EPIP 7.3.7

ESTIMATING RADIOIODINE AIR CONCENTRATIONS

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1.0 PURPOSE

This procedure provides a method to estimate radioiodine air concentrations when charcoal air sample cartridge dose rates exceed the multichannel analyzer (MCA) counting capability. It uses a set of tables to estimate radioiodine concentrations from contact dose rates.

2.0 PREREQUISITES

2.1 Responsibilities

Radiation Protection Supervision (Offsite Radiation Protection Coordinator and/or Radiation Protection Leader) is responsible for:

2.1.1 Estimation of radioiodine air concentrations.

2.1.2 Implementation of radiological monitoring controls.

2.1.3 Ensuring Dose/PAR Coordinator or Rad/Chem Coordinator is informed of results.

2.2 Equipment

Emergency Preparedness Radiation Protection Equipment maintained in OSRPF and/or OSC.

3.0 PRECAUTIONS AND LIMITATIONS

3.1 Personnel shall wear prescribed protective clothing, dosimetry devices, and other protection equipment when performing sample analyses.

3.2 Improper handling of radioactive material can result in personnel contamination, radioactive material uptake, unplanned personnel exposure, and cross-contamination of samples.

3.3 An air particulate filter will have been placed in front of the charcoal filter to collect particulate matter and prevent charcoal filter contamination by particulates.

3.4 The total DAC-hours/hour determined by this procedure is for iodine nuclides only.

4.0 INITIAL CONDITIONS

4.1 The contact dose rate reading (after purging, if charcoal filter) on the air sample cartridge is greater than 1 mR/hr or the spectroscopy amplifier dead time is greater than 20%.

4.2 The iodine air sampling cartridge contains activity which exceeds the counting capability of the MCA.

5.0 PROCEDURE

5.1 Purging Charcoal Filter

NOTE: IF a silver zeolite cartridge was used for the sample, THEN no purging is necessary.

IF a charcoal cartridge was used,
THEN purge the cartridge with non-radioactive air to remove radioactive noble gases that may have accumulated in the filter. Purging may be accomplished utilizing the following:

NOTE: Purging should be accomplished inside a chemistry laboratory hood or in an open area away from personnel.

5.1.1 **IF** service air is utilized to perform the purge,
THEN verify that the plant service air is not contaminated.

5.1.2 **IF** an air sampler is utilized to perform the purge,
THEN place the filter in another sampler and operate it in an area outside the known radioactive airborne area. Use a clean particulate filter to prevent contamination from particulates.

5.1.3 Purge until the contact reading on filter stabilizes over 5 minutes.

5.2 Determining Contact Dose Rate

NOTE: The contact dose rate is defined as the dose rate observed when the inlet side of the cartridge is placed in contact with the beta shield of the survey meter in the closed window position. The contact dose rate may be measured through a plastic bag.

5.2.1 Measure the iodine air sampling cartridge contact dose rate with a Survey Meter (i.e., Eberline RO-2, Bicron RSO-5, or equivalent).

5.2.2 Record the contact dose rate on Worksheet 1 and on the plastic bag the cartridge is in.

5.3 Determining Radioiodine Air Concentrations

NOTE: The user may need to interpolate to get the desired numbers from the tables.

5.3.1 Determine the appropriate table to be used by selecting the table matching:

a. The type of iodine air sampling cartridge used, and

b. The flow rate used during the air sampling.

5.3.2 Record the conversion factors from the appropriate table on Worksheet 1.

5.3.3 Calculate the radioiodine air concentrations by multiplying the conversion factors by the contact dose rate.

5.4 Determining DAC-Hours

5.4.1 Calculate the DAC-hours/hour for each nuclide listed by dividing the radioiodine air concentration by the corresponding DAC conversion factor.

5.4.2 Sum the DAC-hours/hour for all listed radioiodine nuclides.

5.4.3 Sign/Print the "Complete by" and "Date" sections of Worksheet 1.

5.4.4 Forward the results to the Dose/PAR Coordinator.

6.0 REFERENCES

6.1 Correspondence, NEM-89-510, Contact Dose Rate to Air Concentration Conversion Factors for I-130, I-132, I-133, I-134 and I-135, 8/7/89

6.2 Calculation 1999-0113, Air Cartridge Contact Dose Rate to Air Concentration Conversion Factors for Radioiodines

7.0 BASES

B-1 10 CFR 20, Standards for Protection Against Radiation

TABLE 1
CARTRIDGE - CHARCOAL - FLOW RATE - 100 LPM
AIR CARTRIDGE CONTACT DOSE RATE TO AIR CONCENTRATION
CONVERSION FACTORS

Time Post-Accident (Hours)	Conversion Factor (μCi/cc per mR/h contact total)				
	I-131	**I-132**	**I-133**	**I-134**	**I-135**
0	1.52E-07	2.19E-07	3.12E-07	3.43E-07	2.91E-07
0.5	1.83E-07	2.26E-07	3.68E-07	2.77E-07	3.32E-07
1	2.14-E-07	2.28E-07	4.25E-07	2.19E-07	3.69E-07
1.5	2.46E-07	2.26E-07	4.81E-07	1.70E-07	4.04E-07
2	2.78E-07	2.20E-07	5.36E-07	1.30E-07	4:34E-07
4	4.02E-07	1.75E-07	7.30E-07	3.88E-08	5.12E-07
6	5.18E-07	1.24E-07	8.87E-07	1.04E-08	5.39E-07
8	6.31E-07	8.35E-08	1.02E-06	2.62E-09	5.36E-07
10	7.42E-07	5.42E-08	1.13E-06	6.38E10	5.15E-07
12	8.53E-07	3.43E-08	1.22E-06	1.52E-10	4.83E-07
18	1.18E-06	7.93E-09	1.41E-06	1.86E-12	3.63E-07
24	1.49E-06	1.68E-09	1.49E-06	2.10E-14	2.50E-07
30	1.78E-06	3.37E-10	1.49E-06	2.23E-16	1.63E-07
36	2.05E-06	6.48E-11	1.44E-06	2.28E-18	1.02E-07
48	2.49E-06	2.21E-12	1.22E-06	2.19E-22	3.68E-08
72	3.11E-06	2.18E-15	7.48E-07	1.72E-30	4.05E-09
96	3.49E-06	1.92E-18	4.11E-07	1.20E-38	4.00E-10
168	3.88E-06	1.04E-27	5.37E-08	3.28E-63	3.03E-13

TABLE 2
CARTRIDGE - CHARCOAL - FLOW RATE - 30 LPM
AIR CARTRIDGE CONTACT DOSE RATE TO AIR CONCENTRATION
CONVERSION FACTORS

Time Post-Accident (Hours)	Conversion Factor (μCi/cc per mR/h contact total)				
	I-131	I-132	I-133	I-134	I-135
0	1.48E-07	2.13E-07	3.03E-07	3.34E-07	2.83E-07
0.5	1.78E-07	2.19E-07	3.58E-07	2.70E-07	3.23E-07
1	2.08E-07	2.21E-07	4.13E-07	2.13E-07	3.59E-07
1.5	2.39E-07	2.19E-07	4.68E-07	1.65E-07	3.93E-07
2	2.70E-07	2.14E-07	5.21E-07	1.26E-07	4.22E-07
4	3.91E-07	1.70E-07	7.10E-07	3.78E-08	4.98E-07
6	5.04E-07	1.21E-07	8.63E-07	1.01E-08	5.25E-07
8	6.14E-07	8.13E-08	9.90E-07	2.55E-09	5.22E-07
10	7.22E-07	5.27E-08	1.10E-06	6.21E-10	5.01E-07
12	8.29E-07	3.34E-08	1.19E-06	1.48E-10	4.70E-07
18	1.14E-06	7.72E-09	1.37E-06	1.81E-12	3.53E-07
24	1.45E-06	1.64E-09	1.45E-06	2.04E-14	2.44E-07
30	1.73E-06	3.28E-10	1.45E-06	2.17E-16	1.59E-07
36	1.99E-06	6.30E-11	1.40E-06	2.22E-18	9.92E-08
48	2.42E-06	2.15E-12	1.19E-06	2.13E-22	3.58E-08
72	3.03E-06	2.12E-15	7.28E-07	1.67E-30	3.94E-09
96	3.39E-06	1.87E-18	4.00E-07	1.17E-38	3.89E-10
168	3.77E-06	1.02E-27	5.23E-08	3.19E-63	2.94E-13

TABLE 3
CARTRIDGE - SILVER ZEOLITE - FLOW RATE - 100 LPM
AIR CARTRIDGE CONTACT DOSE RATE TO AIR CONCENTRATION
CONVERSION FACTORS

Time Post-Accident (Hours)	**Conversion Factor (μCi/cc per mR/h contact total)**				
	I-131	**I-132**	**I-133**	**I-134**	**I-135**
0	1.64E-07	2.36E-07	3.36E-07	3.70E-07	3.14E-07
0.5	1.97E-07	2.43E-07	3.97E-07	2.99E-07	3.57E-07
1	2.31E-07	2.45E-07	4.58E-07	2.36E-07	3.98E-07
1.5	2.65E-07	2.43E-07	5.19E-07	1.83E-07	4.35E-07
2	3.00E-07	2.37E-07	5.78E-07	1.40E-07	4.67E-07
4	4.33E-07	1.89E-07	7.87E-07	4.19E-08	5.52E-07
6	5.59E-07	1.34E-07	9.56E-07	1.12E-08	5.81E-07
8	6.80E-07	9.00E-08	1.10E-06	2.82E-09	5.78E-07
10	8.00E-07	5.84E-08	1.22E-06	6.88E-10	5.55E-07
12	9.19E-07	3.70E-08	1.32E-06	1.64E-10	5.21E-07
18	1.27E-06	8.55E-09	1.52E-06	2.01E-12	3.92E-07
24	1.61E-06	1.81E-09	1.61E-06	2.26E-14	2.70E-07
30	1.92E-06	3.63E-10	1.61E-06	2.41E-16	1.76E-07
36	2.21E-06	6.99E-11	1.55E-06	2.46E-18	1.10E-07
48	2.68E-06	2.39E-12	1.32E-06	2.37E-22	3.97E-08
72	3.35E-06	2.35E-15	8.07E-07	1.85E-30	4.36E-09
96	3.76E-06	2.07E-18	4.43E-07	1.30E-38	4.31E-10
168	4.18E-06	1.13E-27	5.79E-08	3.53E-63	3.26E-13

TABLE 4
CARTRIDGE - SILVER ZEOLITE - FLOW RATE - 30 LPM
AIR CARTRIDGE CONTACT DOSE RATE TO AIR CONCENTRATION
CONVERSION FACTORS

Time Post-Accident (Hours)	**Conversion Factor (μCi/cc per mR/h contact total)**				
	I-131	**I-132**	**I-133**	**I-134**	**I-135**
0	1.49E-07	2.14E-07	3.06E-07	3.37E-07	2.86E-07
0.5	1.79E-07	2.21E-07	3.61E-07	2.72E-07	3.25E-07
1	2.10E-07	2.23E-07	4.17E-07	2.15E-07	3.62E-07
1.5	2.41E-07	2.21E-07	4.72E-07	1.67E-07	3.96E-07
2	2.73E-07	2.15E-07	5.25E-07	1.27E-07	4.25E-07
4	3.94E-07	1.72E-07	7.16E-07	3.81E-08	5.02E-07
6	5.08E-07	1.22E-08	8.70E-07	1.02E-08	5.29E-07
8	6.19E-07	8.19E-08	9.98E-07	2.57E-09	5.26E-07
10	7.28E-07	5.31E-08	1.11E-06	6.26E-10	5.05E-07
12	8.36E-07	3.36E-08	1.20E-06	1.49E-10	4.74E-07
18	1.15E-06	7.78E-09	1.38E-06	1.83E-12	3.56E-07
24	1.46E-06	1.65E-09	1.46E-06	2.06E-14	2.46E-07
30	1.75E-06	3.30E-10	1.46E-06	2.19E-16	1.60E-07
36	2.01E-06	6.35E-11	1.41E-06	2.24E-18	1.00E-07
48	2.44E-06	2.17E-12	1.20E-06	2.15E-22	3.61E-08
72	3.05E-06	2.14E-15	7.34E-07	1.68E-30	3.97E-09
96	3.42E-06	1.89E-18	4.03E-07	1.18E-38	3.92E-10
168	3.80E-06	1.02E-27	5.27E-08	3.21E-63	2.97E-13

WORKSHEET 1
IODINE AIR CONCENTRATIONS AND DAC-HOURS/HOUR ESTIMATIONS

Time of shutdown _____

Time air sampling initiated _____

Time contact dose rate determined _____

Time elapsed between shutdown and start of air sampling _____ hours

Sample Volume _____ CC

Iodine air sampling media used: Charcoal Silver Zeolite
(Circle one)

Was charcoal cartridge purged? Yes No
(Circle one)

Contact dose rate (after purging, if charcoal filter) _____ mrem/hr

Nuclide	Air Concentration Conversion Factor from Tables 1-4 (μCi/cc per mR/h)		Contact Dose Rate (mR/h)		DAC* (μCi/cc)		DAC-hours/hour
I-131	_____	×	_____	÷	2E-8	=	_____
I-132	_____	×	_____	÷	3E-6	=	_____
I-133	_____	×	_____	÷	1E-7	=	_____
I-134	_____	×	_____	÷	2E-5	=	_____
I-135	_____	×	_____	÷	7E-7	=	_____
					Total		_____ DAC-hours/hour

* 10 CFR 20, Appendix B, Table B-1

Completed By: _____ Date: _____ Time: _____

FORWARD THE RESULTS TO THE DOSE/PAR COORDINATOR

EPIP 8.4.1

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

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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. _____

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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. _____

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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 _____

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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 _____

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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 CAMP 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 CAMP 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 _____

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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 _____

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

5.5.2 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.

5.5.3 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.

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

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

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

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

a. Valves 1 **AND** 2 OPEN. _____

b. Valve 3 SHUT. _____

5.5.8 Evacuate Gas Collection Vessel and connecting lines. _____

5.5.9 SHUT valve 1 **AND** check stable vacuum. _____

5.5.10 **IF** vacuum unstable,
THEN perform following: _____

a. REPAIR leak(s).

b. OPEN valve 1, **AND** repeat Steps 5.5.8 **AND** 5.5.9 until stable.

5.5.11 Secure vacuum **AND** disconnect vacuum line. _____

NOTE: Other methods of pressure adjustment (Step 5.5.12) may be used, as directed by Chemistry supervision.

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

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

5.5.13 OPEN valves 9A **AND** 9B. _____

INITIALS

e. Document hydrogen analysis on Attachment C, Section 3.0. _____

5.6.2 Radioactive Noble Gas

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

b. LOCK syringe, then withdraw from sample vessel. _____

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

c. **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.c 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: _____

d. **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. _____

INITIALS

5.5.14 OPEN valve 8B one-quarter turn. _____

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

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

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

5.5.17 Ensure that the following sample vessel valves are OPEN.

ID	Initials
9A	
9B	
8A	
8B	

5.5.18 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 CAMP 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. _____

INITIALS

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

f. Record analysis data for Lines A - F in Attachment C, Table 2. _____

g. Determine Common Multiplier (CM) in accordance with equation provided in Attachment C, Section 1.2 **AND** record CM in, Table 2, Line G. _____

h. Correct MCA results using values in Table 2, Lines E - F **AND** record corrected µCi/cc for each Noble Gas isotope detected in spaces provided on Table 2. _____

i. Document noble gas analysis on Attachment C, Section 3.0. _____

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 (using an automatic pipettor) 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, _____

d. Document chloride analyses on Attachment C, Section 3.0. _____

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 a 1000 ml polyethylene bottle containing 1000 ml of DI water, using 2 cc syringe or adjustable automatic pipet. _____

b. **IF** the contact radiation reading on 1000 ml polyethylene bottle is >5 mR/hr **OR** >10% detector dead time, **THEN** prepare additional dilution, as follows:

1. Transfer 0.3 cc of diluted sample to another 1000 ml polyethylene bottle containing 1000 ml DI water. _____

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

(a) Repeat Steps 5.8.3.b.1 **AND** 5.8.3.b.2 until reading is ≤5 mR/hr **OR** ≤10% detector dead time. _____

(b) Record number of dilutions performed below, **AND** label each container as second, third, dilution, etc.: _____

Dilutions performed for this analysis: _____

INITIALS

c. **IF** reading (original sample **OR** dilution) is ≤5 mR/hr **OR** ≤10% detector dead time, **THEN** perform following:

1. Count sample in accordance with CAMP procedure for instrument designated by Chemistry supervision. _____

2. Obtain MCA printout. _____

d. Record analysis/calculation data on in Attachment C, Table 5, Lines A - F. _____

e. Determine Common Multiplier (CM) in accordance with equation provided in Attachment C, Section 2.3, **AND** record CM in Table 5, Line G. _____

f. Correct MCA results using values in Table 5, Lines E - G **AND** record corrected µCi/cc for each isotope listed in Table 5, Section B **AND** C. _____

g. Document analysis of iodine **AND** other isotopes for EPIP 10.2, as applicable on Attachment C, Section 3.0. _____

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. _____

INITIALS

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 Record any unusual conditions observed **OR** conditions that interfered with re-installation of sample vessel, including step number(s) **AND** affected component ID in comments block, below, **AND** notify Chemistry supervision of unusual condition(s): _____

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. _____

INITIALS

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. _____

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 CAMP 205, Boron-Titration-Mannitol\ph Method

