path represent conditions indicate the containment barrier has been subjected to conditions which may cause its failure. For the purposes of emergency classification, the barrier is to be considered LOST.
CL-2
Hydrogen at these concentrations may detonate. This would create an explosion in Containment. For the purposes of emergency classification, the barrier is to be considered LOST.
CL-3
Main steam line piping outside containment, up to and including the isolation valves may be considered a part of the Containment barrier. The inability to isolate assumes it is desired and has been attempted. This attempt includes only actions which may be taken from the Control Room. If actions must be taken outside the Control Room to isolate, the barrier must be considered lost. For the purposes of emergency classification, the barrier is to be considered LOST.
CL-4
This criteria includes all isolation paths, including access hatches. Only one valve or door in a given path need be closed. A physical loss of integrity (crack or hole) also meets this criteria. For the purposes of emergency classification, the barrier is to be considered LOST.
CL-5
It is unlikely that any classification scheme can anticipate every circumstance. Therefore this 'threshold' criteria is based on an ad hoc judgment call. If the Emergency Director has reason to believe the integrity of this barrier is lost, he may declare it so. He should have objective reason to believe the barrier is lost. Simply not knowing (for example loss of indications) should not be used as a basis for declaring a barrier challenged or lost. If the barrier is subsequently determined not to have been lost, it may be declared intact, or challenged, as appropriate. If it is determined that the barrier was lost, but is no longer lost, the barrier must remain as lost, until the Recovery phase of the emergency. For the purposes of emergency classification, the barrier is to be considered LOST.

ATTACHMENT D
SAFETY AND SAFETY-RELATED SYSTEMS

Designator	System	Safety-Related Functions
AF	Auxiliary Feedwater	Feedwater supply
AMSAC	ATWS Mitigation System Actuation Circuitry	Non-safety-related isolation
BS	Boron Recycle	Supports Safety Injection
CCW	Component Cooling Water	Cools safety-related equipment
CI	Containment Integrity	Containment integrity
COMP	Computers	Monitoring
CONT	Containment Structures	Containment integrity
CP	Containment Penetrations	Containment integrity
CS	Condensate and Feedwater	Core Cooling
CV	Chemical and Volume Control	Emergency cooling, containment integrity
DA	Diesel Starting Air	Diesel start
DG	Diesel Generator	Emergency power supply
ESF	Engineered Safety Features (Safeguards)	Core Cooling and Integrity
FH	Fuel Handling	Fuel integrity
FM	In core Flux Mapping	Fuel integrity
FO	Fuel Oil	Power supply
FP	Fire Protection	Fire Protection
FW	Feedwater (I&C only)	Non-safety-related isolation
HV	Auxiliary Steam, Heating Steam & Condensate, Chilled & Hot Water	Containment cooling and integrity

ATTACHMENT D
SAFETY AND SAFETY-RELATED SYSTEMS

Designator	System	Safety-Related Functions
IA	Instrument Air	Containment isolation and integrity
IST	Inservice Test Equipment (i.e., steam generator nozzle dams)	Reactor coolant system integrity
MRR	Metering, Relaying, & Regulation	Monitoring
MS	Main, Extraction, Gland Seal & Reheat Steam	Containment integrity, heat removal
NG	Nitrogen Gas	Monitoring
NI	Nuclear Instrumentation	Reactor protection
PACV	Post-Accident Vent, Drains, etc.	Containment integrity, containment hydrogen control
PPCS	Plant Process Computer System	Monitoring
RC	Reactor Coolant	Reactor coolant system integrity, reactor protection, containment integrity
RDC	Rod Drive Control	Reactor coolant system integrity, reactor protection
RH	Residual Heat Removal (LPSI)	Containment integrity, emergency cooling
RM	Radiation Monitoring	Monitoring, RCS and containment integrity
RP	Reactor Protection	Reactor protection, monitoring,
RS	Radwaste Steam	Non-safety-related isolation
S	Structures	Safety-related equipment safety
SA	Service Air	Containment integrity
SF	Spent Fuel Cooling and Filtration	Heat removal and containment integrity
SC	Primary Sampling	Containment and RCS integrity
SI	Safety Injection (HPSI)	Emergency cooling, heat removal, containment integrity

ATTACHMENT D
SAFETY AND SAFETY-RELATED SYSTEMS

Designator	System	Safety-Related Functions
SW	Service Water	Feedwater supply, heat removal, containment integrity
VNBI	PAB Battery & Inverter Room H&V	Heat removal, battery room hydrogen control
VNCC	Containment Accident Fans H&V	Heat removal
VNDG	Diesel Generator Room H&V	Support Diesel operation
VNPSE	Containment Purge Supply & Exhaust H&V	Containment integrity
VNRC	Reactor Cavity Cooling H&V	Containment integrity
WG	Waste Gas	Containment integrity
WL	Waste Liquid	Containment integrity
Y	Vital Instrument Bus 120 VAC	Power supply
4.16KV	4160V Electrical	Power supply
480V	480V Electrical	Power supply
125V	125VDC Electrical	Power supply