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TITLE: POST ACCIDENT SAMPLING - PCS LIQUID/GAS AND
CONTAINMENT AIR

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PALISADES NUCLEAR PLANT
EMERGENCY IMPLEMENTING PROCEDURE

**TITLE: POST ACCIDENT SAMPLING - PCS LIQUID/GAS
AND CONTAINMENT AIR**

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**TITLE: POST ACCIDENT SAMPLING - PCS LIQUID/GAS
AND CONTAINMENT AIR**

Table of Contents

1.0	<u>PERSONNEL RESPONSIBILITY</u>	1
2.0	<u>PURPOSE</u>	1
3.0	<u>REFERENCES</u>	2
3.1	SOURCE DOCUMENTS	2
3.2	REFERENCE DOCUMENTS	2
4.0	<u>INITIAL CONDITIONS AND REQUIREMENTS</u>	2
4.1	RADIOLOGICAL REQUIREMENTS AND PRECAUTIONS	2
	4.1.1 <u>Dosimetry Requirements</u>	2
	4.1.2 <u>Anti-Contamination Clothing Requirements</u>	2
4.2	GENERAL REQUIREMENTS AND PRECAUTIONS	3
5.0	<u>PROCEDURE</u>	4
5.1	PRESAMPLING SURVEYS	4
5.2	PASM PANEL PREPARATION	6
	5.2.5 <u>Grab Sample Panel (PCS) Setup and Evacuation</u>	7
	5.2.6 <u>Sample Cask Preparation</u>	10
	5.2.7 <u>Gas Sample Tong Preparation</u>	11
	5.2.8 <u>Sample Cask Positioning</u>	11
	5.2.9 <u>Evacuation of PCS Liquid Sample Section</u>	12
	5.2.10 <u>Containment Air Evacuation</u>	13
	5.2.11 <u>PASM Setup and Evacuation Completion</u>	
	<u>Notification</u>	14
	5.2.12 <u>Sample PCS Liquid/Gas</u>	15
	5.2.13 <u>LPSI Sample Purge (Only)</u>	18
	5.2.14 <u>Liquid Sample Purge</u>	18
5.3	OPERATION OF INLINE INSTRUMENTS; pH, DISSOLVED OXYGEN	19
5.4	CAPTURING THE PRESSURIZED LIQUID SAMPLE IN SF-1	20
5.5	TERMINATING SAMPLE FLOW	21

**TITLE: POST ACCIDENT SAMPLING - PCS LIQUID/GAS
AND CONTAINMENT AIR**

Table of Contents

5.6	PCS GAS - H ₂ AND ACTIVITY	22
5.6.1	<u>Evacuation of PCS Gas Stripping Section</u>	22
5.7	PASM LIQUID SAMPLE SECTION FLUSH (DI WATER)	26
5.8	DILUTED LIQUID SAMPLE (ACTIVITY) ACQUISITION	28
5.9	UNDILUTED LIQUID SAMPLE (BORON AND CHLORIDES) ..	29
5.10	POST SAMPLE FLUSH	31
5.10.1	<u>Cask Needle and Sample Flask Flush</u>	31
5.10.2	<u>MC-1 Flush</u>	33
5.10.3	<u>N₂ Purge to Gas Chromatograph Coalescing Filter</u> ..	33
5.11	CONTAINMENT AIR SAMPLE	33
5.11.3	<u>Containment Air Sample Purge</u>	34
5.11.4	<u>Grab Sample Collection</u>	35
5.12	PASM SHUTDOWN	37
6.0	<u>ATTACHMENTS</u>	38

ATTACHMENTS

| Attachment 1, "Jumpering CV-1910 and CV-1911 for PASM Sample"

**TITLE: POST ACCIDENT SAMPLING - PCS LIQUID/GAS
AND CONTAINMENT AIR**

USER ALERT
CONTINUOUS USE PROCEDURE

Read each step of the procedure prior to performing that step. When sign-offs are required, sign off each step as complete before proceeding to the next step.