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

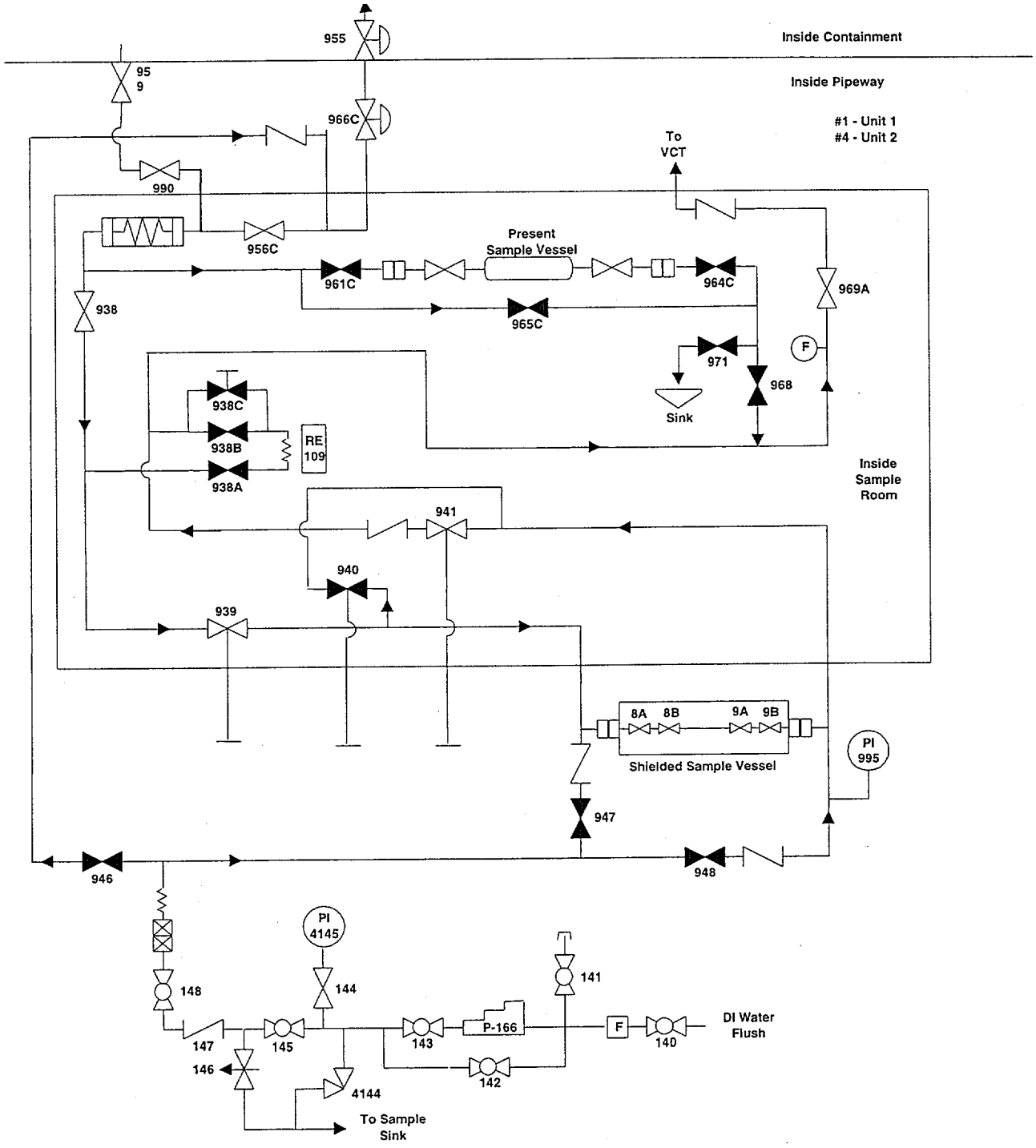
7.0 BASES

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

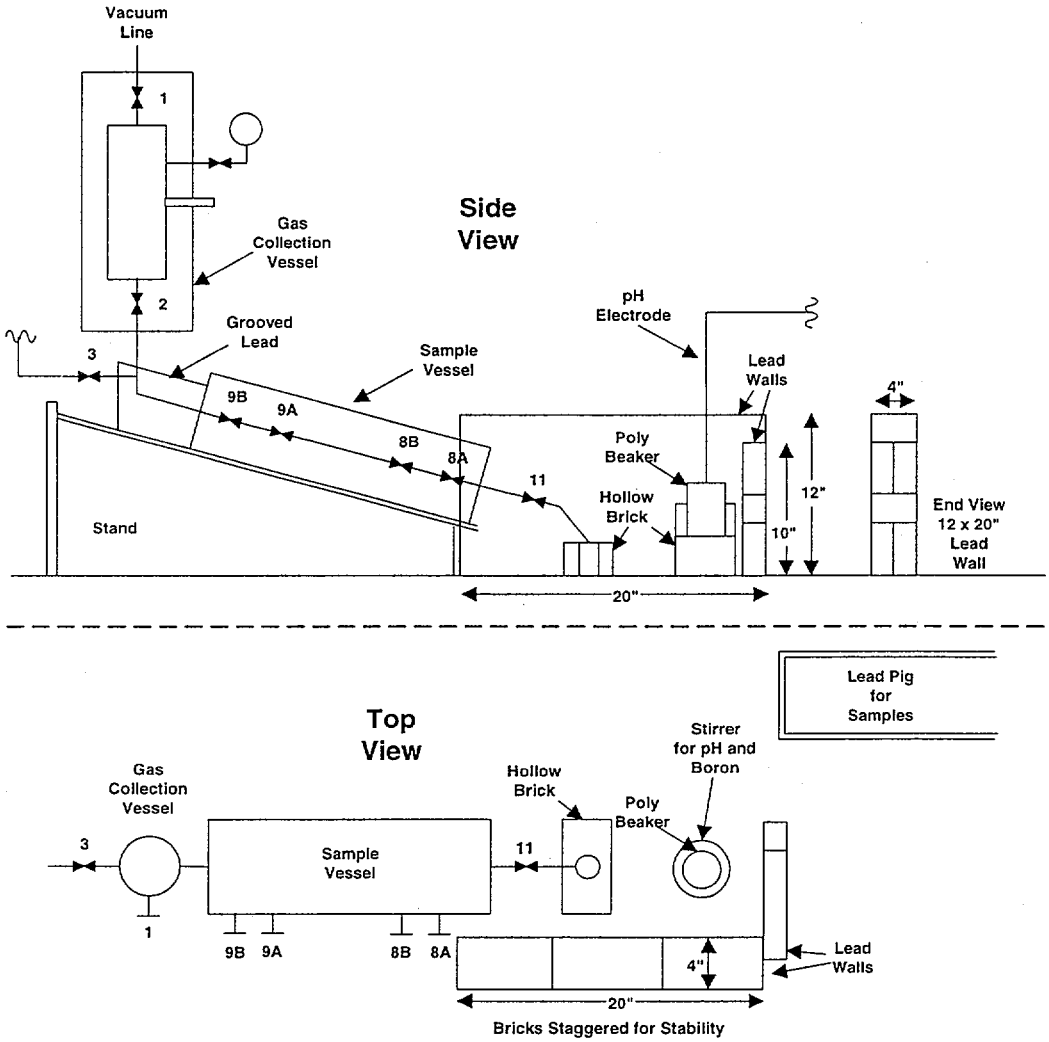
B-2 NUREG-0654, Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants, Rev. 1, November 1980

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):

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

$$= 1.01E^3 \frac{(A) \times (C)}{(B)(D)}$$

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

MCA Results (corrected, using following equation with Table 2, Values E-F):

$$Common\ Multiplier\ (CM) = \frac{280}{(G)} \times \frac{(F)}{(E)}$$

If gas dilution **NOT** *required then the quantity* $\frac{(F)}{(E)} = 1$

Table 2: Radioactive Noble Gases

A. Analysis/Calculation Data			B. Noble Gases				
A	Decay time (min)		Isotope	µCi/cc		Isotope	µCi/cc
B	Count Time (sec)		Xe-133			Xe-138	
C	Detector		Kr-85m			Kr-87	
D	Geometry		Kr-88			Ar-41	
E	Vol Sample Vessel (ml)		Xe-133m			Kr-85	
F	Vol sidearm flask (ml)		Xe-135			Xe-131m	
G	Vol of sample removed with gas syringe (ml)						
H	* CM						

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

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

MCA Results (corrected, using following equation and Table 5, Values E-F):

$$*CM = \frac{1000}{V_S} \times F$$

V_S = Volume of sample (first dilution)

F = Any additional dilution factors (2 or more dilutions)

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."

NOTE: Multiply the corrected MCA iodine results by the listed multiplication factor to obtain the final iodine corrected result.

Table 5: Iodine and Other Isotopes for EPIP 10.2

A. Analysis/Calculation Data			B. Iodine			C. Other (for EPIP 10.2)	
A	Decay time (min)		Isotope	Mult. Fact.	Final Corrected µCi/cc	Isotope	**µCi/cc**
B	Count Time (sec)		I-130	× 4.5 =		Rb-88	
C	Detector		I-131	× 4.5 =		Cs-134	
D	Geometry		I-132	× 4.5 =		Cs-137	
E	V_S: Vol of Sample (1st dil), ml		I-133	× 4.5 =		Te-132	
F	Additional dilutions (>1)		I-134	× 4.5 =		Ba-140	
G	* Common Multiplier		I-135	× 4.5 =		La-140	
			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 8.4.2

POST-ACCIDENT SAMPLING OF CONTAINMENT ATMOSPHERE

DOCUMENT TYPE: Technical

CLASSIFICATION: Safety Related

REVISION: 10

EFFECTIVE DATE: July 12, 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

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 containment atmosphere sample with potentially high radioactivity due to fuel failure and/or loss of reactor coolant system (RCS) integrity.

This procedure may 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 containment atmosphere sample collection and analysis.

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

2.1.3 Chemistry Supervision (Chemistry Leader if 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 the manipulation of valves.

3.5 Containment atmosphere samples shall be taken and analyzed within three (3) hours from the time the decision is made to dispatch a sample team.

4.0 INITIAL CONDITIONS

4.1 Possible fuel failure

4.2 Loss of RCS integrity

5.0 PROCEDURE

INITIALS

5.1 Preliminary Evaluation

NOTE: This section shall be completed prior to entering facade to collect a Containment atmosphere sample under emergency conditions.

5.1.1 Indications of Possible Fuel Damage

NOTE: Fuel failure or loss of RCS integrity may be the cause if any of the conditions in Steps 5.1.1.a - 5.1.1.e 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, unusually high or offscale high _____

b. Containment Air Particulate Monitor, 1(2) RE-211 and Containment Noble Gas Monitor, 1(2) RE-212, unusually high or offscale high. (Readings may be invalid if containment isolation has occurred.) _____

c. Containment Low-Range Monitor, 1(2) RE-102, and Seal Table Monitor, 1(2) RE-107, unusually high or offscale high _____

d. Post Accident Sample Line Monitor, 1(2) RE-109, unusually high or offscale high. (Readings may be invalid if containment isolation has occurred.) _____

e. Auxiliary Building Vent Stack Monitor, RE-214, indicating significant increase due to auxiliary building airborne activity from letdown and charging pump areas _____

INITIALS

NOTE: Equipment collection and laboratory setup (Sections 5.2 and 5.3) may be performed before or while performing Step 5.1.2.

5.1.2 Evaluation of Radiological Hazards in Access Areas Required for Sampling

a. **WHEN** Radiation Protection (RP) has completed airborne, radioactive contamination, and radiation surveys of facade and all areas through which chemistry personnel must pass, **THEN** obtain following:

1. Radiation Work Permit (RWP) or Reentry Permit, as applicable _____

2. Radiation levels indicated by following monitors: _____

(a) RE-211B, Background Monitor

(b) RE-103, Chem Lab Low Range Monitor

3. Radiation levels in personnel accesses to facade _____

b. Estimate (using RWP, data from Step 5.1.2.a.1 through Step 5.1.2.a.3, and Calculation 97-0011, as applicable) potential personnel (whole body and extremity) dose based on dose rates (area/sample) vs. known or estimated times for performing following:

1. Proceeding to facade _____

2. Obtaining sample (including evacuation/wait time) _____

3. Transporting sample to laboratory _____

4. Performing analysis _____

5.2 Equipment

5.2.1 Sampling Equipment List

a. Flashlight with new or spare batteries _____

b. Lead syringe case (lead brick hollowed out to contain syringes and provide shielding with hinged and latchable, lead cover) _____

INITIALS

c. Radiation dose rate survey instrument _____

d. Two, 2 cc gas-tight (pressure-lock) syringes and spare needle _____

e. Two-way radio with spare battery _____

5.2.2 Analysis Equipment and Reagents List

a. Gas Chromatograph (GC) with adequate supply of carrier gas (Argon), and integrator, as designated by the Chemistry Leader _____

b. Gas sample vessel, glass (sacrificial, for equilibrating sample) and lead shielding for sample vessel (in case sample hood inoperable) _____

c. Marker or labels for marking/labeling sample dilutions _____

d. Multichannel Analyzer (MCA), as designated by the Chemistry Leader _____

e. Poly bottle, 1-liter, one (or more if additional dilutions anticipated) with cap, and gas serum vial, one (or more if additional dilutions anticipated) with septum _____

NOTE: Silver zeolite is stocked in the storeroom.

f. Silver zeolite (AgZ) reagent (for iodine analysis) _____

g. Syringe 1 cc, gas-tight (pressure-lock), one or more (if additional dilution probable) _____

h. Test tube (for iodine analysis) with cap or stopper _____

5.3 Laboratory Setup And Preparation Of Sampling Equipment

5.3.1 Consult with the Chemistry Leader to determine following:

a. Which GC (and associated integrator) to be used for Containment atmosphere Hydrogen analysis _____

b. Which MCA to be used for Iodine and Noble Gas Analyses _____

INITIALS

5.3.2 Ensure GC and integrator selected for use by the Chemistry Leader are operating and calibration current (according to applicable procedures for GC and integrator). _____

5.3.3 Ensure MCA selected for use by the Chemistry Leader is operating and calibration current (according to applicable procedures for MCA). _____

5.3.4 Ensure spare syringe needle and needles on the two 2 cc gas-tight syringes are not plugged. _____

5.3.5 Load 1 cc of AgZ into one of the two 2 cc gas-tight syringes. _____

CAUTION

Close syringe case carefully to avoid breaking sample syringes.

5.3.6 Place the two syringes and spare needle in lead syringe case and close. _____

5.3.7 Ensure cap is correctly seated on 1-liter bottle, tightened, and sealed. _____

5.3.8 Place following near work area for easy accessibility: _____

a. 1-liter poly bottle (Step 5.3.7)

b. gas serum vial

c. 1 cc gas-tight syringe (one or more)

d. test tube with cap or stopper

5.3.9 Place lead brick barricade toward rear of hood to shield sacrificial gas sample vessel (with sample) in the event hood ventilation is lost. _____

5.3.10 Obtain a two-way radio **AND** perform a radio check with Control Room (CR) and Operation Support Center (OSC). _____

INITIALS

5.4 Approvals For Implementing Sampling And Analyses

Obtain verbal approval to implement sampling and analysis from:

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

5.4.2 Radiation Protection Supervisor (Rad/Chem Coordinator if TSC is activated) _____

CAUTION

Sampling shall not begin until preliminary evaluation has been completed and all approvals for implementation have been received.

NOTE: Section 5.5 to be accomplished under direction of the Chemistry Supervision.

NOTE: For consistency with PBNP Technical Procedures regarding valve positions, the word SHUT is used.

5.5 Containment Atmosphere Sampling Using Post-Accident Sampling System (RE-211/RE-212 Bypass Loop)

5.5.1 Sampling System Operational Verification, Valve Lineup, and Purge

a. Have Control Room perform following:

1. Ensure instrument air available for operating containment isolation/sample valves and valves inside containment. _____

2. Ensure following pumps secured: _____

(a) P-707-A

(b) P-707-B

INITIALS

3. Ensure following AOV valves SHUT: _____

   (a) RM-3200A

   (b) RM-3200B

   (c) RM-3200C

NOTE: SM approval is required prior to resetting Containment isolation signal.

4. Reset Safety Injection (SI) signal and Containment Isolation (CI) signal (if necessary). _____

5. Switch Mode Selector Switch on ASIP panel to SEPTUM position. _____

NOTE: SM approval is required prior to opening any Containment isolation valve.

6. OPEN AOV containment isolation valve RM-3200A. _____

b. Proceed to door 182 in Potable Water Room to sample Unit 1 Containment atmosphere **OR** to door 183 in Non-nuclear Room to sample Unit 2 Containment atmosphere. _____

NOTE: Station a person at the façade door to open the door upon exit as there are no door knobs from the façade side. Alternately, block open the door to prevent closure if conditions permit. Determine correct course during pre-job brief.

c. Enter facade outside 1(2) RE-211/1(2) RE-212 cubicle. _____

d. OPEN nitrogen supply valves on two nitrogen bottles, **AND** ensure respective nitrogen header valves OPEN. _____

e. OPEN valve RM-3200LL. _____

f. Ensure pressure at nitrogen regulator is 80 to 90 psig. _____

INITIALS

g. Proceed to grab sample panel, **AND** activate eductor by ensuring the following valve positions:

   1. RM-3200JJ, Sample Septum Inlet Series Isolation, OPEN _____

   2. RM-3200M, Sample Septum, SAMPLE _____

   3. RM-3200Y, Nitrogen Supply To PASS, OPEN _____

h. Record pressure indicated on PI-3410 (should indicate negative pressure). _____

   Indicated pressure: _____ psig or in. Hg (circle one as applicable)

i. Exit Facade. _____

NOTE: SM approval is required prior to opening any Containment isolation valve.

j. Have Control Room OPEN following AOV Containment Isolation valves to initiate purge. _____

   1. RM-3200B

   2. RM-3200C

k. **WHEN** sampling system has purged for ≥ 10 minutes, **THEN** return to Facade with two, 2 cc gas-tight syringes (one containing 1 cc of AgZ) in lead syringe case. _____

l. Record pressure indicated on PI-3410 (pressure should be greater than pressure recorded at Step 5.5.1.h). _____

   Indicated pressure: _____ psig or in. Hg (circle one as applicable)

INITIALS

5.5.2 Sample Collection

CAUTION

Syringes shall not be purged while obtaining samples. Purging syringe that contains AgZ will result in AgZ retaining iodine from each withdrawal.

a. Obtain first sample, as follows: _____

NOTE: Syringe should be inserted until syringe cylinder touches septum guide.

1. Collect 1 cc sample, SHUT syringe lock valve, **AND** record time.

   Sample Time: _____ (first sample)

2. Remove syringe from septum and place in syringe case.

b. Repeat Step 5.5.2.a.1 and 5.5.2.a.2 for second sample, **AND** record sample time. _____

   Sample Time: _____ (second sample)

CAUTION

Close lead syringe case carefully to avoid breaking sample syringes.

c. Close lead syringe case and latch. _____

d. Exit Facade. _____

INITIALS

5.5.3 Sample Line Purge

a. Notify Control Room that sampling completed, **AND** have Control Room perform following:

1. SHUT RM-3200A (RE-211/RE-212 Monitor Return) **AND** allow sample inlet to back flush for at least three minutes. _____

CAUTION

The time period that containment isolation valve RM-3200a and containment isolation valve RM-3200c are both shut with nitrogen pressure present in system shall be minimized.

2. SHUT RM-3200C (RE-211/RE-212 Monitor Supply). _____

NOTE: SM approval is required prior to opening any Containment isolation valve.

3. OPEN RM-3200A **AND** allow forward flush of sample outlet for at least three minutes. _____

4. SHUT RM-3200A. _____

5. SHUT RM-3200B. _____

b. Return to Facade, **AND** SHUT following:

1. RM-3200LL _____

2. Supply valves on nitrogen cylinders _____

c. Position valve RM-3200Y to SHUT. _____

d. Deliver samples to laboratory. _____

INITIALS

5.5.4 Record any unusual conditions observed or conditions that interfered with sampling, including step number(s) and affected component ID in Comments block, below.

COMMENTS

5.5.5 Sign and date EPIP 8.4.2 under Sampling, Section 5.9. _____

5.6 Containment Atmosphere Sample Analysis

5.6.1 Volume Adjustments

a. If sample hood ventilation is operable, enter N/A for Step 5.6.1.b, and **GO TO** Step 5.6.1.c. _____

b. **IF** sample hood ventilation is inoperable, **THEN** perform following: _____

1. Ensure sacrificial glass sample vessel is at atmospheric pressure.

2. Insert syringe needle through rubber septum of glass sample vessel and place behind brick barricade.

3. Unlock syringe locking device and allow syringe and glass sample vessel to equilibrate for approximately 30 seconds, then re-lock syringe.

4. Withdraw syringe and store in lead syringe case.

5. Repeat Steps 5.6.1.b.1 through 5.6.1.b.4 for remaining syringe.

INITIALS

c. **IF** sample hood ventilation is operable, **THEN** perform following: _____

1. Place syringe deep inside hood and unlock syringe locking device.

2. Allow 30 seconds for equilibration, then re-lock syringe and store in lead syringe case.

3. Repeat Steps 5.6.1.c.1 and 5.6.1.c.2 for remaining syringe.

5.6.2 Hydrogen Analysis

Perform hydrogen analysis on 1 cc of gas sample in syringe **NOT** containing AgZ, in accordance with procedures for Gas Chromatograph and Integrator prepared for analysis in Section 5.3. _____

NOTE: Noble gas sample, subsequent dilution(s), and iodine sample are to be labeled with sample number, sample name, date/time of sample, sample volume, and dilution(s).

