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TITLE: EMERGENCY POST ACCIDENT ANALYSIS

TRANSMITTAL: LISTED BELOW ARE NEW/REVISED PROCEDURES WHICH MUST BE  
IMMEDIATELY INSERTED INTO OR DISCARDED FROM YOUR PROCEDURE  
MANUAL.

Action Required	Section or Description
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SIGN, DATE, AND RETURN THE ACKNOWLEDGEMENT FORM WITHIN 10 DAYS TO THE PALISADES  
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**PALISADES NUCLEAR PLANT**  
**EMERGENCY IMPLEMENTING PROCEDURE**

**TITLE: EMERGENCY POST ACCIDENT ANALYSIS**

Michael Sullivan / 12/6/00  
Procedure Sponsor Date

TACHartrand / 8/5/96  
Technical Reviewer Date

JPKryska / 9/20/96  
User Reviewer Date

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**ATTACHMENTS**

Attachment 1, "Post Accident Analytical Data Sheet"

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**USER ALERT**

**REFERENCE USE PROCEDURE**

Refer to the procedure periodically to confirm that all procedure segments of an activity will be or are being performed. Where required, sign appropriate sign-off blanks to certify that all segments are complete.

**1.0 PERSONNEL RESPONSIBILITY**

The OSC Chemistry Supervisor shall implement this procedure.

**2.0 PURPOSE**

To describe the sequential method of analyzing the Primary Coolant System samples obtained from the post accident sample panel during a post accident condition.

**3.0 INITIAL CONDITIONS AND/OR REQUIREMENTS**

This procedure shall be implemented per Emergency Implementing Procedures EI-7.1, "Post Accident Sampling - PCS Liquid/Gas and Containment Air."

**4.0 REFERENCES**

**4.1 SOURCE DOCUMENTS**

4.1.1 NUREG 0737

4.1.2 NUREG 0654

4.1.3 Technical Specifications Chapter 5, Section 5.5.3, "Post Accident Sampling Program"

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**4.2 REFERENCE DOCUMENTS**

- 4.2.1 Emergency Implementing Procedure EI-7.1, "Post Accident Sampling - PCS Liquid/Gas and Containment Air"
- 4.2.2 Emergency Implementing Procedure EI-7.3, "Hydrogen Analysis of Post Accident Samples"
- 4.2.3 Emergency Implementing Procedure EI-7.4, "Post Accident Gas and Liquid Activity Analysis"
- 4.2.4 Emergency Implementing Procedure EI-7.5, "Boron; Chloride Ion Chromatography Method Post Accident"
- 4.2.5 Emergency Implementing Procedure EI-1, "Emergency Classification and Actions"
- 4.2.6 Emergency Implementing Procedure EI-7.0, "Emergency Post Accident Sampling Decision Process"
- 4.2.7 Palisades Administrative Procedure 10.46, "Plant Records"

**5.0 PREREQUISITES**

**5.1 DOSIMETRY REQUIREMENTS**

- 5.1.1 As dictated by OSC Health Physics Supervisor.
- 5.1.2 Individuals handling samples shall wear ring TLDs on one finger to each hand.

**5.2 ANTI-C CLOTHING REQUIREMENTS**

Minimum clothing shall be determined by the OSC Health Physics Supervisor.

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**6.0      PRECAUTIONS AND LIMITATIONS**

- 6.1      After a reactor accident, very high radiation dose rate and high levels of airborne radioactivity may be present in unexpected locations. Take precautions to keep internal and external exposure to a minimum. These may include, but are not limited to the following precautions:
- a.      Air sampling shall be performed to determine the iodine concentration in the sampling and analysis areas.
  - b.      Since the radiological conditions in the sampling area are uncertain, radiological surveillance shall be required.
  - c.      At least one calibrated high-range dose rate instrument should be available at all times.
  - d.      The instruments used for survey purposes should be ion chamber or gm type instruments. If an instrument with a sealed chamber is not available, bag the instrument to preclude internal contamination with radioactive gases.
  - e.      Handling of samples should be minimized. When samples must be handled, a Beta radiation dose rate deduction of 90% can be assumed for heavy rubber gloves. Dose to the extremities shall be limited to 40,000 mrem Shallow Dose Equivalent, (SDE).
  - f.      When not being handled, samples shall be stored in a shielded or remote location. All open samples shall be handled in vent hoods.
  - g.      Airborne conditions in the Auxiliary Building could require the use of pressure demand type supplied air respirators or Self Contained Breathing Apparatus (SCBA) by all personnel involved.