1.0 PERSONNEL RESPONSIBILITY

Operations Support Group Leader, with assistance of Operations Support Center Chemistry Supervisor, shall implement this procedure. In the absence of Operations Support Group Leader, the Site Emergency Director shall delegate this responsibility.

2.0 PURPOSE

This procedure details operation of Post Accident Sampling and Monitoring (PASM) System to provide the following during post accident conditions:

- a. PCS liquid sample (diluted or undiluted)
- b. PCS dissolved gas sample (diluted)
- c. Containment Atmosphere (diluted)
- d. Operation of PASM installed chemistry instrumentation:
 1. pH
 2. Dissolved Oxygen
 3. Gas Chromatograph (H₂ Analysis)

**TITLE: POST ACCIDENT SAMPLING - PCS LIQUID/GAS
AND CONTAINMENT AIR**

3.0 REFERENCES

3.1 SOURCE DOCUMENTS

- 3.1.1 "Instrumentation Manual for Post Accident Sampling and Monitoring System Upgrade," Sentry Equipment Corp

3.2 REFERENCE DOCUMENTS

- 3.2.1 Emergency Implementing Procedure EI-7.0, "Emergency Post Accident Sampling Decision Process"
- 3.2.2 Emergency Implementing Procedure EI-7.2, "Emergency Post Accident Analysis"
- 3.2.3 Emergency Implementing Procedure EI-16.2, "Post-Accident Sample Monitoring System Supplies and Associated Equipment Checks"
- 3.2.4 Emergency Implementing Procedure EI-11.2, "Core Damage Assessment From Post Accident Sampling"
- 3.2.5 Chemistry and Radiological Services Department Policy and Practice 98-003 (Rev 0), "Communication Expectations for PASM"

4.0 INITIAL CONDITIONS AND REQUIREMENTS

4.1 RADIOLOGICAL REQUIREMENTS AND PRECAUTIONS

4.1.1 Dosimetry Requirements

- a. As dictated by OSC Health Physics Supervisor.
- b. Individuals handling samples shall wear ring TLDs on one finger of each hand.

4.1.2 Anti-Contamination Clothing Requirements

- a. As dictated by OSC Health Physics Supervisor.
- b. OSC Health Physics Supervisor shall dictate when additional hand protection (eq, lineman's gloves or heavy rubber gloves) is required for individuals requiring direct contact with samples.

PALISADES NUCLEAR PLANT
EMERGENCY IMPLEMENTING PROCEDURE

Proc No EI-7.1
Revision 15
Page 3 of 38

**TITLE: POST ACCIDENT SAMPLING - PCS LIQUID/GAS
AND CONTAINMENT AIR**

- 4.1.3 Unless authorized by Site Emergency Director, sampling where general area dose rates exceed 10rem/hr shall not be performed.
- 4.1.4 When not needed, samples shall be stored in shielded or remote locations.
- 4.1.5 While performing this procedure make a conscious effort to maintain your exposure ALARA. When possible, withdraw to an area of lower dose rate (eg, during flushing or purging operations of greater than 2 minutes duration).
- 4.1.6 Once the decision has been made to sample, the sample must be obtained and analyzed within three hours.
- 4.2 **GENERAL REQUIREMENTS AND PRECAUTIONS**
 - 4.2.1 If problems are encountered operating PASM Panel, contact OSC Chemistry Supervisor before proceeding.
 - 4.2.2 CV-1910 and CV-1911 close on Containment high radiation or high pressure. In this situation, these valves will have to be jumpered open per Attachment 1 of this procedure, "Jumpering CV-1910 and CV-1911 for PASM Sample," in order to obtain PCS samples.
 - 4.2.3 CCW Valve SV-944A closes on a Safety Injection Signal (SIS). This secures cooling to the sample coolers. This valve will need to be reopened by the Control Room prior to obtaining a PCS Hotleg or LPSI sample from the panel.