5.6.3 Noble Gas Initial Dilution and Equilibration

a. Penetrate capped, 1-liter poly bottle with needle of syringe containing 1 cc AgZ and 1 cc Containment Atmosphere sample. _____

b. Eject gaseous contents of syringe (1 cc sample) from syringe into the 1-liter poly bottle using care to retain all of the AgZ in syringe. _____

c. Purge syringe air space once or twice while needle is inserted in poly bottle to recover all noble gases. _____

d. Remove syringe and store in lead syringe case. _____

e. Tape over syringe needle hole in poly bottle. _____

f. Allow a minimum of 15 minutes for gas to reach equilibrium. _____

INITIALS

NOTE: Iodide analysis (Section 5.6.4) may be performed while Noble Gas sample is reaching equilibrium (Step 5.6.3.f).

5.6.4 Iodine Analysis

a. Hold syringe containing AgZ deep inside hood, unscrew syringe top, and remove internal plunger. _____

b. Pour the AgZ into a counting test tube and cap. _____

c. **IF** the AgZ/iodine sample is less than 1 mR/hr contact, **THEN** perform the following:

1. Count sample directly on the MCA using test tube geometry. _____

2. Enter results in Attachment B, Section 3.0, Radioactive Iodine Analysis. _____

3. N/A Step 5.6.4.d. _____

4. N/A Step 5.7.1. _____

d. **IF** the iodine activity is too high to count directly (≥1 mR/hr contact), **THEN** perform the following:

1. Determine radiation level in R/hr at one foot. _____

2. Place sample in proper geometry orientation (attenuating sample, as necessary) in accordance with CAMP procedure for MCA prepared for analysis in Section 5.3. _____

3. Count and determine percent isotopic composition in accordance with CAMP procedure for MCA prepared for analysis in Section 5.3. _____

4. Complete data evaluation in Section 5.7.1. _____

INITIALS

5.6.5 Noble Gas Analysis

a. Withdraw a 1 cc gas sample from poly bottle prepared in Section 5.6.3. _____

b. If contact reading on syringe is less than 5 mR/hr, enter N/A for Steps 5.6.5.c, and **GO TO** Step 5.6.5.d. _____

NOTE: Dilutions (Step 5.6.5.c) NOT required for drills or training.

c. **IF** contact reading on syringe is greater than 5 mR/hr, **THEN** perform following:

1. Prepare a dilution of sample in syringe in accordance with Section 5.6.3. _____

2. Obtain new syringe **OR** ensure syringe is thoroughly purged, then withdraw 1 cc gas sample from second dilution. _____

3. Measure dose rate on syringe. _____

4. **IF** contact reading on syringe is still greater than 10 mR/hr,
THEN repeat Steps 5.6.5.c.1 through 5.6.5.c.3 until dose rate on syringe is less than 5 mR/hr. _____

5. Record number of dilutions. _____

Number of dilutions: _____

INITIALS

NOTE: Spectroscopy amplifier dead time must be less than 10%.

NOTE: Ensure appropriate amount of air has been evacuated from gas serum vial prior to injecting sample.

d. **IF** contact reading on syringe is less than 5 mR/hr, **THEN** inject sample into a gas serum vial and count in accordance with CAMP procedure for instrument prepared in Section 5.3. _____

e. Sign and date EPIP 8.4.2 under Analyses, Section 5.9. _____

5.7 Calculations

5.7.1 Iodine Calculations

a. Determine Total Gamma Energy/Disintegration (E_τ) using Table 1 (following). _____

Table 1

Isotope	(1) Total γ Energy/Dis	(2) Fractional % Composition (In Fraction Form)	(1) x (2) Weighted γ Energy
I-130	2.130		
I-131	0.380		
I-132	2.260		
I-133	0.608		
I-134	2.600		
I-135	1.560		
Total Weighted γ Energy:		(E_τ)	

INITIALS

b. Calculate total iodine activity using following equation: _____

$$C_{(CI)}=\frac{R/hr@1ft.}{6E_{\tau}}$$

c. Calculate each individual iodine isotopic concentration (μ Ci/cc), using Table 2 (following). _____

μ Ci/cc $I_{(i)} = C_{(Ci)} \times 1 \times 10^{+6} \times$ (Fractional % Composition)

Table 2

Isotope	(1) $C_{(CI)}$ (From Step 5.7.1.b)	(2) 1×10^{6}	(3) Fractional % Composition	(1) x (2) x (3) Isotopic Concentration
I-130				
I-131				
I-132				
I-133				
I-134				
I-135				

d. Enter isotopic iodine data in appropriate location of Attachment B, Section 3.0, Radioactive Iodine Analysis. _____

5.7.2 Pressure and Temperature Correction

a. Obtain Containment pressure (psig) and temperature (°F) from Control Room supervision. _____

b. Obtain atmospheric pressure (mbar) and temperature (°F) from Chemistry laboratory barometer. _____

c. Perform pressure and temperature correction, using calculation from Attachment B. _____

5.7.3 Sign and date EPIP 8.4.2 under Calculations, Section 5.9. _____

INITIALS

5.8 Procedure Submittal and Sample Storage

NOTE: Steps 5.8.1 and 5.8.2 may be performed in any order.

5.8.1 Submit completed sections of procedure to the Chemistry Leader. _____

5.8.2 Store samples (AgZ and gases) in designated high level shielded storage area located in Auxiliary Building outside of Gas Decay Tank Room. _____

5.9 Performer Documentation

Sampling

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

Hydrogen Analysis

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

Iodine Analysis and Calculations

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

Noble Gas Analysis and Calculations

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

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

INITIALS

5.10 Analysis Report

5.10.1 Complete Attachment B, Containment Atmosphere Post-Accident Sampling Analysis Report. _____

5.10.2 Forward completed procedure (including completed Attachment B) to the Rad/Chem Coordinator. _____

6.0 REFERENCES

6.1 Calculation 97-0011, Radiation Conditions at the RC-211/212 HUT during PASS sampling, 3/10/97

6.2 NPM 94-0030, Compilation of WEPCO commitments associated with NUREG-0737, Clarification of TMI Action Plan Requirements, 1/12/94

6.3 CAMP 401, Radioactive Standard and Sample Placement for Multichannel Analyzer Calibration and Quantification

6.4 SE 97-96, Unit 2 Post-Accident Sample System Upgrades (MR-97-057/WO9700312)

6.5 SE 97-145, Unit 1 Post-Accident Sample System Upgrades (MR-97-056/WO9706481)

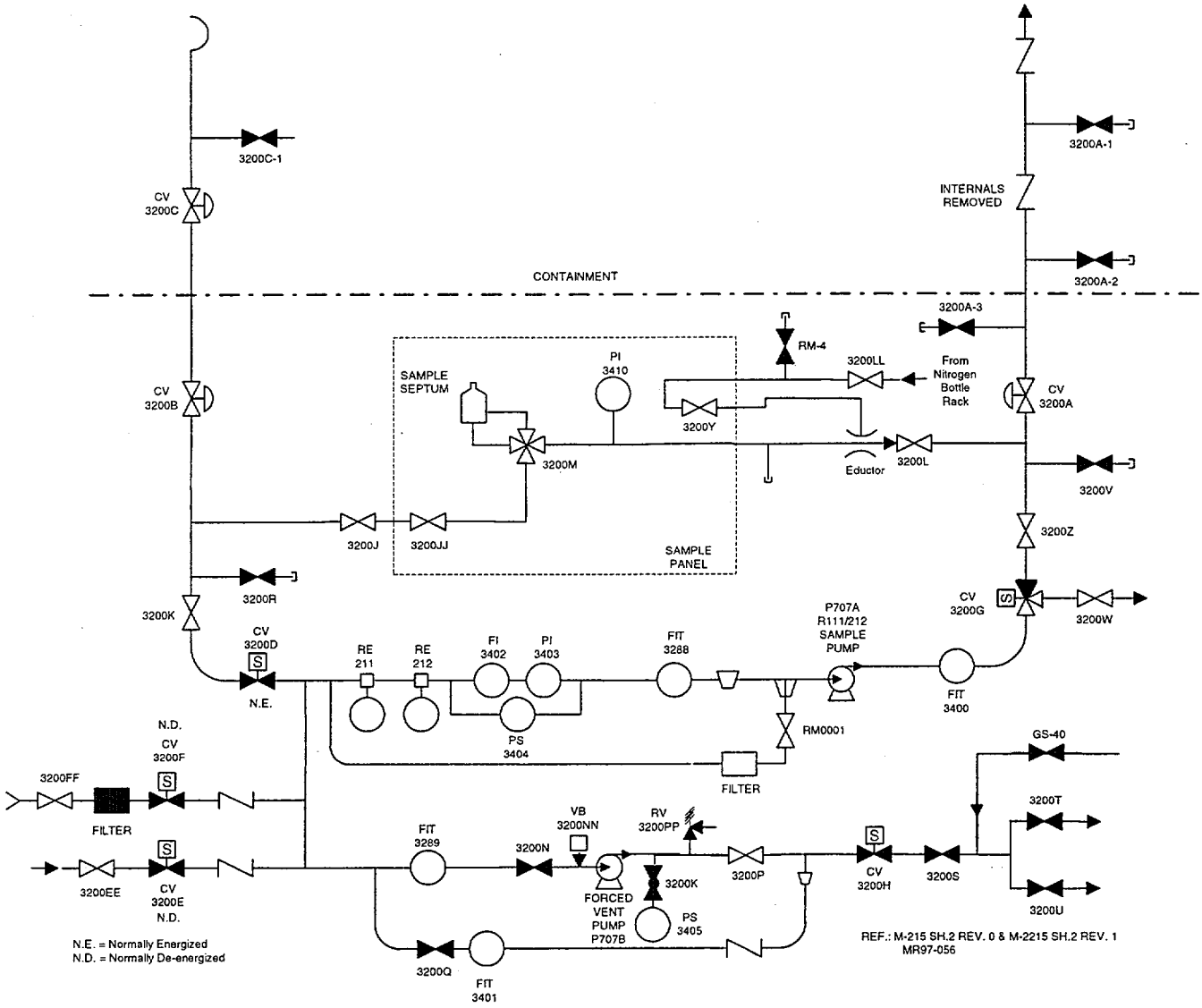
7.0 BASES

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
PASS VALVE LINEUP FOR CONTAINMENT ATMOSPHERE GRAB SAMPLING
(Reference Only)



ATTACHMENT B
CONTAINMENT ATMOSPHERE POST ACCIDENT SAMPLING ANALYSIS REPORT
Page 1 of 2

1.0 HYDROGEN ANALYSIS

Percent (%) hydrogen from instrument output (Section 5.6.2):

Table 1: Hydrogen

Percent (%) HYDROGEN (from instrument output, Section 5.6.2)	%

2.0 RADIOACTIVE NOBLE GAS ANALYSIS

Noble Gas @ STP, corrected, using data in Part A of Table 2 and calculations at 2.1 and 2.2, below.

Table 2: Radioactive Noble Gases

A. Analysis/Calculation Data		B. NOBLE GASES				
Decay time (min)		Isotope	µCi/cc		Isotope	µCi/cc
Count Time (sec)		Xe-133			Kr-87	
Detector		Kr-85m			Xe-135m	
Geometry		Kr-88			Ar-41	
[1]Number of Dilutions (D)		Xe-133m			Kr-85	
* Common Multiplier (CM)		Xe-135			Xe-131m	
		Xe-138				

2.1 Common Multiplier*:

$$*CM = (D)^{1} \times \frac{1075}{1.0} \times (\text{Pressure} - \text{Temperature Correction})$$

[1] See Step 5.6.5.c. One or more dilutions may have been performed.

2.2 Pressure-Temperature Correction:

$$= \frac{(P_{SP} + 14.7)(T_L + 459)}{P_L (T_C + 459)}$$

Where: P_{SP} = Pressure of sample, psig from EPIP 8.4.2, Step 5.5.1.l

T_C = Temperature (°F) in Containment

P_L = Pressure (psia) in Laboratory, where:

$$P_L = 14.7 \times \frac{P \text{ (mbar)}}{1013 \text{(mbar)}}$$

T_L = Temperature (°F) in Laboratory

ATTACHMENT B
CONTAINMENT ATMOSPHERE POST ACCIDENT SAMPLING ANALYSIS REPORT
Page 2 of 2

3.0 RADIOACTIVE IODINE ANALYSIS

Results of MCA

Iodines @ STP, corrected, using data in Part A of Table 3 and calculation at 2.2, above.

NOTE: Isotopes in Part B.2 of Table 3 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 3: Iodines and Other Nuclides For Core Damage Estimation (EPIP 10.2)

A.		B.			
Analysis Parameters		B.1: IODINES		B.2 OTHER (for EPIP 10.2)	
Decay time (min)		Isotope	µCi/cc	Isotope	µCi/cc
Count Time (sec)		I-130		Rb-88	
Detector		I-131		Cs-134	
Geometry		I-132		Cs-137	
* Press/Temp Correction		I-133		Te-132	
		I-134		Ba-140	
		I-135		La-140	
		Total		La-142	

4.0 ROUTING AND APPROVAL

NOTE: Documentation of sampling, analyses, and calculations is provided in Section 5.6.3.

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

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

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

EPIP 8.4.3

EMERGENCY CONTAINMENT SUMP "A" SAMPLING

DOCUMENT TYPE: Technical

CLASSIFICATION: Safety Related

REVISION: 7

EFFECTIVE DATE: July 12, 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

1.0 PURPOSE

This procedure outlines the steps taken and precautions to consider when Operations personnel are required to sample the "A" containment sumps under accident situations.

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 coordination of the Control Room evolutions.

2.1.2 The Duty and Call Radiation Protection Supervisor (Rad/Chem Coordinator if TSC is activated) is responsible for the oversight of the reactor coolant sample collection and analysis.

2.1.3 The Radiation Protection Supervision is responsible for the implementation of radiological monitoring controls.

2.1.4 The Chemistry Supervision is responsible for the sample analysis.

2.2 Equipment

2.2.1 Emergency Preparedness Radiation Protection Equipment maintained in OSC

2.2.2 Clean Poly Sample Bottle

3.0 PRECAUTIONS AND LIMITATIONS

3.1 A preliminary evaluation of the conditions that may be encountered in the pipeway where the sample will be drawn must be done prior to entering the Auxiliary Building.

3.2 During sampling, personnel may be subjected to radiological hazards including high radiation, contamination, and airborne radioactivity.

3.3 Personnel shall wear prescribed protective clothing, dosimetry devices, and other protective equipment when performing radiological sampling.

3.4 Improper handling of radioactive material can result in personnel contamination, radioactive material uptake, unplanned personnel exposure, and cross-contamination of samples.

3.5 Instrument air must be available to the unit to perform sampling.

4.0 INITIAL CONDITIONS

Indications of possible fuel damage per Step 5.1 evaluation.

5.0 PROCEDURE

NOTE: This evaluation shall be completed prior to entering the Auxiliary Building to obtain a containment "A" sump sample.

5.1 Perform Preliminary Evaluation For Possible Fuel Damage

Evaluate all of the following for indications of fuel damage:

NOTE: Containment isolation may invalidate readings for Steps 5.1.1, 5.1.2, and 5.1.3.

5.1.1 The letdown valve gallery monitor (RE-116) unusually high or offscale. If greater than 200 mR/hr, do not take the sump "A" sample.

5.1.2 The failed fuel monitor 1(2)RE-109 unusually high or offscale. If greater than 100 mR/hr, do not take the sump "A" sample.

5.1.3 The containment atmosphere monitors, 1(2)RE-211 and 1(2)RE-212 unusually high or offscale.

5.1.4 The containment low-range monitors, 1(2)RE-102 and seal table monitors, 1(2)RE-107 reading unusually high or offscale.

5.1.5 The Auxiliary Building vent stack monitor, RE-214, could show a significant increase due to auxiliary building airborne activity from the letdown and charging pump areas.

5.1.6 The sample room area monitor, 1(2)RE-106 and charging pump area 1(2)RE-104, would give an indication of conditions in the Auxiliary Building and sample lines.

5.2 Determine Additional Radiological Protection Activities Required For Sampling

After review of the radiation monitoring system readouts, Radiation Protection will determine any airborne and radiation surveys appropriate before Auxiliary Building entry.

5.3 Check For Loss Of Instrument Air

Verify that instrument air is still in service to the affected unit. The sample cannot be obtained without instrument air to open the sample valves.

5.4 Containment Sump "A" Sampling Procedure (Operations)

5.4.1 Do **NOT** initiate this procedure under emergency conditions until the evaluations of Section 5.1 have been completed and results reviewed by the following:

a. Shift Manager (SM) (Operations Support Center Coordinator if TSC is activated),

b. Duty and Call Radiation Protection Supervisor (Rad/Chem Coordinator if TSC is activated), and

5.4.2 **IF** approval is granted by those listed in Step 5.4.1,
THEN obtain a Containment Sump "A" sample using Procedure OI 95, Obtaining A Sump "A" Sample.

5.4.3 Take a contact reading on the sample prior to transport and inform Radiation Protection Supervision of the value.

5.5 Analysis (Chemistry)

5.5.1 Analyze the sample for boron.

5.5.2 Perform gamma scan of sample.

5.5.3 Report results to Rad/Chem Coordinator or Shift Manager.

5.5.4 Determine if adequate sodium hydroxide has been added to containment by completing Attachment A, Calculation 99-0034, Containment Sump pH Calculation.