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- 6.2 Assume that all reactor coolant samples are extremely radioactive until determined otherwise by survey. Handle all liquids collected during post-accident sampling, including dilutions, with extreme care to prevent unnecessary personnel exposure.
- a. Shielding shall be used in the hot laboratory hood. Ensure shield is in the hood. This shield will normally be located in the hot laboratory hood.
  - b. Personnel should keep their occupational radiation exposure (wholebody and extremity) as low as reasonably achievable (ALARA) by practical use of shielding, by maintaining a distance from the sources of radiation, and by proceeding to a low background radiation area during wait time periods.
  - c. Remote handling tools may be used in support of ALARA.
  - d. Check dosimeters periodically to determine approximate exposure.
- 6.3 There is a three hour time limit on sampling and analysis from the time the sample is requested.

7.0 **PROCEDURE**

**USER ALERT**

**REFERENCE USE PROCEDURE**

Refer to the procedure periodically to confirm that all procedure segments of an activity will be or are being performed. Where required, sign appropriate sign-off blanks to certify that all segments are complete.

7.1 **PRE-ANALYSIS INSTRUMENT PREPARATION**

7.1.1 **Boron; Chloride Ion Chromatograph**

Ensure Ion Chromatograph is calibrated and an acceptable functional check is run prior to analyzing a PASM sample for Boron and Chloride per Emergency Implementing Procedure EI-7.5, "Boron; Chloride Ion Chromatography Method Post Accident."



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**7.1.2     Gas Chromatograph (Backup for In-line Gas Chromatograph)**

- a.     Ensure carrier gas flow has been established and instrument settings are proper.
- b.     Standardize as per Emergency Implementing Procedure EI-7.3, "Hydrogen Analysis of Post Accident Samples."
- c.     Perform functional check as per Emergency Implementing Procedure EI-7.3, "Hydrogen Analysis of Post Accident Samples."

**7.1.3     Gamma Spec System**

- a.     Conduct a 500 second background analysis to ensure no interference with changing background radiation levels as per Emergency Implementing Procedure EI-7.4, "Post Accident Gas and Liquid Activity Analysis."
- b.     Verify that a daily source check count has been performed to show that the equipment is performing at the calibrated efficiencies/Kev for the Gamma Spec System to be used for PASM analysis.

**7.2        SAMPLE PREPARATION**

**7.2.1     Diluted PCS Gas Sample for Radioactivity**

- a.     Prepare and Analyze PCS gas sample per Emergency Implementing Procedure EI-7.4, "Post Accident Gas and Liquid Activity Analysis."
- b.     Attach gamma spectral analysis printout to data sheet, Attachment 1, "Post Accident Analysis Data Sheet."

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**7.2.2 Diluted PCS Gas Sample for H<sub>2</sub> Analysis (Backup for In-line Gas Chromatograph)**

- a. No preparation of the H<sub>2</sub> gas sample is necessary. Sample will be analyzed directly as it is delivered to the lab after being counted for activity.
- b. Analyze as per Emergency Implementing Procedure EI-7.3, "Hydrogen Analysis of Post Accident Samples."
- c. Syringe should be purged in lab hood.
- d. Remove septum from vial and allow to vent in hood.

**7.2.3 Undiluted PCS Liquid Sample for Chloride, and Boron**

Boron, Chloride analysis will be performed using Emergency Implementing Procedure EI-7.5, "Boron; Chloride Ion Chromatography Method Post Accident."

**7.2.4 Diluted PCS Liquid Sample for Radioactivity**

- a. Prepare and analyze diluted PCS liquid sample per Emergency Implementing Procedure EI-7.4, "Post Accident Gas and Liquid Activity Analysis."
- b. Attach gamma spectral analysis printout to data sheet, Attachment 1, "Post Accident Analysis Data Sheet."