**TITLE: POST ACCIDENT SAMPLING - PCS LIQUID/GAS
AND CONTAINMENT AIR**

5.0 PROCEDURE

USER ALERT

CONTINUOUS USE PROCEDURE

Read each step of the procedure prior to performing that step. When sign-offs are required, sign off each step as complete before proceeding to the next step.

NOTE: Steps in this procedure can be N/A'ed with OSC Chemistry Supervisor's approval.

5.1 PRESAMPLING SURVEYS

5.1.1 OSC Chemistry Supervisor requests OSC Health Physics (HP) Supervisor for performance of dose rates and/or air sample surveys of the following areas:

- a. PASM Room 233
- b. NSSS Sample Panel Room
- c. Nitrogen Bottle Rack Area
- d. Hall to Chemistry Hot Lab
- e. Chemistry Hot Lab
- f. Count Room
- g. Chemistry Grey Lab

PALISADES NUCLEAR PLANT
EMERGENCY IMPLEMENTING PROCEDURE

Proc No EI-7.1
Revision 15
Page 5 of 38

**TITLE: POST ACCIDENT SAMPLING - PCS LIQUID/GAS
AND CONTAINMENT AIR**

5.1.2 OSC HP Supervisor shall ensure:

- a. Stay times are computed for ALL individuals required to work in High Radiation areas as surveyed in Step 5.1.1.
- b. HP coverage at sample panels and in labs is commensurate with dose rates and may include:
 1. Monitoring dose rates at and around sample panels during all sample acquisition activities.
 2. Continuous air sampling at sample panels and in labs during sample analysis.

5.1.3 If applicable areas are accessible, the OSC Chemistry Supervisor will dispatch two, two-person Chem Tech Teams (with HP coverage, as dictated by OSC HP Supervisor) to:

- a. PASM Panel
- b. Analysis Station including:
 1. Hot Lab
 2. High Level Count Room
 3. Chemistry Grey Lab

NOTE: Low Level Count Room is an alternate analysis location for High Level Count Room.

5.1.4 OSC Chemistry Supervisor shall determine PASM Panel set up as determined using Emergency Implementing Procedure EI-7.0, "Emergency Post Accident Sampling Decision Process."

5.1.5 Ensure there are no unexpected alarms locked in on the EC-168 alarm panel. If an unexpected alarm is present, contact the OSC Chemistry Supervisor.

**TITLE: POST ACCIDENT SAMPLING - PCS LIQUID/GAS
AND CONTAINMENT AIR**

5.2 PASM PANEL PREPARATION

5.2.1 As each step of this procedure is completed, it shall be "CHECKED OFF" (✓) in the space provided in the right-hand margin. If a step is not to be completed, enter "N/A" rather than a check.

5.2.2 In PASM area: ACRONYMS:

CCW - counterclockwise

CW - clockwise

- a. One Chem Tech operates PASM Panel valves and controls per this procedure.
- b. Other Chem Tech reads aloud procedural steps herein, including the component coordinates when necessary to aid the operator, and operates Panel EC-168.
- c. When two technicians are working as a team to perform PASM sampling, communication should consist of the following three-way format:
 1. The verbal message is given.
 2. The message is repeated back.
 3. Acknowledgment of the correct repeat-back is given.
- d. Per Chemistry and Radiological Services Department Policy and Practice 98-003 (Rev 0), "Communication Expectations for PASM," this procedure may be performed by one technician utilizing a working copy of the procedure and checking off each step as it is performed.

NOTE: Coordinates are given to assist in locating components on PASM Panels.