5.5.5 Report results to Rad/Chem Coordinator or Shift Manager.

6.0 REFERENCES

6.1 Calculation 99-0034, Containment Sump pH Calculation

6.2 OI 95, Obtaining A Sump "A" Sample

7.0 BASES

None

ATTACHMENT A
CALCULATION 99-0034, CONTAINMENT SUMP PH CALCULATION

Nuclear Power Business Unit
CALCULATION DOCUMENT FORM

Page 1 of 7

UNIT 1

Calculation/Addendum Number:	Title of Calculation/Addendum:
99-0034	TSC/EOF Containment Sump pH Calculation

☒ Original Calculation/Addendum ☐ Supersedes Calculation/Addendum
☐ Revised Calculation/Addendum Revision # ____

☒ QA Scope
☐ Non-QA Scope

Associated Documents: _____

Superseded By Calculation/Addendum # _____

This Calculation has been reviewed in accordance with NP 7.2.4. The review was accomplished by one or a combination of the following (as checked):

____ A review of a representative sample of repetitive calculations.

__X__ A detailed review of the original calculation.

____ A review of the calculation against a similar calculation previously performed.

____ A review by an alternate, simplified, or approximate method of calculation.

Page Inventory:
Page 1 - 4 Form PBF-1608
Page 5 - 7

Attachments:
A: Pages 1 through 6

Prepared By: Edward A. Hinshaw (Print Name)	E.A. Hinshaw (Signature)	Date: 2/26/99
Reviewed By: DUANE HOFSTAD (Print Name)	(Signature)	Date: 3-5-99
Approved By: HORNAK (Print Name)	R.F. Hornak (Signature)	Date: 3/8/99

PBF-1608
Revision 3 09/30/98

Reference(s): NP 7.2.4

ATTACHMENT A
CALCULATION 99-0034, CONTAINMENT SUMP PH CALCULATION

Nuclear Power Business Unit
CALCULATION DOCUMENT FORM

Calculation/Addendum: 99-0034
Page 2 of 7
Preparer: Edward A. Hinshaw
Date: 2/24/99

Calculation Checklist (Optional for Non-QA Scope)

Item No.		Attribute Description	N/A	Author	Reviewer
1.	**Purpose**				
	a.	Is the purpose clearly stated indicating issue to be resolved or information to be determined?		☒	☒yes ☐no
2.	**Methodology and Acceptance Criteria**				
	a.	Has the method/approach been described?		☒	☒yes ☐no
	b.	Have appropriate acceptance criteria and their sources been identified?		☒	☒yes ☐no
3.	**Assumptions**				
	a.	Are the assumptions provided with sufficient rationale to permit verification?		☒	☒yes ☐no
	b.	Have assumptions associated with pending plant or procedure changes that require verification been identified?	NA	☐	☐yes N/A ☐no
	c.	Have the requirements to revise governing calculations or verify pending assumptions been documented in a modification or an EWR?	NA	☐	☐yes N/A ☐no
5.	**References**				
	a.	Have all the appropriate references, including revisions and/or dates, been identified?		☒	☒yes ☐no
	b.	Are all references readily available in the PBNP Records System, as public documents, or attached?		☒	☒yes ☐no
4.	**Inputs**				
	a.	Have the applicable inputs and sources been identified?		☒	☒yes ☐no
6.	**Calculation**				
	a.	Have formulae and inputs been provided consistent with the source document, including engineering units?		☒	☒yes ☐no
7.	**Computer-Aided Design Calculations (NP 7.2.4 Attachment A)**				
	a.	Has the computer program been validated per the requirements of Attachment A?	NA	☐	☐yes N/A ☐no
	b.	Have the program version and revision been identified on the computer run and in the calculation?	NA	☐	☐yes N/A ☐no

PBF-1608
Revision 3 09/30/98

Reference(s): NP 7.2.4

ATTACHMENT A
CALCULATION 99-0034, CONTAINMENT SUMP PH CALCULATION

Nuclear Power Business Unit
CALCULATION DOCUMENT FORM

Calculation/Addendum: 99-0034
Page 3 of 7
Preparer: Edward A. Hinshaw
Date: 2/24/99

Item No.		Attribute Description	N/A	Author	Reviewer
	c.	Is the input to the computer program adequately documented?	NA	☒ EAH 3/5/99	☐yes N/A ☐no
	d.	If spreadsheet or other simple computer aided tools are used in the calculation, have the formulae been documented in the calculation?	NA	☐	☐yes N/A ☐no
	e.	Have the attributes been documented in the calculation for any input or output data files supporting the calculation, including file name, date stamp, time stamp (hour and minute only), and file size?	NA	☐	☐yes N/A ☐no
8.	**Summary of Results and Conclusions**				
	a.	Do the summary of results and conclusions clearly state the calculation results and respond to the purpose?		☒	☒yes ☐no
	b.	Do the conclusions address the acceptability/ unacceptability of the results?	NA	☒	☒yes ☐no
	c.	Has a CR been initiated to identify any unsatisfactory conditions?	NA	☐	☐yes N/A ☐no
	d.	Have all engineering judgments been provided with sufficient rationale?		☒	☒yes ☐no
9.	**Administrative**				
	a.	Have calculation format and content as noted in NP 7.2.4 been followed?		☒	☒yes ☐no
	b.	Have all required attachments been included in the document and numbered appropriately?		☒	☒yes ☐no
	c.	Has the calculation been prepared neatly and legibly with sufficient contrast to allow satisfactory record copies to be produced?		☒	☒yes ☐no
	d.	Are the calculation number, preparer's initials, preparation date, and page number provided on each page?		☒	☒yes ☐no
	e.	Have revisions been clearly identified by revision bars or other appropriate means (for revised calculations only)?	NA	☐	☐yes N/A ☐no
	f.	If the calculation supersedes a previous calculation, is this noted on the cover sheet?	NA	☐	☐yes N/A ☐no
	g.	Has the calculation been appropriately identified as QA or Non-QA scope?		☒	☒yes ☐no
	h.	Has the review method been clearly identified on the cover page?			☒yes ☐no

PBF-1608
Revision 3 09/30/98

Reference(s): NP 7.2.4

ATTACHMENT A
CALCULATION 99-0034, CONTAINMENT SUMP PH CALCULATION

Nuclear Power Business Unit
CALCULATION DOCUMENT FORM

Calculation/Addendum: 99-0034
Page 4 of 7
Preparer: Edward A. Hinshaw
Date: 2/24/99

Item No.		Attribute Description	N/A	Author	Reviewer
	i.	Is all information requested by PBF-1620 entered on the form?		☒	☒yes ☐no

COMMENTS AND RESOLUTION

Reviewer Comments:	Resolution:

PBF-1608
Revision 3 09/30/98

Reference(s): NP 7.2.4

ATTACHMENT A
CALCULATION 99-0034, CONTAINMENT SUMP PH CALCULATION

Calc # 99-0034 TSC/EOF Containment Sump pH Calculation

Purpose:

The purpose of this calculation is to support the form to be used by the TSC or EOF for determination of the approximate containment sump pH based on actual plant conditions. The form is to be used by the TSC or the EOF to determine if adequate sodium hydroxide has been added to containment. The calculation will determine the conversion factors used on the proposed form.

Methodology & Acceptance Criteria:

Using plant design criteria and data, a simplified form will be developed to allow the TSC or EOF to quickly determine if an adequate minimum amount of sodium hydroxide has been added to containment following an event which would require containment sump recirculation.

Assumptions:

1) The entire contents of the RCS and the Accumulators empties into the containment building.
2) The volume of water contained in piping systems such as CVCS and other system connections was ignored.
3) The concentration of sodium hydroxide in the spray add tank was assumed to be 31%. The average concentration over the last 11 years was 31.04/31.2 for units 1/2 respective.
4) The volume for the accumulators is assumed to be the maximum as described in the FSAR. This would be a conservative value for a low pH concern and introduces only 3.2% error on the conservative side. Therefore the accumulator volume used is 2272 cubic feet.
5) Since a LOCA is assumed to occur from 100% power, the volume of water in the RCS has a specific gravity of 0.7476 (Ref 5).
6) Density of sodium hydroxide can be linearly interpolated between 30 and 33%.

Reference:

1) Chemistry computer program Cequil produced all the numbers used in attachment A for the resultant pH of a mixture of sodium hydroxide and boric acid.
2) Calculation 89-015 determined the correlation of specific gravity to boron concentration. 1.005 g/cc for RWST and Accumulators, 1.012 g/cc for BAST.
3) TLB-10 for RWST level versus volume conversion of 2835 gallons/%.
4) FSAR volume in cubic feet for RCS, FSAR TABLE 4.1-1 & TS 15.5.3.B.3. Other references indicate up to 6643 cubic feet.
5) From ASME Steam Tables 5th Edition. Temp & Pressure from FSAR Table 4.1-2
6) Specific gravity of 31% sodium hydroxide from Calc N89-089, interpolated between 30 and 33% =1.35
7) Accumulator maximum volume 1136 cubic feet, Tech Spec 15.3.3.A.1.b.
8) Calculation N-89-089 for density of 30% and 33% sodium hydroxide.

Inputs:

1) The RCS volume is considered 6700 cubic feet. Reference 4. This value was then converted to kilograms using the specific gravity of water at operating temperature and converting to 25 degrees celsius.
2) Specific Gravity of 0.7476 is of water at 552.5 deg F and 2235 psig. Reference 5
3) Density of 30% NaOH=11.17 lb/gal Reference 8
4) Amount of NaOH in 30% solution 3.35 lb/gal. Reference 8
5) Density of 33% NaOH=11.44 lb/gal. Reference 8
6) Amount of NaOH in 33% solution 3.78 lb/gal. Reference 8
7) Density of 31% NaOH=11.26 lb/gal (5,12Kg/gal) Interpolated from inputs 3 and 5.
8) Amount of NaOH in 31% solution= 3.49 lb/gal (1,586 Kg/gal). Interpolated from inputs 4 and 6.

ATTACHMENT A
CALCULATION 99-0034, CONTAINMENT SUMP PH CALCULATION

Calc # 99-0034 TSC/EOF Containment Sump pH Calculation

Calculation:

RCS VOLUME IN KILOGRAMS IS CALCULATED AS FOLLOWS:

$$RCSVO := 6700 \cdot ft^3 \cdot 28.312 \cdot \frac{liter}{ft^3} \cdot 0.7476 \cdot \frac{kg}{liter} \qquad RCSVO = 1.418 \cdot 10^5 \ kg$$

ACCUMULATOR VOLUME IS CALCULATED AS FOLLOWS:

Two accumulators at spec gravity of 1.005

$$ACCUMVOL := 2272 \cdot ft^3 \cdot 28.312 \cdot \frac{liter}{ft^3} \cdot 1.005 \cdot \frac{kg}{liter}$$

$$ACCUMVOL = 6.465 \cdot 10^4 \ kg$$

This is the total RCS and Accumulator volume conversion factor.

$$TOTAL\_RCS := ACCUMVOL + RCSVO$$

$$TOTAL\_RCS = 2.065 \cdot 10^5 \ kg$$

RWST VOLUME CORRECTION IS CALCULATED AS FOLLOWS:

$$RWSTVOL := 3.785 \cdot \frac{liter}{gal} \cdot 1.005 \cdot \frac{kg}{liter}$$

$$RWSTVOL = 3.804 \cdot \frac{kg}{gal}$$

BAST VOLUME CORRECTION IS DEFINED AS:

This factor converts % boric acid concentration times gallons of BAST used to mg B

$$BASTCOR := 3.785 \cdot \frac{liter}{gal} \cdot 10^6 \cdot \frac{mg}{kg} \cdot \frac{10.81}{61.83} \cdot \frac{g}{g} \cdot 1.012 \cdot \frac{kg}{liter}$$

$$BASTCOR = 6.697 \cdot 10^3 \cdot \frac{mg}{gal \cdot \%}$$

SPRAY ADD TANK CONVERSION FACTORS

$$SODIUMCOR := .310 \cdot \frac{kg}{kg} \cdot \frac{22.99}{40} \cdot 10^6 \cdot \frac{mg}{kg} \cdot 3.785 \cdot \frac{liter}{gal} \cdot 1.35 \cdot \frac{kg}{liter} \qquad SODIUMCOR = 9.104 \cdot 10^5 \cdot \frac{mg}{gal}$$

31% by weight X Ratio of Na to NaOH X Conversion Factors X Spec Grav of 31% NaOH (Ref 6)

This factor converts gallons of SAT to mg Na

This section converts gallons of spray add solution to Kilograms of water.

ATTACHMENT A
CALCULATION 99-0034, CONTAINMENT SUMP PH CALCULATION

Calc # 99-0034 TSC/EOF Containment Sump pH Calculation

To convert gallons of Spray Add Tank solution to kilograms of water, I took the density of the spray addition solution minus the amount of NaOH in the solution. This leaves the amount of water in the spray solution.

Conversion factor= ((11.26 lb/gal - 3.49 lb/gal) /8.33 lb/gal) X 3.785 kg/gal = 3.53

Results:

The following conversion factors are to be used for the form to calculate the approximate pH of the containment sump.

Converts Accumulator volume in cubic feet and adds to RCS	206500 kg water in RCS & Accumulators
Converts RCS boron concentration to milligrams of boron	141800 mg Boron/ppm Boron in RCS
Converts ppm Boron for Accumulators into miligrams boron	64650/2 since the two accumulators are added together before multiplying.
Converts ppm Boron and Gallons of RWST used to milligrams	3.804 mg Boron
Converts Gallons of BAST at Concentration to milligrams Boron	6697 mg Boron/gallon BAST
Converts Gallons of SAT added to milligrams of Sodium	910400 mg Na/gallon
Converts Gallons of SAT into kilograms of Water	3.53 kg/gal

Conclusion:

The conversion factors used for the determination of approximate pH in the Containment Sump were calculated in this calculation and are valid for use by the TSC/EOF to predict sump pH.

ATTACHMENT A
CALCULATION 99-0034, CONTAINMENT SUMP PH CALCULATION

Calc 99-0034 TSC/EOF Containment Sump pH Calculation

Containment Sump pH Calculation Form

This form is to be used for determination of the approximate sump pH based on actual plant conditions. It is to be used by the TSC or the CEC to determine if adequate sodium hydroxide has been added to the containment. This calculation also includes boric acid added from the BAST

Assumptions made to simplify the calculation:

1) The entire contents of the RCS and the Accumulators has emptied into the containment building. If the accumulators have not emptied, enter 0 for boron concentration and enter only the RCS volume in the WATER section. The volume for the accumulators is assumed to be the maximum as described in the FSAR. This would be a conservative value for a low pH concern and introduces only 3.2% error on the conservative side. Therefore the accumulator volume used is 2272 cubic feet.
2) The RCS volume is considered 6700 cubic feet. This value was then converted to liters using the specific gravity of water at operating temperature and converting to 25 degrees celsius.
3) The volume of water contained in piping systems such as CVCS and other system connections was ignored. This assumption would introduce an error less than 1%.
4) The concentration of sodium hydroxide in the spray add tank was assumed to be 31%. The average concentration over the last 11 years was 31.04/31.2 for units 1/2 respective.

Enter the most recent RCS boron.	RCS_BORON	_____ PPM (1)

Note: Enter Zero (0) if the Accumulators were isolated or did not inject into the RCS.

"A" Accumulator boron concentration.	ACCUMA_BORON	A _____ PPM (2)
"B" Accumulator boron concentration.	ACCUMB_BORON	B _____ PPM (3)
RWST boron concentration:	RWST_BORON	_____ PPM (4)
RWST level change in %: _____% X 2835 gal/%	RWST_VOL	_____ GAL (5)
Enter the on-service BAST concentration:	BAST_BORON	_____ % (6)
Enter the volume of BAST used in gallons:	BAST_VOL	_____ GAL (7)
Enter the volume of SAT used so far in gallons:	SAT_VOL	_____ GAL (8)

ATTACHMENT A
CALCULATION 99-0034, CONTAINMENT SUMP PH CALCULATION

Calc 99-0034 TSC/EOF Containment Sump pH Calculation

This section calculates the amount of boron added to containment

BORON= _____ (1) x 141800 + (_____ (2) + _____ (3)) X 32325 = _____ (9) mg

BORON1= _____ (9) + _____ (4) X _____ (5) x3.804 + _____ (6) x _____ (7) x 6697

BORON1= _____ (10) mg

This section calculates the amount of sodium added to containment

SODIUM= _____ (8) X 910400 mg/gal **SODIUM**= _____ (11) mg

This section calculates the total water added to containment

WATER = 206500 + 3.804 X _____ (5) + 3.830 X _____ (7) + 3.53 X _____ (8)
NOTE 1

* NOTE 1
Use 141800 kg if neither accumulator emptied

WATER= _____ (12) kg

BORON CONCENTRATION = (10) /(12) = _____ (10) / _____ (12) = _____ ppm

Boron Concentration (X axis) on Figures 1& 2

SODIUM CONCENTRATION = (11) / (12) = _____ (11) / _____ (12) = _____ ppm

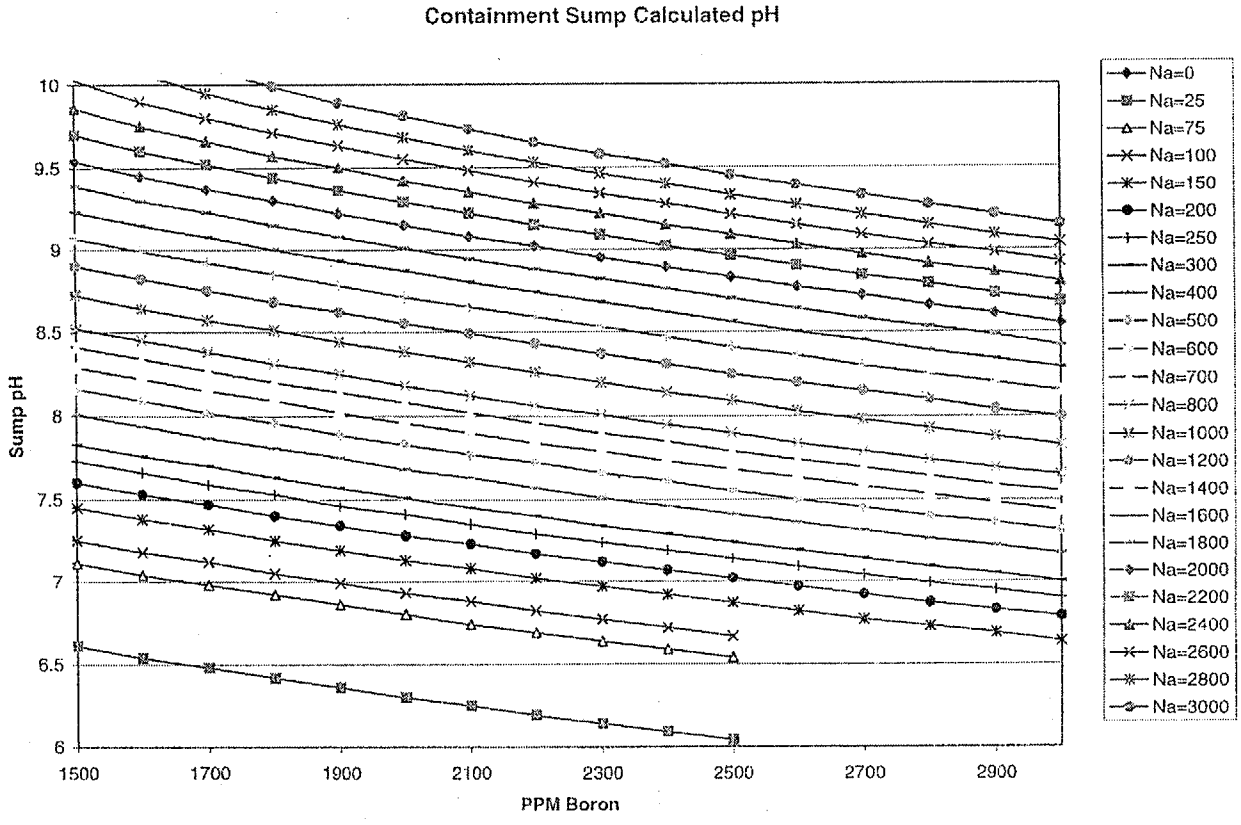
Sodium Concentration (Labelled lines) on Figures 1 & 2

REFER TO ATTACHED FIGURES TO FIND THE THEORETICAL PH OF THE CONTAINMENT SUMP.