**7.2.5 Containment Air Sample for Radioactivity**

- a. Prepare and analyze containment air sample per Emergency Implementing Procedure EI-7.4, "Post Accident Gas and Liquid Activity Analysis."
- b. Attach gamma spectral analysis printout to datasheet Attachment 1, "Post Accident Analysis Data Sheet."

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**8.0      CALCULATIONS**

**8.1      IN-LINE GAS CHROMATOGRAPH ANALYSIS**

- 8.1.1      Hydrogen peak height obtained from Emergency Implementing Procedure EI-7.1, "Post Accident Sampling - PCS Liquid/Gas and Containment Air."

\_\_\_\_\_ Peak Height

- 8.1.2      Determine corrected peak height using the following calculation:

$$\text{Corrected Peak Height} = \frac{\text{Peak Height} \times \text{Attenuation}}{10}$$

\_\_\_\_\_ Corrected Peak Height

- 8.1.3      Determine cc/kg for H<sub>2</sub> using calibration curve. Calibration curves are specific for attenuation values.

\_\_\_\_\_ H<sub>2</sub> cc/kg

- 8.1.4      Record H<sub>2</sub> cc/kg on Attachment 1.

**8.2      BACKUP GAS CHROMATOGRAPH ANALYSIS**

- 8.2.1      Hydrogen % for diluted PCS gas sample obtained from Emergency Implementing Procedure EI-7.3, "Hydrogen Analysis of Post Accident Samples."

\_\_\_\_\_ % H<sub>2</sub>

- 8.2.2      Determine ppm H<sub>2</sub> using the following calculation:

$$\text{H}_2 \% \times 10,000 \text{ ppm/\%} = \text{ppm H}_2$$

\_\_\_\_\_ ppm H<sub>2</sub>

- 8.2.3      Determine cc/kg H<sub>2</sub> using the following calculation:

$$\text{ppm H}_2 \times 9.338 \text{ cc/kg/ppm} = \text{H}_2 \text{ cc/kg}$$

\_\_\_\_\_ H<sub>2</sub> cc/kg

- 8.2.4      Record H<sub>2</sub> cc/kg on Attachment 1.

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9.0 **ATTACHMENTS AND RECORDS**

9.1 **ATTACHMENTS**

9.1.1 Attachment 1, "Post Accident Analytical Data Sheet"

9.2 **RECORDS**

Records generated by this procedure shall be filed in accordance with Palisades Administrative Procedure 10.46, "Plant Records."

e | 10.0 **SPECIAL REVIEWS**

| None

**POST ACCIDENT ANALYTICAL DATA SHEET**

**PCS OFF GAS ANALYSIS (diluted sample)**

1. Sample Date/Time \_\_\_\_\_/\_\_\_\_\_ (from EI-7.1)
2. Hydrogen Concentration \_\_\_\_\_ cc/kg
3. Attach gamma spectral analysis print out to data sheet.

**PCS LIQUID ANALYSIS (undiluted sample)**

1. Sample Date/Time \_\_\_\_\_/\_\_\_\_\_ (from EI-7.1)
2. Chloride Concentration (See EI-7.5, "Boron; Chloride Ion Chromatography Method Post Accident") \_\_\_\_\_ ppm
3. Boron Concentration (See EI-7.5, "Boron; Chloride Ion Chromatography Method Post Accident") \_\_\_\_\_ ppm
4. Dissolved Oxygen Concentration (From EI-7.1)  
Recommended \_\_\_\_\_ ppm
5. pH (From EI-7.1) Recommended \_\_\_\_\_

**PCS LIQUID ANALYSIS (diluted sample)**

1. Sample Date/Time \_\_\_\_\_/\_\_\_\_\_ (from EI-7.1)
2. Attach gamma spectral analysis print out to data sheet.

**CONTAINMENT AIR ANALYSIS**

1. Sample Date/Time \_\_\_\_\_/\_\_\_\_\_ (from EI-7.1)
2. Attach gamma spectral analysis print out to data sheet.

ALL ANALYTICAL RESULTS COMPLETED

\_\_\_\_\_/\_\_\_\_\_  
Date Time