PALISADES NUCLEAR PLANT
EMERGENCY IMPLEMENTING PROCEDURE

Proc No EI-7.1
Revision 15
Page 7 of 38

**TITLE: POST ACCIDENT SAMPLING - PCS LIQUID/GAS
AND CONTAINMENT AIR**

CHECK

5.2.3 Place SS-0210 and SS-0211 in the ON position. _____

5.2.4 Verify that the following temperature indicating switches are in service: _____

a. TIS-1901

1. If the Green LED is ON (unit in Manual Mode), enable the alarm function by pushing A/M touch pad, this enters Auto Mode with Green LED off.

5.2.5 **Grab Sample Panel (PCS) Setup and Evacuation**

a. Open one nitrogen cylinder Isolation Valve in the Valve Gallery. _____

b. Ensure ventilation fan switch HS-1922 to right of J-670, Needle Control Panel, is "ON." _____

c. Verify nitrogen pressure at PI-1904 (C-103-1 @ J-12) is 110 to 140 psig. _____

d. Ensure diluter reservoir (I-27) greater than 50% full. Obtain demin water for diluter from Hot Lab. _____

e. Fill dilution inject syringe (Q-27) from diluter reservoir. Ensure 23 cc injection stop is in place. _____

f. At Panel EC-168, ensure heat trace for Containment air sample line, HS-1921 is on. _____

g. At C-103-1 Panel B, ensure heat trace for Containment air sample line, HS-1941 is on. _____

PALISADES NUCLEAR PLANT
EMERGENCY IMPLEMENTING PROCEDURE

Proc No EI-7.1
Revision 15
Page 8 of 38

**TITLE: POST ACCIDENT SAMPLING - PCS LIQUID/GAS
AND CONTAINMENT AIR**

CHECK

h. To ensure rinse water has not collected in sample loop:

1. Place beaker underneath needle assembly in cave. _____
2. At Needle Control Panel J-670, position HS-1918 to "LOWER CYLINDER." _____
3. **IF** "CART ENGAGED" lamp does not light, position HS-1918 to "RAISE," **THEN** repeat Step 2. _____
4. **WHEN** "CART ENGAGED" lamp is lit, position HS-1918 to "INSERT NEEDLE." Needle is in proper position when "NEEDLE INSERTED" lamp is lit. _____
5. Position HS-1918 to "HOME." _____
6. Rotate MV-1907 (V-23) CCW to 9 o'clock. _____
7. Rotate MV-1926 (S-23) CW to 3 o'clock to establish sample loop N₂ purge flow. _____
8. Purge one (1) minute. _____
9. Rotate MV-1926 (S-23) CCW to 12 o'clock. _____
10. At Needle Control Panel (J-670), position HS-1918, to "RAISE." _____
11. When "CYLINDER CLEAR" lamp (J-670) is lit, position HS-1918 to "HOME." _____
12. Remove beaker from cave. _____

PALISADES NUCLEAR PLANT
EMERGENCY IMPLEMENTING PROCEDURE

Proc No EI-7.1

Revision 15

Page 9 of 38

**TITLE: POST ACCIDENT SAMPLING - PCS LIQUID/GAS
AND CONTAINMENT AIR**

CHECK

- i. Ensure the following on Sample Panel EC-103-1:

<u>Valve</u>	<u>Coordinates</u>	<u>Position</u>	
MV-1910	E-19	9 o'clock	_____
MV-1926	S-23	12 o'clock	_____
MV-1923	M-18	Closed	_____
MV-1924	O-18	Closed	_____
MV-1925	L-14	Closed	_____
PCV-1916	P-16	Closed	_____
MV-1909	R-14	Open	_____
MV-1921	M-16	Closed	_____
MV-1920	N-17	Open	_____
MV-1927	L-25	Closed	_____
MV-1913	G-25	9 o'clock	_____
MV-1907	V-23	9 o'clock	_____
MV-1911	H-17	3 o'clock	_____
MV-1905	E-15	9 o'clock	_____
MV-1903	Q-20	Open	_____
MV-1904	L-20	Open	_____
MV-1938	O-21	Closed	_____
MV-1906	E-13	9 o'clock	_____
MV-1912	D-17	6 o'clock	_____
MV-1928	H-23	3 o'clock	_____
MV-1916	V-28	3 o'clock	_____
MV-1917	V-29	3 o'clock	_____
MV-1939	R-17	12 o'clock	_____
MV-1949	W-15	Open	_____

- j. Verify PI-1905 (G-12) is reading 100-160 p̄sig. _____

NOTE: MV-PMW122 is located on south wall of PASM Panel Room; MV-PMW132 is above stairwell door, elevation 611', Auxiliary Building.