SUMP pH _____ Date: _____ Time: _____ Initials: _____

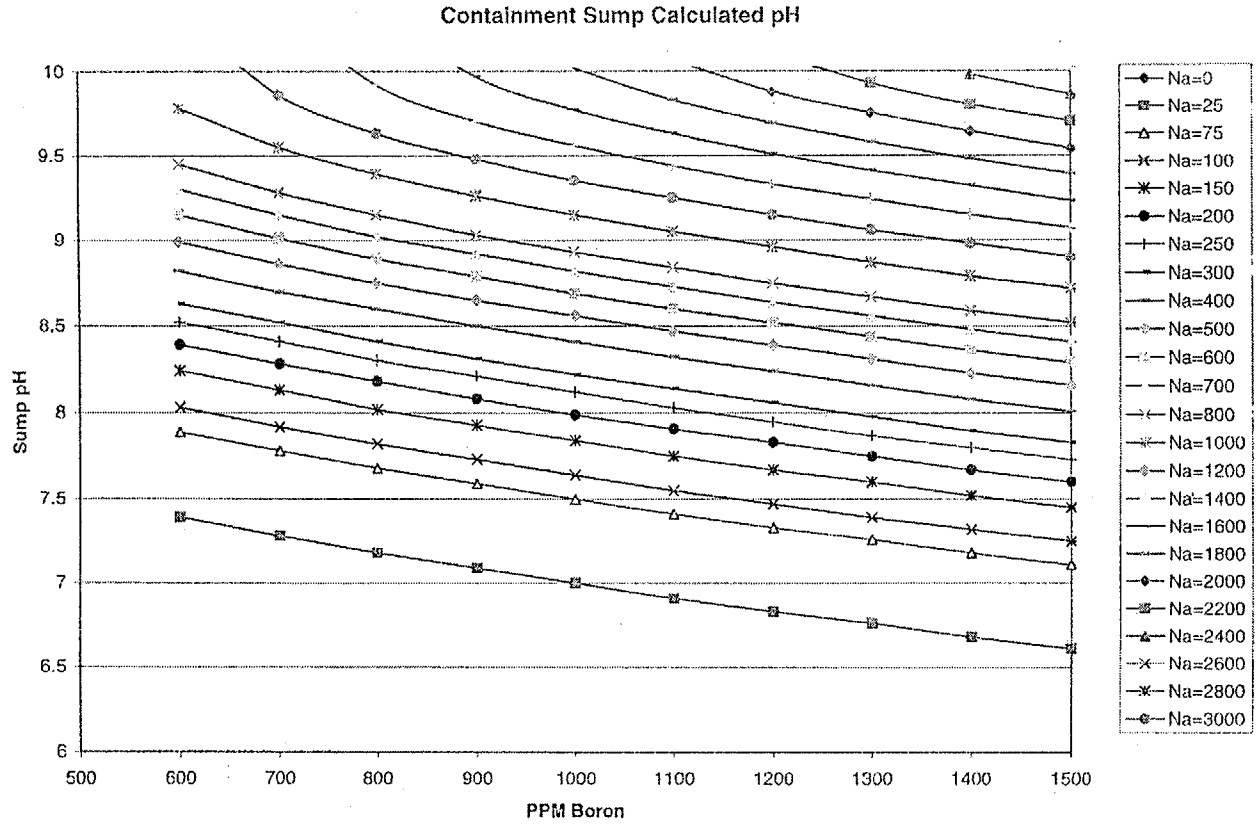
THIS CALCULATION IS CONSERVATIVE LOW, ACTUAL PH WILL BE HIGHER DUE TO BORIC ACID PRECIPITATION AND REACTION OF BORIC ACID WITH MATERIALS IN CONTAINMENT. UP TO 200 PPM OF BORON COULD REACT OR PRECIPITATE AS STATED IN FSAR

ATTACHMENT A
CALCULATION 99-0034, CONTAINMENT SUMP PH CALCULATION



ATTACHMENT A
CALCULATION 99-0034, CONTAINMENT SUMP PH CALCULATION

Calculation 99-0034 Attachment A



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REFERENCE USE

ATTACHMENT A
CALCULATION 99-0034, CONTAINMENT SUMP PH CALCULATION

Calculation 99-0034 — Containment Sump pH — Attachment A

Boron	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800
Sodium													
0	5.17	5.12	5.07	5.02	4.98	4.94	4.9	4.86	4.82	4.79	4.75	4.72	4.69
25	7.39	7.28	7.18	7.09	7	6.91	6.83	6.76	6.68	6.61	6.54	6.48	6.42
50	7.7	7.59	7.49	7.4	7.31	7.23	7.14	7.07	6.99	6.92			
75	7.89	7.78	7.68	7.59	7.5	7.41	7.33	7.26	7.18	7.11	7.04	6.98	6.92
100	8.03	7.92	7.82	7.73	7.64	7.55	7.47	7.39	7.32	7.25	7.18	7.12	7.05
150	8.24	8.13	8.02	7.93	7.84	7.75	7.67	7.6	7.52	7.45	7.38	7.32	7.25
200	8.39	8.28	8.18	8.08	7.99	7.91	7.83	7.75	7.67	7.6	7.53	7.47	7.4
250	8.52	8.41	8.3	8.21	8.12	8.03	7.95	7.87	7.8	7.73	7.66	7.59	7.53
300	8.63	8.52	8.41	8.31	8.22	8.14	8.06	7.98	7.9	7.83	7.76	7.7	7.63
400	8.82	8.7	8.6	8.5	8.41	8.32	8.24	8.16	8.08	8.01	7.94	7.87	7.81
500	8.99	8.86	8.75	8.65	8.56	8.47	8.39	8.31	8.23	8.16	8.09	8.02	7.96
600	9.15	9.01	8.89	8.79	8.69	8.6	8.52	8.44	8.36	8.29	8.22	8.15	8.09
700	9.3	9.15	9.02	8.92	8.82	8.73	8.64	8.56	8.48	8.41	8.34	8.27	8.2
800	9.45	9.28	9.15	9.03	8.93	8.84	8.75	8.67	8.59	8.52	8.45	8.38	8.31
1000	9.78	9.55	9.39	9.26	9.15	9.05	8.96	8.87	8.79	8.72	8.64	8.57	8.51
1200	10.36	9.86	9.63	9.48	9.35	9.25	9.15	9.06	8.98	8.9	8.82	8.75	8.68
1400		10.38	9.92	9.7	9.56	9.44	9.33	9.24	9.15	9.07	8.99	8.92	8.85
1600			10.39	9.97	9.77	9.63	9.51	9.41	9.32	9.23	9.15	9.08	9
1800					10.02	9.83	9.69	9.58	9.48	9.39	9.3	9.23	9.15
2000						10.07	9.88	9.75	9.64	9.54	9.45	9.37	9.3
2200							10.11	9.93	9.8	9.7	9.6	9.52	9.44
2400									9.98	9.86	9.75	9.66	9.57
2600										10.03	9.9	9.8	9.71
2800											10.07	9.95	9.85
3000											10.26	10.11	9.99
3200											10.53	10.29	10.14
3400											11.13	10.54	10.32
3600											11.83	11.09	10.56

EAH 2/26/1999 — High Sodium/Boron — Page 5 of 6

ATTACHMENT A
CALCULATION 99-0034, CONTAINMENT SUMP PH CALCULATION

1900	2000	2100	2200	2300	2400	2500	2600	2700	2800	2900	3000	Boron
												Sodium
4.66	4.63	4.61	4.58	4.55	4.53	4.5	4.48	4.46	4.44	4.42	4.4	0
6.36	6.3	6.25	6.19	6.14	6.09	6.04						25
						6.35						50
6.86	6.8	6.74	6.69	6.64	6.59	6.54						75
6.99	6.93	6.88	6.82	6.77	6.72	6.67						100
7.19	7.13	7.08	7.02	6.97	6.92	6.87	6.82	6.77	6.73	6.69	6.64	150
7.34	7.28	7.23	7.17	7.12	7.07	7.02	6.97	6.92	6.87	6.83	6.79	200
7.46	7.41	7.35	7.29	7.24	7.19	7.14	7.09	7.04	6.99	6.95	6.9	250
7.57	7.51	7.45	7.4	7.34	7.29	7.24	7.19	7.14	7.09	7.05	7	300
7.75	7.68	7.63	7.57	7.51	7.46	7.41	7.36	7.31	7.26	7.22	7.17	400
7.89	7.83	7.77	7.72	7.66	7.61	7.55	7.5	7.45	7.4	7.36	7.31	500
8.02	7.95	7.9	7.84	7.79	7.73	7.68	7.63	7.58	7.53	7.48	7.43	600
8.14	8.08	8.02	7.96	7.9	7.85	7.79	7.74	7.69	7.64	7.59	7.55	700
8.25	8.18	8.12	8.06	8.01	7.95	7.9	7.84	7.79	7.74	7.69	7.65	800
8.44	8.38	8.32	8.26	8.2	8.14	8.09	8.03	7.98	7.93	7.88	7.83	1000
8.62	8.55	8.49	8.43	8.37	8.31	8.25	8.2	8.15	8.1	8.04	8	1200
8.78	8.71	8.65	8.59	8.53	8.47	8.41	8.36	8.3	8.25	8.2	8.15	1400
8.93	8.87	8.8	8.74	8.68	8.62	8.56	8.5	8.45	8.39	8.34	8.29	1600
9.08	9.01	8.94	8.88	8.82	8.76	8.7	8.64	8.58	8.53	8.48	8.42	1800
9.22	9.15	9.08	9.02	8.95	8.89	8.83	8.77	8.72	8.66	8.61	8.55	2000
9.36	9.29	9.22	9.15	9.09	9.02	8.96	8.9	8.84	8.79	8.73	8.68	2200
9.5	9.42	9.35	9.28	9.22	9.15	9.09	9.03	8.97	8.91	8.86	8.8	2400
9.63	9.55	9.48	9.41	9.34	9.28	9.21	9.15	9.09	9.03	8.98	8.92	2600
9.76	9.68	9.6	9.53	9.46	9.4	9.33	9.27	9.21	9.15	9.09	9.04	2800
9.89	9.81	9.73	9.65	9.58	9.52	9.45	9.39	9.33	9.27	9.21	9.15	3000
10.03	9.94	9.85	9.77	9.7	9.63	9.57						3200
10.18	10.07	9.98	9.89	9.82	9.75	9.68						3400
10.35	10.21	10.11	10.02	9.94	9.86	9.79					9.48	3600

EPIP 10.1

EMERGENCY REENTRY

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TABLE OF CONTENTS

1.0 PURPOSE

This procedure provides the guidance and requirements necessary to conduct emergency reentry operations. These operations can include reentry for radiological surveys, repairs, operational functions, fire, medical emergencies, or search and rescue.

The guidance in this procedure includes directions for the proper radiological protection and monitoring of personnel involved.

2.0 PREREQUISITES

2.1 Responsibilities

2.1.1 Prior to the activation of the Operations Support Center (OSC), the Shift Manager (SM), or a designee, is responsible for

a. Dispatch of reentry teams

b. On-Shift Radiation Protection Technologists (RPTs)

c. On-Shift Radiochemical Technicians (RCTs)

d. Non-PBNP We Energies personnel, Nuclear Management Company (NMC) fleet personnel, or contractor teams that may be conducting repairs inside and outside the protected area

e. Medical emergencies in the PBNP owner controlled area

2.1.2 The TSC Manager is responsible for the prioritization of reentry teams, coordinated with the OSC Coordinator, Reentry Team Coordinator, and SM.

2.1.3 The Reentry Team Coordinator, under the direction of the OSC Coordinator, is responsible for the oversight of all OSC Leaders, reentry teams and recovery operations (Attachment A, Reentry Team Management).

2.2 Equipment

2.2.1 FM radio base station and portable radios (EPMP 2.1).

2.2.2 Radiation Protection equipment (PIM OSC 3.2, Attachment A).

2.2.3 OSC Radiation Protection Inventory (EPMP 1.1).

2.2.4 Chemistry equipment (PIM OSC 3.6, Attachment A).

2.2.5 OSC emergency preparedness inventory (EPMP 1.3).

a. First aid kits, burn kits, trauma kits, and stretchers

b. OSC tools

2.2.6 Other equipment deemed appropriate for the specific event.

3.0 PRECAUTIONS AND LIMITATIONS

3.1 Radiological controls, as specified in HP 3.2, Radiological Labeling, Posting and Barricading Requirements, are to be maintained during all reentry operations, if circumstances allow.

3.2 Radiation Protection practices must be adhered to in accordance with Radiation Protection Procedure NP 4.2.19, General Rules for Work in a Radiologically Controlled Area, if circumstances allow.

3.3 Personnel shall wear radiological protection equipment as prescribed in NP 4.2.27, Personnel Exposure Monitoring Device Minimum Requirements and General Use and NP 4.2.22, Requirements for Use of Protective Clothing; shall be used for guidance.

3.4 The use of self-contained respiratory protection equipment should be considered for on-shift RPTs and Operations personnel having a necessity to enter any area where a spill or other discharge of reactor coolant has caused, or has the potential for causing, an increase in airborne activity.

3.5 During the performance of radiation surveys, personnel may be subjected to radiological hazards, including high radiation areas, contaminated areas, and airborne radioactivity areas.

3.6 Improper handling of radioactive material can result in personnel contamination, radioactive material uptake, or unplanned personnel exposure.

3.7 When processing fire brigade teams, follow established fire brigade response policies.

3.8 Personnel should exercise the principles of time, distance, and shielding to minimize radiation exposure.

4.0 INITIAL CONDITIONS

4.1 Assembly and accountability of personnel has been completed and/or persons are known to be missing or in need of help - Search and Rescue.

4.2 Emergency response requires reentry to support plant repair and/or recovery, radiological release termination, or damage assessment.

4.3 Fire or potential fire.

5.0 PROCEDURE

5.1 Initial Control Room Response

5.1.1 The SM shall dispatch all necessary reentry teams and maintain accountability of all on-shift personnel prior to the activation of the OSC.

5.1.2 Prior to allowing entries into and/or work to continue in the RCA, the SM and RPT shall review the radiation monitoring system area and process monitors to determine area radiation levels and possible high airborne activity that could affect personnel exposure. Possible abnormal conditions may be indicated by:

a. Increased count rates above the alarm setpoints on the Auxiliary Building vent stack monitor (RE-214).

b. Any continuous air sampler(s) exceeding the alarm setpoint(s) and/or indicating a rising trend.

c. Local area monitors above alarm setpoints.

5.1.3 Direct personnel working within the radiation control area (RCA) to periodically check the count rate on the following continuous air samplers for indications of increasing Auxiliary Building airborne activity:

a. C59 panel area

b. Spent fuel pool

c. Outside the charging pump cubicles

d. Outside the CVCS holdup tank

5.1.4 **IF** on-shift RPTs, RCTs, or Operations personnel need to enter an area where there is a known or suspected spill, leak, or release of radioactive material or airborne activity,
THEN consult with the on-shift RPT and consider the following:

a. Self-contained respiratory protection equipment.

b. Dosimetry, appropriate protective clothing, and survey instruments for continuous exposure monitoring.

c. Implementing radiation surveys of affected area(s) to determine the scope of the radiation and contamination problem.

d. Radiation protection postings of the affected area(s), if required.

e. Decontamination operations, if necessary.

5.1.5 Direct all entries and/or exits of personnel from the RCA to be by way of the checkpoint unless an alternate route is appropriate.

5.1.6 If appropriate, direct RCTs to report to TSC Count Room and begin activation of that area using PIM OSC 3.6, OSC Chemistry Leader.

5.2 Reentry Team Deployment

NOTE: All teams should be dispatched promptly. A 15 minute goal has been established, commensurate with urgency of the task and available resources.

NOTE: Reentry teams for life saving, fire fighting, release termination, and search and rescue shall have the highest priority and be dispatched immediately, completing Attachment B, Reentry Team Dispatch, after dispatch.

NOTE: Teams shall consist of a minimum of two people, both qualified in first aid/CPR if a medical emergency.

5.2.1 **IF** a medical emergency,
THEN also implement EPIP 11.2.

5.2.2 The routine procedure for development of work orders **WILL NOT** be used during emergencies. An unforeseen Work Order (WO) shall be used to document and control repair work per Step 5.4.

5.2.3 The routine procedure for development of tagouts **WILL NOT** be used during emergencies. An emergency Tagout shall be used per Step 5.5.

5.2.4 The Reentry Team Coordinator shall assign team priorities consistent with the priorities of the TSC.

5.2.5 **IF** radiological conditions are present or suspected,
THEN the Reentry Team Coordinator shall notify the Radiation Protection Leader.

5.2.6 When a reentry team is required, the Reentry Team Coordinator shall assign an OSC Leader per the task required. The OSC Leader shall prepare and deploy the reentry team, completing the appropriate section of Attachment B, Reentry Team Dispatch.

a. **IF** radiological conditions are present,
THEN the OSC Leader shall coordinate the reentry team dispatch with the Radiation Protection Leader. The Radiation Protection Leader shall prepare and brief reentry teams, completing the appropriate section of Attachment B, in lieu of an RWP.

b. Assign a team identifier which reflects the team's function.

c. Determine and record the job scope and appropriate tagouts for the task.

d. Obtain SM approval for tagouts.

e. Determine the appropriate repair parts and tools for the task.

f. Issue and test the FM portable radios or other communication devices, as appropriate.

g. Select and assign personnel to the team evaluating team member qualifications for the (i.e., SCBA, First Aid, CPR) reentry per ETD 01.

h. Assign a team lead to be responsible for communications, keys, dose checks, and the need for reliefs.

i. Determine the appropriate personal protection equipment necessary for the task.

j. Evaluate the safety precautions that should be adhered to.

k. Conduct a short, concise job brief consisting of:

- Scope of task, location, hazards, and stay times.
- Reminder to maintain visual or vocal contact with other team members.
- Relevant information from other reentry teams.
- Use plant maps available in the OSC to illustrate routes and backout areas.
- During reentry task, monitor progress and be observant of unexpected conditions.

5.2.7 After team deployment, the OSC Leader shall:

a. Inform the OSC Communicator of the team deployment.

b. Inform the OSC Technical Monitor of the team deployment.

c. Form a standby team to be used for reliefs and/or search and rescue if necessary.

d. Monitor reentry team dispatched for work in progress, unexpected conditions, and safety concerns.

e. Complete Attachment B, Reentry Team Dispatch, to track reentry team dispatch.

5.3 Reentry Teams Debriefing

5.3.1 Complete the appropriate sections of Attachment C, Reentry Team Debrief.

a. Log exposure of each team member and obtain their initials.

b. Anyone >4 rem, >25 rem or suspected >10,000 DAC-hours (ref. EPIP 5.1 if answer is yes).

c. Status of task team was assigned to and related comments.

d. General observations regarding damage, water spills, leaks, route problems, etc.

e. Status of team members physical condition.

f. Disposition of team members.

g. Update OSC status boards and plant maps with current conditions.

5.3.2 Advise Reentry Team Coordinator of reentry team task status and comments for use in future reentry team assignments.

5.3.3 Ensure Radiation Protection is maintaining a running total of each persons radiation exposure upon each reentry team return and keeping the Rad/Chem Coordinator and/or Dose/PAR Coordinator advised of their radiological exposure status.

5.4 Work Order Control

5.4.1 Tasks desired by the TSC or Control Room will be defined as clearly and briefly as possible. All personnel required will be used to define and clarify the tasks (i.e., TSC Engineers, respective OSC Leaders per task requirements, etc.).

5.4.2 Obtain PBF-9923d, Unforeseen Work Order, form and a number from the Unforeseen Work Order log (located in the OSC file cabinet) and record on Attachment B, Reentry Team Dispatch. This form "becomes" the work order for emergencies.

5.4.3 Record the reentry task on Attachment B, in the "job scope" block. Attach additional sheets as necessary.

5.4.4 Ensure any required Tagout is defined (Reference Step 5.5).

5.4.5 At the termination of the event, ensure all paperwork is collected for reconstruction of work completed, actions taken, etc.

5.5 Tagouts

5.5.1 Determine the required boundaries to be tagged to perform the task. Ensure all sources (water, air, steam, and electricity) are addressed. All personnel required will be used to define and clarify the tasks (i.e., TSC Engineers, respective OSC Leaders per task requirements, etc.).

CAUTION

If tags must be hung in a required order, ensure this is clearly indicated on both the tagout and the tags.

5.5.2 Obtain a tagging number from the PBF-1906d, Danger Tag Protected Worker log and record on Attachment B, Reentry Team Dispatch. This log may have been brought to the TSC by the TSC Manager. Attachment B "becomes" the tagout for emergencies.

5.5.3 Record the Tagout description on Attachment B. Attach additional sheets as necessary.

5.5.4 Obtain verbal approval from the Control Room SM. This may require faxing more complex tagouts or may be accomplished by verbal coordination for a few valves or breakers.

5.5.5 Record the SM initials and time per the verbal approval on Attachment B.

NOTE: The purpose of danger tags is to protect workers and allow emergency work.

5.5.6 Complete the Danger Tags. At a minimum each tag shall include:

a. Tagging number or Team ID

b. Exact component description

c. Desired position and/or state

5.5.7 Review the Danger Tag(s) with the person(s) who will be responsible for hanging the tag(s).

NOTE: Operating Permit Tags WILL NOT be used under emergency conditions. Instructions below will take precedence.

5.5.8 **IF** it becomes necessary to remove a tag (and change component status) temporarily (for example, to check pump rotation),
THEN the Reentry Team Coordinator is responsible to ensure ALL personnel are protected.

5.5.9 Obtain verbal approval to remove the tag (and change component status) from the Control Room SM.

5.5.10 Make a Gai-tronics announcement warning personnel of the impending status change.

5.5.11 Contact **each** team in the plant directly and warn them of the impending status change.

5.5.12 Ensure **immediate** means are available to contact the person lifting the tag (i.e., radio).

5.5.13 Brief person lifting tags on expected results and actions to take if the results are **NOT** obtained.

5.5.14 Monitor for unexpected conditions as tag is lifted.

6.0 REFERENCES

6.1 EPIP 4.2, Operations Support Center (OSC) Activation and Evacuation

6.2 EPIP 5.1, Personnel Emergency Dose Authorization

6.3 EPIP 5.2, Radioiodine Blocking and Thyroid Dose Accounting

6.4 EPIP 11.2, Medical Emergency

6.5 EPMP 1.1, Routine Check, Maintenance, Calibration and Inventory Schedule for Radiation Protection Emergency Preparedness Equipment

6.6 EPMP 1.3, Routine Inventory of TSC, EOF, AEOF, JPIC and OSC Emergency Preparedness Supplies

6.7 EPMP 2.1, Testing of Communications Equipment

6.8 ETD 01, Emergency Response Organization (ERO) Call List

6.9 HP 3.2, Radiological Labeling, Posting, and Barricading Requirements

6.10 HP 4.7, Emergency Response with Respiratory Equipment

6.11 NP 2.1.1, NMC Conduct of Operations (NMC FP-01) OP-C00

6.12 NP 1.9.15, Tagging Procedure

6.13 NP 4.2.19, General Rules for Work in a Radiologically Controlled Area

6.14 NP 4.2.22, Requirements for Use of Protective Clothing

6.15 NP 4.2.32, Respiratory Protection Program

6.16 NP 4.2.27, Personnel Exposure Monitoring Device Minimum Requirements and General Use

6.17 NP 8.1.5, Unforeseen Work Order Creation

6.18 PBF-1906d, Danger Tag Protected Worker Log

6.19 PBF-9923d, Unforeseen Work Order

6.20 PIM OSC 3.2, Radiation Protection Leader

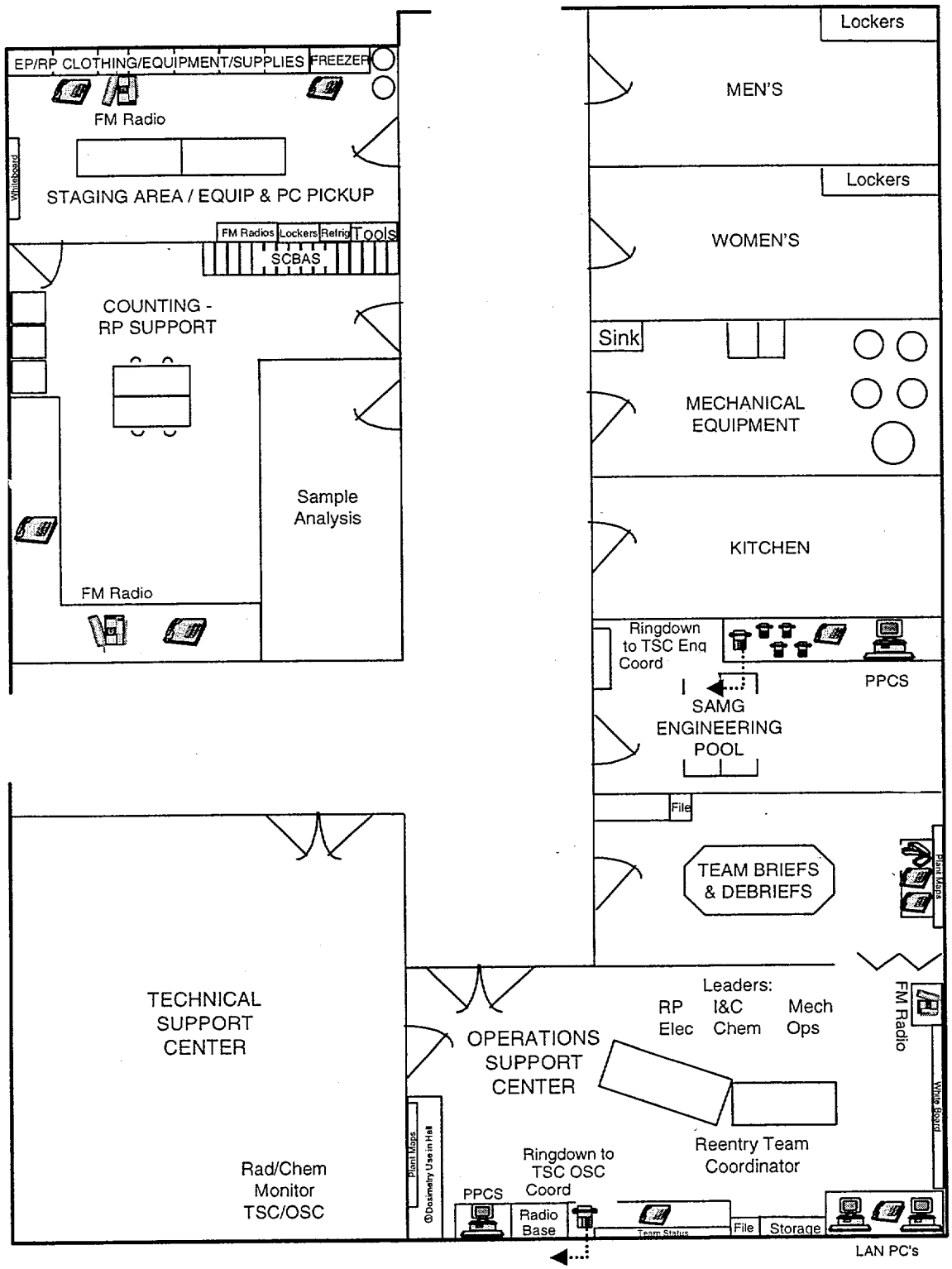
6.21 PIM OSC 3.6, Chemistry Leader

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

ATTACHMENT A
REENTRY TEAM MANAGEMENT



ATTACHMENT B
REENTRY TEAM DISPATCH

NOTE 1: This attachment is used in lieu of an Radiation Work Permit, Maintenance Work Order, and Tagout.
NOTE 2: Teams shall consist of a minimum of two people. Each team member's qualifications required for this reentry task are current.
NOTE 3: OSC Leader can N/A RP Leader section if sending team to known clean area.

JOB BRIEF-OSC Leader _____ **Date/Time** ____/____
(Signature)

Team ID _____ Team Lead _____
Communications Equip _____ ☐ w/CR
☐ w/OSC-A/B: x x x x ☐ w/OSC-E: x x
Keys _____ Dose Checks _____
Need for Reliefs _____ Other _____
Job Scope & WO # _____
_____
_____
Tagout #s & Desc _____
_____
_____SM Approval for Tagouts _____/_____
Parts/Tools _____
_____
Procedures/Drawings _____
Safety Precautions/PPE _____
_____

☐ Visual or vocal contact with team member
☐ Maps and information from other teams
☐ Changing conditions (e.g., flooding, steam, damages)
☐ In-plant routes, Back-out Areas

After Team Deployment:
☐ Inform OSC Communicator & Tech Monitor of team deployment
☐ Form standby team (for reliefs and/or search and rescue-optional)

RP BRIEF-RP Leader _____ **Date/Time** _____/_____
(Signature)

Keys (HRA) _____ Stay Times _____
Protective Clothing _____
In-Plant Radiological Conditions _____
_____
Survey Instruments _____
Respiratory Protection _____
_____
☐ Electronic Personnel Dosimeter ☐ SRD/Range _____
☐ Extremity Dosimetry ☐ Other _____
☐ Time keeping/High Dose Tasks _____
☐ SCBAs Donned - Estimated empty time _____
☐ Maps and information from other teams
☐ >4 rem or >10 CFR 20 Limits (per EPIP 5.1 prior to dispatch)
☐ Issue KI >25 rem Thyroid (per EPIP 5.2 prior to dispatch)

Review running dose records and assign dose limits (<25 rem whole body)

Members	Dose Alarm (mrem)	Dose Rate Alarm (mrem/hr)	Allowable Dose (rem)	Received Dose (rem)

Time Deployed: _____
Expected Return Time: _____
Actual Return Time: _____

Distribution Upon Dispatch:
Original in OSC
Copy to Team Lead and TSC

Distribution Upon Return:
Original to TSC

ATTACHMENT C
REENTRY TEAM DEBRIEF

Team ID _____ Task _____
Time/Time Deployed _____/_____ Time Returned _____

NOTE: Ensure Radiation Protection is maintaining a running total of each persons radiation exposure upon each reentry team return and keeping the Rad/Chem Coordinator and/or Dose/PAR Coordinator advised of their radiological exposure status.

Exposure

Initials							
Dose (rem)							

Anyone > 25 rem or suspected > 10,000 DAC-hours? If yes, remove from emergency duty and notify the Emergency Director for referral to a physician for medical evaluation (EPIP 5.1).

☐ NO ☐ YES _____
(Name)

Anyone > 4 rem? If yes, consult Emergency Director for potential referral to physician (EPIP 5.1)

☐ NO ☐ YES _____
(Name)

Task Status/Comments

_____
_____
_____

General Observations

Damage _____
_____

Water/Spills/Leaks _____
_____

Radiological Concerns _____
_____

Route Problems _____
_____

Other _____
_____

Team Members Physical Status

_____
_____

Team Members Standby Status

☐ Standby - OSC E, El. 8', El. 26', or as conditions or space allow
☐ Released to go home
☐ Other _____

☐ Update OSC status boards and plant maps.

Respective OSC Leader Review _____ Time/Date _____/_____

Reentry Team Coordinator Review _____ Time/Date _____/_____

Route to the Rad/Chem Coordinator with a copy to OSC Coordinator when completed

EPIP 11.2

MEDICAL EMERGENCY

DOCUMENT TYPE: Technical

CLASSIFICATION: NNSR

REVISION: 16

EFFECTIVE DATE: July 12, 2002

REVIEWER: N/A

APPROVAL AUTHORITY: Department Manager

PROCEDURE OWNER (title): Group Owner

OWNER GROUP: Emergency Preparedness

Verified Current Copy: _____ _____ _____
Signature Date Time

List pages used for Partial Performance

_____
_____
_____

Controlling Work Document Numbers

_____ _____
_____ _____
_____ _____

TABLE OF CONTENTS

1.0 PURPOSE

This procedure is to provide Point Beach Nuclear Plant personnel with guidance for the immediate care of an injured/ill person(s) requiring onsite or offsite medical assistance. Both contaminated and non-contaminated events are considered.

2.0 PREREQUISITES

2.1 Responsibilities

2.1.1 The Shift Manager (SM) is responsible for the overall command and control of the event (Reentry Team Coordinator if the OSC is activated).

2.1.2 Radiation Protection personnel are responsible for providing radiation and contamination controls at the scene, during transport to the hospital, and at the hospital.

2.1.3 The individual discovering the medical emergency is responsible for notifying the Control Room, providing treatment if qualified, and remaining at the scene to assist.

2.1.4 Personnel trained in first aid and CPR shall be immediate responders to the scene and provide treatment as appropriate.

2.1.5 The PBNP nurse is responsible for determining the equipment for the first aid room, maintaining the supply inventory, and responding to the event if onsite.

2.1.6 The SM, Industrial Health & Safety Manager, and injured/ill person(s) supervisor, group manager, or contractor supervisor are responsible for ensuring the completion of NP 1.9.2, Accident And Personal Injury Reporting; OSHA Form 200 Requirements; Industrial Safety.

2.2 Equipment

2.2.1 On-Site First Aid Provisions (EPMP 1.3)

a. Emergency showers throughout plant - Use with a severely contaminated but less severely injured/ill person(s).

NOTE: IF, for emergency reasons, it is necessary to transfer first aid supplies to the Radiation Control Area, THEN the unused supplies will be retained by Radiation Protection for release to the clean side.

b. Defibrillators
- Control Room to South
- Energy Center
- NSB Cafeteria
- RCA Checkpoint
- South Gatehouse
- Training Building Medical Office

c. Burn Kits
- Control Room Interior
- Control Room to South
- Facades [Unit 1(2) located on El. 26' and 66' outside each containment's personnel hatch]
- RCA Checkpoint
- Site Boundary Control Center
- Switchyard
- Technical Support Center
- Truck Access Unit 1

d. First Aid Kits
- Control Room Interior
- Control Room to South
- Field Monitoring Team Vehicles
- Facades [Unit 1(2) located on El. 26' and 66' outside each containment's personnel hatch]
- North Gatehouse (former)
- RCA Checkpoint
- RCA Maintenance Shop
- Sewage Treatment Plant
- Site Boundary Control Center
- South Gatehouse
- Switchyard
- Technical Support Center
- Truck Access Unit 1

e. Stretcher
- Control Room to South
- Facades [Unit 1(2) located on El. 26' and 66' outside each containment's personnel hatch]
- RCA Checkpoint
- South Gatehouse (long board)
- Technical Support Center
- Truck Access Unit 1

f. Trauma Kit
- Control Room Interior
- RCA Checkpoint
- RCA Maintenance Shop
- Technical Support Center

2.2.2 First aid rooms - Extension building within protected area and Training Building Medical Office

2.2.3 Radiation Protection supplies and survey instrumentation.

2.2.4 Portable FM Radios.

2.2.5 Aurora Medical Center - Manitowoc County - Fully equipped, controlled access emergency room (Reference EPMP-1.1b)

2.2.6 Letters of agreement are in existence with ambulance services, Aurora Medical Center - Manitowoc County, and trained physicians for treating contaminated, injured person(s).

3.0 PRECAUTIONS AND LIMITATIONS

3.1 Employees rendering medical assistance for serious injuries shall be first aid and/or CPR qualified.

3.2 To eliminate or minimize occupational exposure to blood and other potentially infectious body fluids, personal protective equipment shall be used.

3.3 **IF** the possibility exists that treatment and transportation of a patient from PBNP may be complicated by radioactive contamination,
THEN a fully equipped, controlled access emergency room shall be used at Aurora Medical Center - Manitowoc County.

3.4 **IF** in doubt concerning the severity of an injury or illness,
THEN seek the higher level of medical attention.

3.5 Do **NOT** move the injured/ill person(s) unless in an extremely high radiation area (exposures >100 rem may result in radiation sickness) **OR** if failure to move the person may result in a more serious injury.

3.6 **IF** event declared a mass casualty incident by offsite response personnel, **THEN** coordinate all efforts with the EMS Chief Officer.

4.0 INITIAL CONDITIONS

An injured/ill person(s) needing medical assistance has been discovered at Point Beach Nuclear Plant, includes both protected and exclusion areas.

5.0 PROCEDURE

5.1 Slight Personal Injury/Illness

Not serious, but requiring **onsite medical attention** (i.e., Band-aid, small cuts where bleeding has stopped, splinters, bruises).

5.1.1 Report the injury to your supervisor.

5.1.2 Seek and receive appropriate first aid.

5.1.3 Ensure proper reporting is competed per Step 5.9.

5.2 Minor Personal Injury/Illness

Not serious but requiring **offsite professional medical attention** (i.e., larger cuts possibly requiring stitches but bleeding stopped, sprains, strains).

5.2.1 Report the injury to your supervisor.

5.2.2 **IF** contamination is not involved and it is between 0800 to 1700 Monday through Friday,
THEN after appropriate first aid, the injured/ill will be transported, by a supervisor from the injured/ill person's group, or a person designated by the SM, to a local physician's office, or hospital, for treatment.

5.2.3 **IF** contamination is involved,
OR it is outside normal working hours,
THEN the injured/ill person(s) will be treated and transported to the Aurora Medical Center - Manitowoc County per Step 5.4.

5.2.4 Ensure proper reporting is completed per Step 5.9.

5.3 Serious Injury/Illness

Requiring **offsite emergency medical transportation** per Step 5.4 (i.e., trauma, heart attacks, heat stroke, unconsciousness, broken bones). The SM (Reentry Team Coordinator if OSC activated) shall ensure immediate care is provided and an ambulance is obtained for transport, radiological monitoring and control is implemented, and Security and Aurora Medical Center - Manitowoc County are apprised of the event.

5.4 Individual Discovering the Injured/Ill Person(s) Response

5.4.1 Immediately notify the Control Room at ext. 2911 and provide the following information:

a. Nature and extent of the injury or illness

b. Specific location of person(s)

c. What is needed (i.e., ambulance, first aid supplies, CPR-qualified person, radiation protection personnel, etc.)

d. Name of the person(s)

e. Other emergency conditions present (i.e., fire, steam, etc.)

5.4.2 Perform necessary first aid to your level of training.

CAUTION

DO NOT MOVE THE INJURED/ILL PERSON(s), UNLESS:

a. The injured/ill person(s) is in an extremely high radiation field. (Be aware that exposures of 100-200 rem may result in radiation sickness and exposures in excess of ~300 rem may involve the risk of fatality to 50% of those exposed if medical treatment is not provided.) (Reference Step 6.9.)

OR

b. Failure to move the injured/ill person(s) will result in even more serious injury.

5.4.3 Remain with the individual and keep them calm, if conditions permit.

5.4.4 Brief more qualified personnel on the person(s) condition and actions taken upon their arrival.

5.5 Shift Manager Response (Reentry Team Coordinator if OSC Activated)

Complete Attachment A, Shift Manager/Reentry Team Coordinator Actions, to ensure:

5.5.1 Injured/ill person(s) is(are) receiving medical treatment.

5.5.2 A scene leader (with radio) reports to the area for command and control of the emergency. If declared a mass casualty incident, coordinate efforts with the offsite EMS Chief Officer assigned to the scene.

a. Identify safety equipment needed.

b. Evaluate potential areas for setup as triage, treatment areas, equipment staging areas, etc.

5.5.3 Radiation Protection personnel are assigned to the scene if radiological concerns are present.

5.5.4 Onsite personnel and outside agencies that will provide support to the emergency are contacted.

5.5.5 Documentation and follow-up are completed per Step 5.9, including notification of the person(s) family as appropriate.

5.5.6 The need for a eight-hour report to the NRC has been assessed.

5.6 Radiation Protection Supervisor, Specialist, and/or Technologist Response

5.6.1 If requested to report to the scene for radiological monitoring, complete Attachment B, Radiation Protection Actions - Onsite, to ensure:

NOTE: The medical care of the person(s) always takes priority over other actions (e.g., radiation protection, contamination control, area cleanup, etc.).

a. Report to the scene with radiation monitoring instruments suitable for direct radiation readings of area and person(s).

b. Administer first aid if qualified and not already in progress.

c. Determine the magnitude of the radiological hazard (if any) and if the person(s) is contaminated.

- **IF** extreme radiation exposure is being received, (>100 rem may result in radiation sickness),
  THEN recommend that the person(s) be moved.

- **IF** the injured/ill person(s) is receiving significant radiation exposure (i.e., may exceed administrative limits) and cannot be moved from the field,
  THEN consider use of shielding to reduce exposure.

d. Report the following information to the Control Room (or Reentry Team Coordinator in OSC, if activated):

- Injured/ill person(s) is(is not) contaminated.

- **IF** contaminated,
  THEN provide the affected areas and highest appropriate value in cpm or mR/hr.

e. Evaluate need to issue protective clothing and dosimetry to emergency medical technicians, based upon severity of medical injuries and scene conditions.

f. Assist in radiological control aspects of handling the person(s) until they are safely within the ambulance.

- Deconning if actions do not escalate medical condition.

- Wrapping to prevent spread of contamination and escalation of medical condition.

g. Route several Radiation Protection personnel to the Aurora Medical Center - Manitowoc County to assist with the radiological setup prior to the arrival of the person(s). On backshift and weekends, contact RP Duty and Call Supervisor.

h. Accompany the injured/ill person(s) in the ambulance, providing contamination control for the person(s) and ambulance personnel, **IF** permitted by the Emergency Medical Technicians.

5.6.2 Complete Attachment C, Radiation Protection Actions - Offsite, to ensure:

a. Assist in the radiological setup of the hospital and personnel.

b. Assist in the ongoing radiological monitoring and contamination control.

NOTE: As soon as possible, assure that the hospital emergency department hallways, ambulance garage, ambulance and equipment, plus facilities and equipment, have been decontaminated and released. The various areas shall be done separately from the others to expedite public access.

c. Perform clean release surveys at the hospital and for the ambulance.

5.7 Aurora Medical Center - Manitowoc County Personnel Response

5.7.1 **IF** the injured/ill person(s) is not contaminated,
THEN he/she will be handled by standard Aurora Medical Center - Manitowoc County procedures.

5.7.2 **IF** the injured/ill person(s) is contaminated by radioactive material,
THEN the Aurora Medical Center - Manitowoc County will implement their "Condition Alert-Nuclear" procedure to treat him/her.

5.8 Security Officers Response

Upon being notified that medical response personnel (EMTs/Ambulance/Nurse) will be arriving, the security officers will:

5.8.1 Determine the desired location(s) of the ambulance, and/or responding personnel.

5.8.2 Escort the ambulance and responding personnel to desired location(s).

5.8.3 Expedite ingress/egress of the ambulance and responding personnel.

5.8.4 If declared a mass casualty incident coordinate all security efforts with the offsite Security Personnel assigned to the site.

a. Ambulance staging areas and loading.

b. EMS Command Post.

5.9 General Administrative Issues

The SM or Reentry Team Coordinator if OSC is activated, shall perform administrative responsibilities in accordance with NP 1.9.2, Accident and Personal Injury Reporting, OSHA Form 200 Requirements; Industrial Safety. This includes ensuring that someone has notified the person(s) family if appropriate. If the OSC is activated, the completion of this step may be delegated to someone else by obtaining the TSC Manager's approval.

6.0 REFERENCES

6.1 DCS 2.1.1, Requirements and Guidance for Immediate Notification to NRC/EPA of "Significant Events" at PBNP

6.2 EP 6.0, Emergency Measures

6.3 EP 7.0, Emergency Facilities and Equipment

6.4 EPMP 1.3, Routine Inventory of TSC, EOF, AEOF, JPIC and OSC Emergency Preparedness Supplies

6.5 EPMP-1.1b, Radiation Protection - Emergency Preparedness Quarterly Checklist

6.6 HPIP 3.51, Contamination Surveys

6.7 NP 1.9.2, Accident and Personal Injury Reporting; OSHA Form 200 Requirements; Industrial Safety

6.8 NP 4.2.25, Release of Material, Equipment and Personal Items from Radiologically Controlled Areas

6.9 Regulatory Guide 8.29, Instruction Concerning Risks From Occupational Exposure, February 1996, Revision 1

6.10 Manitowoc County Emergency Medical Services Mass Casualty Response Plan

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

ATTACHMENT A
SHIFT MANAGER/REENTRY TEAM COORDINATOR ACTIONS

Initials/Time

1.0 Ensure injured/ill person(s) is(are) receiving first aid by ***two*** trained responders. ____/____

2.0 Assign one person (with portable radio) to report as a scene leader for command and control and to keep you apprised of the event (recommend an SRO). ____/____

NOTE: If the injured/ill person(s) is in a radiation or contaminated area where contamination cannot be evaluated and cannot be moved, then assume he/she is contaminated.

3.0 Call the Manitowoc County Sheriff's Department (9-911) to request an ambulance, if needed. Provide the following information:

3.1 Number of injured/ill persons: _____

3.2 Nature of the injuries: _____

3.3 Radiological status (circle one) Clean - Contaminated - Potentially contaminated ____/____

4.0 Contact PBNP Nurse, if onsite, to report to the scene. Provide information of the event. ____/____

5.0 Notify security if the nurse is responding and/or if an ambulance has been requested. Advise them to escort responding personnel to the scene and of potential radiological concerns. ____/____

6.0 **IF** radiological concerns are present,
THEN assign Radiation Protection personnel to implement Attachment B of this procedure and report to the scene. ____/____

7.0 **IF** the injured person will be transported contaminated, call the Aurora Medical Center - Manitowoc County ( )
THEN inform them to implement their Condition Alert-Nuclear Procedure and update them on the person's radiological status. ____/____

8.0 **IF** the injured person is contaminated,
THEN notify the Manitowoc County Sheriff's Department and request the ambulance remain at the hospital until Radiation Protection personnel release the vehicle and its equipment. ____/____

9.0 Contact the State at and advise them that a contaminated person has been transported to the hospital. ____/____

10.0 Ensure NP 1.9.2, Accident and Personal Injury Reporting; OSHA Form 200 Requirements; Industrial Safety, is completed or assigned to someone else for completion (with TSC Manager's approval if OSC activated), including notifying the person family as appropriate. ____/____

11.0 Assess the need for a eight-hour event report per DCS 2.1.1, Requirements and Guidance for Immediate Notification to NRC/EPA of "Significant Events." ____/____

ROUTE COMPLETED FORM TO EMERGENCY PREPAREDNESS

ATTACHMENT B
RADIATION PROTECTION ACTIONS - ONSITE
Page 1 of 2

NOTE: The medical care of the person(s) always takes priority over other actions (e.g., radiation protection, contamination control, area cleanup, etc.)

Initials/Time

1.0 Immediately report to the scene upon being contacted by the Control Room with radiation monitoring instruments suitable for direct radiation readings of area and person(s). ____/____

2.0 Administer medical treatment if qualified and first aid is not already in progress. ____/____

3.0 Survey the injured/ill person(s) and area for radiation and contamination, documenting the highest reading on the following page. ____/____

4.0 Contact the Control Room **OR** the Reentry Team Coordinator if the OSC is activated, with the results of your surveys and affected areas of injured/ill person(s) and scene. ____/____

5.0 **IF** extreme radiation exposure is being received, (>100 rem may result in radiation sickness),
OR failure to move the person(s) may result in a more serious injury,
THEN recommend that the person(s) be moved. ____/____

6.0 **IF** the injured/ill person(s) is receiving significant radiation exposure (i.e., may exceed administrative limits) and cannot be moved from field,
THEN consider use of shielding to reduce exposure. ____/____

7.0 Evaluate need to issue dosimetry and protective clothing to offsite medical response personnel, based on severity of injury and scene conditions. ____/____

8.0 Assist in radiological control aspects of handling the person(s) until they are safely within the ambulance.

8.1 Deconning if actions do not escalate medical condition. ____/____

8.2 Wrapping with sheet, blanket, or plastic to prevent spread of contamination if medical condition prevents deconning. ____/____

9.0 Route several Radiation Protection personnel to the Aurora Medical Center - Manitowoc County to implement Attachment C, assisting with the radiological setup prior to the arrival of the injured/ill person(s). On backshift and weekends, contact on call RP Duty and Call Supervisor. ____/____

10.0 Accompany the injured/ill person(s) in the ambulance, providing contamination control for the person(s) and ambulance personnel, **IF** permitted by the Emergency Medical Technicians. ____/____

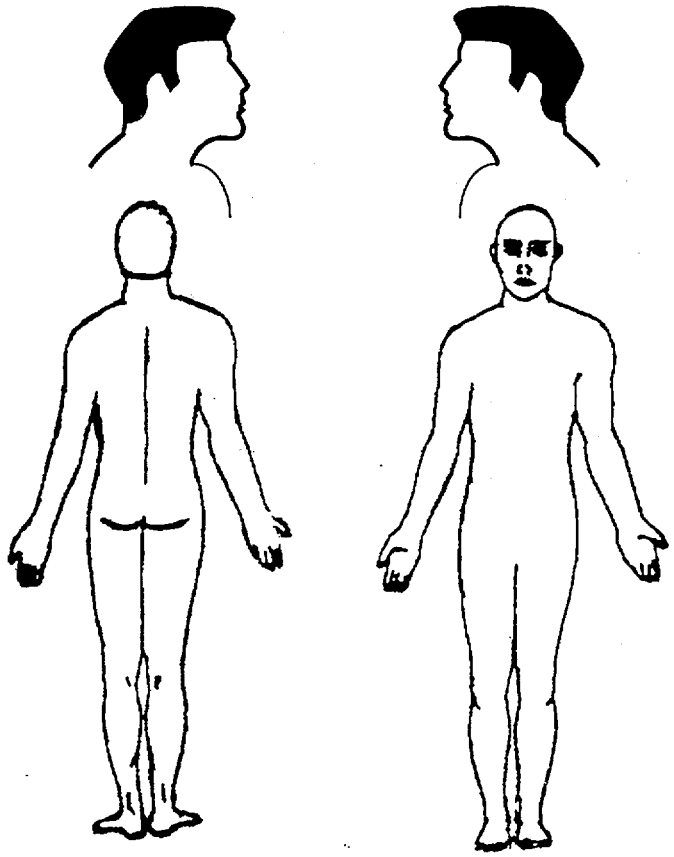
ATTACHMENT B
RADIATION PROTECTION ACTIONS - ONSITE
Page 2 of 2

NOTE: The medical care of the person(s) always takes priority over other actions (e.g., radiation protection, contamination control, area cleanup, etc.)

11.0 Injured/Ill Persons Name: _____ Date/Time _____/_____
Employer: _____ Work Group: _____

12.0 Results of radiological survey of scene in cpm or mR/hr: _____
Comments: _____

13.0 Indicate wounds and/or contaminated areas in cpm or mR/hr:
Comments: _____



14.0 Potential for internal contamination? ☐ Yes ☐ No
Comments: _____

15.0 Describe actions taken to minimize the spread of contamination (i.e., decon, wrap, etc.):
_____
_____
_____

ROUTE COMPLETED FORM TO EMERGENCY PREPAREDNESS

ATTACHMENT C
RADIATION PROTECTION ACTIONS - OFFSITE
Page 1 of 4

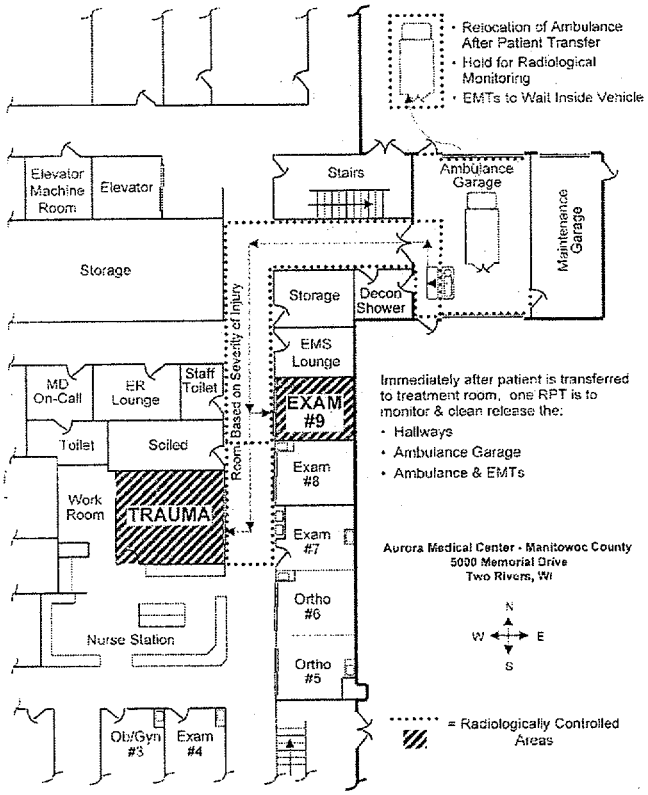
NOTE 1: The attending physician's orders must be followed and ONLY the physician is in direct charge of the situation. The medical care of the person(s) always takes priority over other actions (e.g., radiation protection, contamination control, area cleanup, etc.).

NOTE 2: As soon as possible, assure that the hospital emergency department hallways, ambulance garage, ambulance and equipment, plus facilities and equipment have been decontaminated and released. The various areas shall be done separately from the others to expedite public access.

Initials/Time

1.0 Proceed to the Aurora Medical Center - Manitowoc County. If possible, arrive before the ambulance. ____/____

2.0 Upon arrival, identify yourself to hospital personnel and provide setup assistance with contamination boundaries, postings and controls for the ambulance garage, emergency department hallways and emergency room.



NOTE: If ambulance garage is unavailable, alternate route is to park in the "ambulance relocation area" northwest of the ambulance garage. A radiologically controlled area should be set up there for patient transfer and entrance via the north door of the ambulance garage.

____/____

ATTACHMENT C
RADIATION PROTECTION ACTIONS - OFFSITE
Page 2 of 4

NOTE: PBNP personnel entering the emergency room should dress in the same protective equipment being worn by the hospital staff.

Initials/Time

3.0 Issue dosimetry for hospital and plant personnel and ensure they have appropriate protective clothing. ____/____

4.0 Provide a radiological status of injured person to hospital personnel. ____/____

5.0 Assist in maintaining radiological and contamination controls for:

5.1 Hospital personnel and equipment leaving the restricted area. ____/____

5.2 Injured/ill person(s) during treatment. ____/____

6.0 Upon transfer of the injured contaminated person into the emergency room, monitor, survey, and clean release the following areas per Step 8.0.

6.1 Emergency Department hallways ____/____

6.2 Ambulance garage ____/____

6.3 Ambulance and ambulance personnel ____/____

6.4 Ambulance Relocation Area, if implemented. ____/____

7.0 Upon completion of medical treatment and transfer of the injured/ill person into another area, monitor, survey, and clean release the following areas per Step 8.0.

7.1 Medical personnel and equipment ____/____

7.2 Emergency Room/Emergency department hallways ____/____

7.3 Other locations and equipment set up as radiological restricted areas during the treatment of the person(s) ____/____

8.0 Survey and Clean Release Guidelines

8.1 Masslinn (treated cloth wipes)

8.1.1 For large flat surface areas, the affected area may be wiped with masslinn. All areas where there is the potential for contamination must be wiped.

8.1.2 The masslinn should be laid flat with the dirty side up for the survey.

ATTACHMENT C
RADIATION PROTECTION ACTIONS - OFFSITE
Page 3 of 4

8.1.3 Count the masslinn using an open-window, pancake type probe sensitive to beta and gamma radiation. The measurement shall be made at a distance of approximately 1/2 inch and at a scan rate of less than 4 inches per second.

8.1.4 The area may be released as clean if the count rate from the masslinn is determined to be free from detectable radioactive contamination.

8.1.5 Fixed contamination levels must be ≤ background (none detectable). (Reference NP 4.2.25)

8.2 Direct Frisk

8.2.1 Any surface area may be surveyed directly with a hand-held frisker which is sensitive to beta and gamma radiation.

8.2.2 The area may be released as clean if the count rate determined to be free from detectable radioactive contamination.

8.2.3 Fixed contamination levels must be ≤ background (none detectable). (Reference NP 4.2.25)

8.3 Smear Survey

8.3.1 Any surface area may be surveyed indirectly using smears and a counting instrument.

8.3.2 The standard method described in HPIP 3.51, Contamination Surveys, for obtaining, documenting, and counting smears will be followed.

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RADIATION PROTECTION ACTIONS - OFFSITE
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NOTE: Hospital staff will work with plant personnel to eliminate the biological hazard of the radioactive waste generated prior to disposal of the material as radioactive waste.

Initials/Time

9.0 Collect any protective clothing and dosimetry that may have been issued to the ambulance EMTs and complete appropriate paperwork. ____/____

10.0 Bag and properly label all disposable and non-disposable contaminated items. ____/____

11.0 Notify the Rad Waste Supervisor of waste and quantity to ensure the immediate transport and proper disposal of contaminated materials. ____/____

12.0 Identify hospital and ambulance equipment which may require replacement below. ____/____

12.1 _____

12.2 _____

12.3 _____

12.4 _____

12.5 _____

12.6 _____

12.7 _____

13.0 Comments _____
_____
_____
_____
_____ ____/____

ROUTE COMPLETED FORM TO EMERGENCY PREPAREDNESS

EPIP 12.1

EMERGENCY EVENT DE-ESCALATION, TERMINATION, OR RECOVERY OPERATIONS

DOCUMENT TYPE: Technical

CLASSIFICATION: NNSR

REVISION: 8

EFFECTIVE DATE: July 12, 2002

REVIEWER: N/A

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1.0 PURPOSE

This procedure is to specify the conditions which warrant event de-escalation, event termination, or recovery implementation.

2.0 PREREQUISITES

2.1 Responsibilities

2.1.1 The Emergency Director is responsible for determining whether it is appropriate to de-escalate an event, terminate an event, or implement recovery operations.

2.1.2 The Shift Manager (SM), TSC Manager, EOF Manager and Operations Coordinator will provide input to the decision to de-escalate an event, terminate an event, or implement recovery operations.

2.2 Equipment

None

3.0 PRECAUTIONS AND LIMITATIONS

3.1 This procedure should be used based on the highest classification of the event. Site Emergencies and General Emergencies will usually require a recovery phase, whereas Unusual Events or Alerts may go directly from classification to termination, if appropriate.

3.2 Major repairs and/or decontamination may be necessary to return the plant to an operating condition.

3.3 Terminating an Emergency

WHEN 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 WITH THE FOLLOWING CAVEATS:

3.3.1 **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.

3.3.2 **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.

4.0 INITIAL CONDITIONS

4.1 The emergency conditions at the plant have improved and the possibility exists that the event can be de-escalated or terminated.

4.2 The emergency condition no longer exists and the plant is considered in a stable, shutdown, safe condition with no possibility of conditions degrading further.

5.0 PROCEDURE

5.1 Review of Classified Event Status

Review Attachment A, Emergency Classification Termination Criteria, with the SM, TSC Manager, EOF Manager, and Operations Coordinator to determine whether de-escalation, termination, or recovery operations is appropriate. (Check one of the following.)

_____ De-escalation to lower classification. (Go to Step 5.2.)

_____ Terminate emergency classification. (No recovery operations are necessary. Go to Step 5.3.)

_____ Implement recovery operations. (Exit this procedure and go to EPIP 12.2, Recovery Implementation)

_____ Continue current classification. (Exit this procedure and continue to monitor EPIP 1.2, Emergency Classification)

5.2 Event De-Escalation

5.2.1 Review EPIP 1.2, Emergency Classification, with the SM, TSC Manager, EOF Manager and Operations Coordinator.

Evaluate plant and release conditions to ensure the event may be reclassified to a lower emergency classification.

Current Classification _____ New Classification _____ Time _____

NOTE: No PARs should be required if the release is terminated or below Tech Specs.

5.2.2 Complete EPIP 2.1, Attachment B, Nuclear Accident Reporting Form.

5.2.3 Direct the offsite communicator to complete EPIP 2.1, Section 5.2, Notifications to State and Counties (within 15 minutes of declaration).

5.2.4 Ensure personnel in all Emergency Response Facilities are aware of new classification.

5.2.5 Direct the SM to notify on-site personnel per EPIP 1.1, Course of Actions, Attachment A.

5.2.6 Ensure EPIP 2.1, Section 5.4, Notifications to the NRC, have been completed (immediately following offsite notifications, **NOT** to exceed 60 minutes from declaration).

5.2.7 Ensure follow-up communications, as necessary, are being completed:

a. EPIP 2.1, Section 5.5, Status Updates to the State and Counties

b. EPIP 2.1, Section 5.6, Status Updates to the NRC

5.2.8 Continue to review this procedure until event termination or recovery operations are implemented.

5.3 Event Termination Without Recovery

5.3.1 Discuss the following with the SM, TSC Manager, EOF Manager, and Operations Coordinator:

a. The need for long-term cleanup or recovery operations is **NOT** necessary.

b. Current conditions do **NOT** meet any of the emergency action levels listed in EPIP 1.2, Emergency Classifications.

Current Classification _____ Terminated at: _____

5.3.2 Complete EPIP 2.1, Attachment B, Nuclear Accident Reporting Form.

5.3.3 Direct the offsite communicator to complete EPIP 2.1, Section 5.2, Notifications to State and Counties (within 15 minutes of declaration).

5.3.4 Ensure personnel in all Emergency Response Facilities are aware of termination.

5.3.5 Direct the SM to notify on-site personnel per EPIP 1.1, Course of Actions, Attachment A.

5.3.6 Ensure EPIP 2.1, Section 5.4, Notifications to the NRC, have been completed (immediate following offsite notifications, **NOT** to exceed 60 minutes from declaration).

5.3.7 Direct all Emergency Response Facility personnel to complete the termination section of their Position Instruction Manuals.

6.0 REFERENCES

6.1 EP 4.0, Emergency Conditions

6.2 EP 9.0, Recovery

6.3 EPIP 1.1, Course of Actions

6.4 EPIP 1.2, Emergency Classification

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

6.6 EPIP 12.2, Recovery Implementation

6.7 IR 90-017, dated 08/20/90, NRC Announced Emergency Preparedness Inspection, Section 3, "Emergency Plan Activations"

6.8 NP 1.8.2, Event Emergency Response Report

6.9 NP 5.3.3, Incident Investigation and Post-Trip Review

6.10 RCM 96, NRC Response Coordination Manual

6.11 RTM 96, NRC Response Technical Manual

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

ATTACHMENT A
EMERGENCY CLASSIFICATION TERMINATION CRITERIA

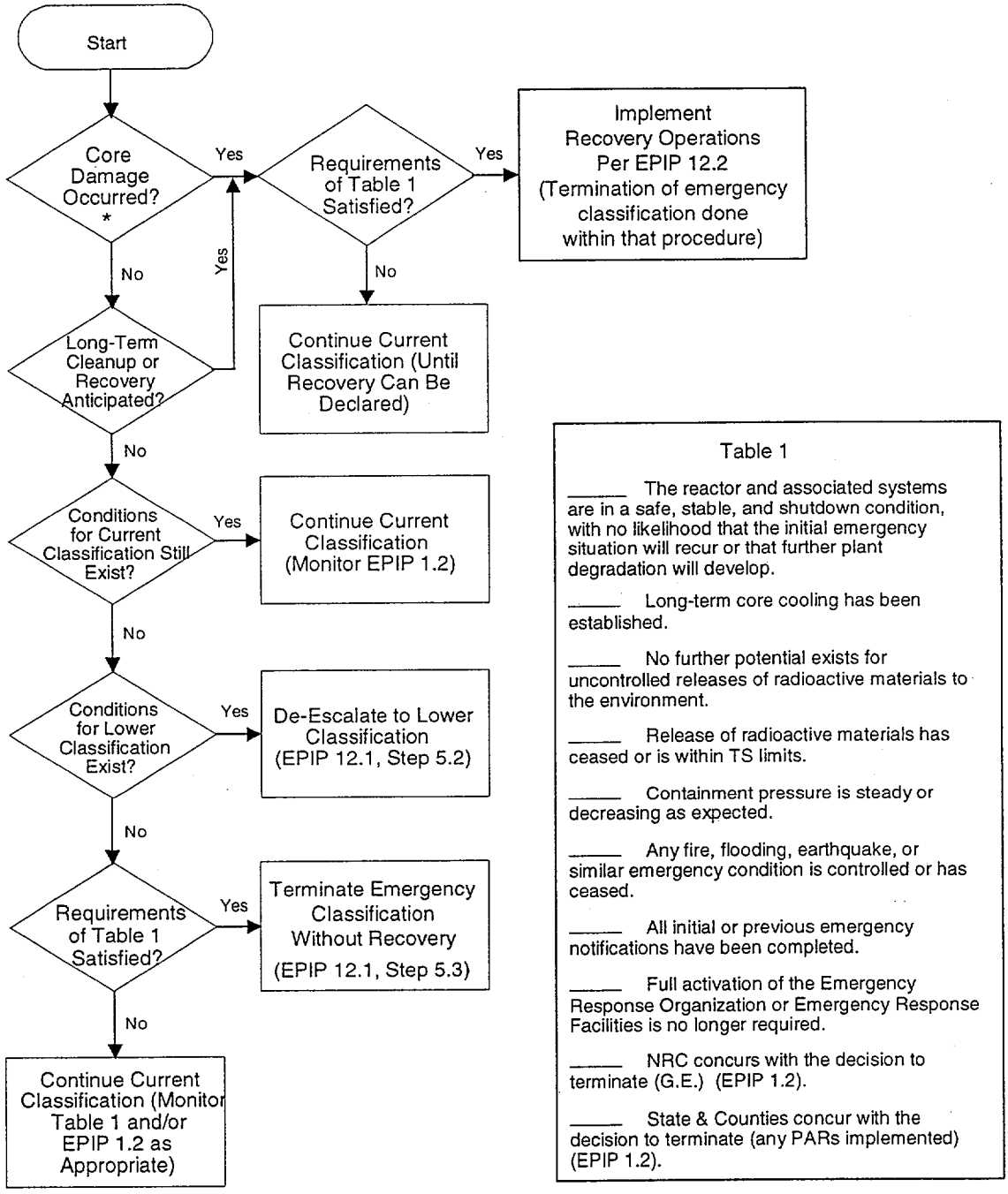

Table 1

_____ The reactor and associated systems are in a safe, stable, and shutdown condition, with no likelihood that the initial emergency situation will recur or that further plant degradation will develop.

_____ Long-term core cooling has been established.

_____ No further potential exists for uncontrolled releases of radioactive materials to the environment.

_____ Release of radioactive materials has ceased or is within TS limits.

_____ Containment pressure is steady or decreasing as expected.

_____ Any fire, flooding, earthquake, or similar emergency condition is controlled or has ceased.

_____ All initial or previous emergency notifications have been completed.

_____ Full activation of the Emergency Response Organization or Emergency Response Facilities is no longer required.

_____ NRC concurs with the decision to terminate (G.E.) (EPIP 1.2).

_____ State & Counties concur with the decision to terminate (any PARs implemented) (EPIP 1.2).

* If necessary, Reference EP 4.0, Table 4-1

EPIP 12.2

RECOVERY IMPLEMENTATION

DOCUMENT TYPE: Technical

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REVISION: 14

EFFECTIVE DATE: July 12, 2002

REVIEWER: N/A

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OWNER GROUP: Emergency Preparedness

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1.0 PURPOSE

This procedure provides guidance for entering the recovery phase, establishing a recovery plan, restoring the plant to a normal operating status, and terminating recovery efforts.

The goals of the recovery effort are to assess the in-plant consequences of the emergency, assist the State of Wisconsin with the intermediate and ingestion phase radiological operations, and initiate plant cleanup and repair operations.

2.0 PREREQUISITES

2.1 Responsibilities

2.1.1 The Emergency Director is responsible for the oversight of the recovery organization and recovery operations.

2.1.2 The TSC Manager, Rad/Chem Coordinator, Dose/PAR Coordinator, Operations Coordinator, Engineering Coordinator, EOF Manager, JPIC Manager, and Resource Coordinator have various responsibilities for the recovery operations per Attachment A, Proposed Recovery Organization and Responsibilities.

2.2 Equipment

None

3.0 PRECAUTIONS AND LIMITATIONS

Recovery operations may **NOT** be terminated until the PBNP Recovery Organization, under the direction of the Emergency Director, and the NRC agree that the plant can be maintained within Technical Specifications.

4.0 INITIAL CONDITIONS

Completion of EPIP 12.1, Emergency Event De-Escalation, Termination, or Recovery Operations, indicates that implementing recovery operations is appropriate.

5.0 PROCEDURE

5.1 Terminate Event Classification With Recovery

5.1.1 Current Classification _____ Terminated at: _____

5.1.2 Complete EPIP 2.1, Attachment B, Nuclear Accident Reporting Form, indicating on the form that we will be terminating and implementing recovery actions.

5.1.3 Direct the offsite communicator to complete EPIP 2.1, Section 5.2, Notifications to State and Counties (within 15 minutes of declaration).

5.1.4 Ensure personnel in all Emergency Response Facilities are aware of termination.

5.1.5 Direct the Shift Manager (SM) to notify on-site personnel per EPIP 1.1, Course of Actions, Attachment A.

5.1.6 Ensure EPIP 2.1, Section 5.4, Notifications to the NRC, have been completed (immediately following offsite notifications, **NOT** to exceed 60 minutes from declaration).

5.2 Implement Recovery Operations

5.2.1 Ensure personnel in all Emergency Response Facilities are aware that the event has been de-escalated and/or recovery operations are being implemented.

5.2.2 Review EP 9.0, Recovery.

NOTE: Some of the following steps may have been completed as part of the emergency response phase.

5.2.3 Establish a recovery organization, per Attachment A, appropriate for the existing onsite and offsite conditions.

The recovery organization should consist of personnel capable of ensuring:

a. Assessment of onsite and offsite radiological conditions.

b. Assessment of plant operating conditions (affected and non-affected unit).

c. Development of reentry and recovery work plans and schedules.

d. Communications with offsite agencies.

5.2.4 Establish an Incident Investigation Team (TSC Manager). This team will:

a. Gather available evidence on contributing factors.

b. Identify all causal factors.

c. Ensure all abnormal conditions are corrected or neutralized.

5.2.5 Complete the following prior to developing recovery reentry plans:

NOTE: Reference EPIP 10.1, Emergency Reentry, for guidance in preparing and deploying recovery reentry teams.

a. Conduct comprehensive survey of site facilities and define all radiological problem areas.

b. Isolate and post all radiation or contamination areas using appropriate Radiation Protection guidelines.

c. Perform visual inspection of site areas and equipment noting any areas/equipment requiring cleanup or repair.

5.2.6 Assemble recovery managers (or designees) to develop initial Recovery Plans.

NOTE: Following an emergency, all failed equipment <u>NOT</u> necessary for safe shutdown and all records are to be quarantined pending an NRC investigation.

a. Review Attachment B, Recovery Plan Action Items.

b. Assign action items to the appropriate group(s) for completion, completing Attachment C, Recovery Plan Action Item Assignments.

c. Ensure the group(s) review EPIP 10.1, Emergency Reentry, for items to consider for inclusion in work plans or procedures for recovery operations.

NOTE: The recovery plan may be similar to an outage work plan; consider using the outage planning group to support recovery planning.

5.2.7 Ensure the development of a comprehensive recovery plan which includes all work orders, modifications, etc., that need to be completed.

5.2.8 Implement the comprehensive recovery plan action items determined in Step 5.2.6 and Step 5.2.7.

5.2.9 Reconvene the recovery managers (or designees) to review and revise the recovery plan as appropriate until the recovery phase is complete.

5.3 Recovery Termination

5.3.1 Recovery operations may be terminated when the PBNP Recovery Organization, under the direction of the Emergency Director, and the NRC agree that the plant can be maintained within Technical Specifications.

5.3.2 Verify all Emergency Response Facilities are restored to a state of readiness prior to leaving facilities.

6.0 REFERENCES

6.1 EP 9.0, Recovery

6.2 EPIP 1.1, Course of Actions

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

6.4 EPIP 10.1, Emergency Reentry

6.5 EPIP 12.1, Emergency Event De-Escalation, Termination, or Recovery Operations

6.6 RCM 96, NRC Response Coordination Manual

6.7 RTM 96, NRC Response Technical Manual

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

ATTACHMENT A
PROPOSED RECOVERY ORGANIZATION AND RESPONSIBILITIES
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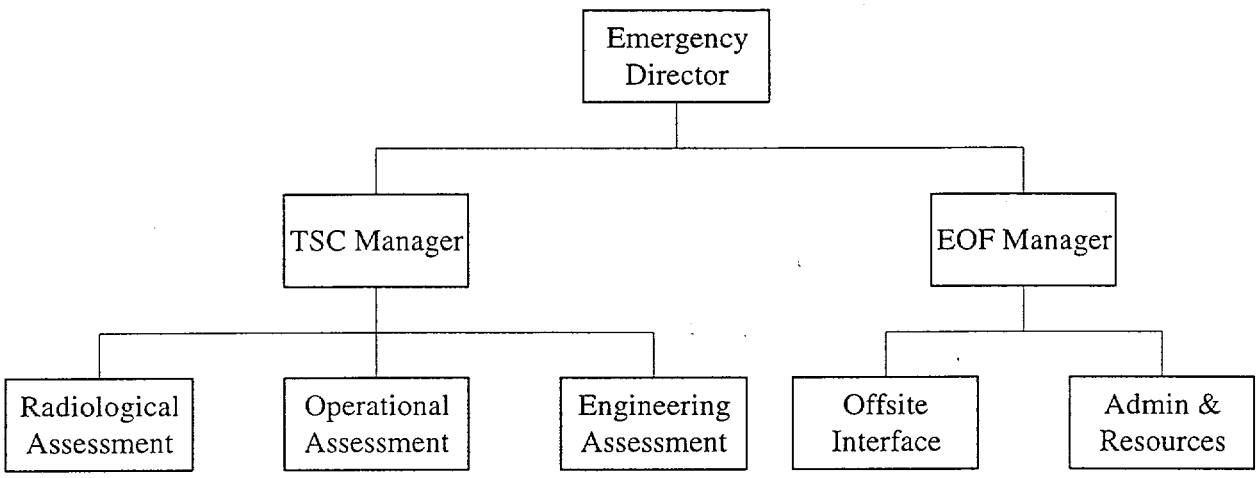

Emergency Director

- Ensures completion of this procedure.
- Determines positions and assigns personnel necessary for recovery organization.
- Determines which facilities will be required for recovery operations (TSC, OSC, EOF, etc.).
- Ensures facilities **NOT** required for recovery operations are closed and returned to a ready state.
- Manages interface with NRC Site Team.

TSC Manager

- Oversees implementation of site recovery operations.
- Establishes an onsite personnel schedule sufficient to meet the immediate needs of the recovery organization.
- Ensures all activities, proposed courses of action, and contingency plans receive proper analysis and coordination.
- Ensures plant security and plant access is maintained in accordance with Security Plan.
- Establishes an Incident Investigation Team.

ATTACHMENT A
PROPOSED RECOVERY ORGANIZATION AND RESPONSIBILITIES
Page 2 of 3

Radiological Assessment (Dose/PAR Coordinator for Offsite and Rad/Chem Coordinator for Onsite)

- Coordinates post-accident offsite sampling and analysis program in support of onsite and offsite recovery activities.
- Maintains contact with federal, state, and local agencies regarding environmental sample results and coordinates additional sampling.
- Calculates population dose, if applicable.
- Provides recommendations regarding public protective actions.
- Coordinates dose management and radiation protection for WE employees involved in recovery activities.
- Develops plans and procedures to process and control liquid, gaseous and solid wastes generates as a result of the emergency and/or recovery activities.

Operational Assessment (Operations Coordinator)

- Continues to manage plant operations.
- Determines priorities for repair work.
- Conducts assessment of plant equipment and systems.
- Ensures procedures and work plans are written for all required recovery activities.

Engineering Assessment (Engineering Coordinator)

- Develops engineering plans and schedules for performance of recovery activities.
- Directs and coordinates engineering, design, and construction activities required for recovery operations.
- Ensures appropriate administrative controls are completed, i.e., 50.59s, MRs, WOs, etc.
- Coordinates engineering functions with the Quality Assurance section.
- Coordinates activities of the NSS Supplier, the architect-engineer, various contractor forces, and other individuals and/or consultants.

EOF Manager

- Coordinates release of information with local, state, and federal agencies.
- Establishes and maintains communications with offsite agencies.
- Acts as liaison between WE and offsite agencies.
- Acts as liaison between WE and NRC Site Team and/or Augmented Inspection Team.
- Ensures appropriate personnel are interfacing with NRC Site Team.

ATTACHMENT A
PROPOSED RECOVERY ORGANIZATION AND RESPONSIBILITIES
Page 3 of 3

Offsite Communications (JPIC Manager)

- Manages all public information activities relative to recovery operations.
- Determines equipment and facility needs for the JPIC. Coordinates acquisition with Resource Coordinator.

Administrative and Resources (Resource Coordinator)

- Implements the personnel schedules developed for all facilities based upon the anticipated duration of recovery operations.
- Provides for acquisition of materials and services as necessary for recovery operations.
- Provides for personnel necessities onsite, i.e., food and refreshments.
- Provides for personnel necessities for offsite and government agencies, i.e., communications, office supplies, office space, etc.

ATTACHMENT B
RECOVERY PLAN ACTION ITEMS
Page 1 of 2

NOTE: Following an emergency, all failed equipment NOT necessary for safe shutdown and all records are to be quarantined pending an NRC investigation.

Perform assessments in the following areas and identify potential short-term and long-term recovery action items.

1. Current operational status of plant systems and equipment involved in the emergency.

2. Current operational status of the unaffected unit and its effect on the affected unit.

3. Identification of all systems, components, or equipment damaged or made inoperable.

4. Estimate of necessary repairs, parts and special tools to restore all affected systems and equipment back to fully-operational state.

5. Estimate of additional personnel resources that may be required during the restoration period and any specialized training that may be necessary.

6. Identification of 50.59 reviews necessary for unaffected unit.

7. Identification of applicable plant surveillance tests and procedures to restore plant systems to normal operational or shutdown configuration.

8. Identification of applicable system operability tests and procedures to restore plant systems to normal operational or shutdown configuration.

9. Estimate of liquid and solid radioactive waste generated during the event and recommendations on management and disposal.

10. Identification of special radiological considerations for personnel entry into affected areas with elevated dose rates or contamination levels (i.e., temporary shielding, engineering evaluations, robotics, etc.)

11. Estimate of the decontamination and monitoring activities necessary to restore affected areas inside and outside the plant site to pre-accident levels.

12. Identification of continued offsite radiological sampling and potential assistance to state or local agencies in the area of sampling, monitoring, and decontamination.

ATTACHMENT B
RECOVERY PLAN ACTION ITEMS
Page 2 of 2

13. Identification of methodology for continuing coordination with government agencies and media.

14. Identification of incident investigation team.

15. Evaluation of controlled releases that may result from recovery operations.

16. Assessment of long-term Security requirements.

ATTACHMENT C
RECOVERY PLAN ACTION ITEM ASSIGNMENTS
Page ____ of ____

ACTION ITEM	GROUP	PRIORITY

Emergency Director Approval:_____ Date _____ Time _____

Return this completed Attachment to Emergency Preparedness.