1. If no pressure is indicated, ensure valves MV-PMW122 and MV-PMW132 are open. _____

- k. At Panel EC-167 align PASM drains by placing HS-1930 to open and HS-1929 to close. _____

PALISADES NUCLEAR PLANT
EMERGENCY IMPLEMENTING PROCEDURE

Proc No EI-7.1
Revision 15
Page 10 of 38

**TITLE: POST ACCIDENT SAMPLING - PCS LIQUID/GAS
AND CONTAINMENT AIR**

CHECK

- I. To ensure rinse water has not collected in needle assembly:

1. Ensure HS-1918 in "HOME" position and "CYLINDER CLEAR" lamp is lit. _____
2. Rotate MV-1917 (V-29) CW to 6 o'clock. _____
3. Wait one minute. _____
4. Rotate MV-1917 (V-29) CCW to 3 o'clock. _____

5.2.6 Sample Cask Preparation

- a. From PASM Supply Cabinet obtain:

1. Hand Speed Wrench _____
2. Screwdriver _____
3. Inner Cask Lifting Device _____
4. 2 Tritium Vials with Septums _____

- b. Prepare two sample casks in a low dose rate area as follows:

1. Loosen bolts on cask top shield. _____
2. Lift cask top shield from cask and set aside. _____
3. Loosen and remove screws from holding ring. _____
4. Remove holding ring and gasket and set aside. _____
5. Screw inner cask lifting device onto inner cask two turns. _____

PALISADES NUCLEAR PLANT
EMERGENCY IMPLEMENTING PROCEDURE

Proc No EI-7.1
Revision 15
Page 11 of 38

**TITLE: POST ACCIDENT SAMPLING - PCS LIQUID/GAS
AND CONTAINMENT AIR**

CHECK

6. Lift inner cask out of sample cask. _____
7. Place a evacuated tritium vial in each of the two transfer casks and label one diluted liquid and the other undiluted liquid. _____
8. Reinstall inner cask in sample cask. _____
9. Reinstall gasket and holding ring. _____
10. Reinstall screws in holding ring, tighten with screwdriver. _____
11. Remove inner cask lifting device from inner cask. _____
12. Label cask with contents. _____
13. Replace top shield on sample cask; do not tighten bolts. _____
14. Insert wire plug into lid of cask containing undiluted liquid. _____

5.2.7 Gas Sample Tong Preparation

- a. Place a 14cc serum vial in the sample tong labeled PCS Gas. _____
- b. Place a 14cc serum vial in the sample tong labeled Containment Air. _____

5.2.8 Sample Cask Positioning

- a. Transport sample casks to PASM Panel. _____
- b. Remove top shields from casks. _____
- c. Roll cask for undiluted liquid sample into PASM Panel cave and center cart against stops. _____

PALISADES NUCLEAR PLANT
EMERGENCY IMPLEMENTING PROCEDURE

Proc No EI-7.1
Revision 15
Page 12 of 38

**TITLE: POST ACCIDENT SAMPLING - PCS LIQUID/GAS
AND CONTAINMENT AIR**

CHECK

NOTE: Needle is in proper sampling position when
"NEEDLE INSERTED" lamp is lit.

- d. At Needle Control Station J-670, position
HS-1918 to "LOWER CYLINDER." _____
- e. When "CART ENGAGED" lamp is lit, position
HS-1918 to "INSERT NEEDLE." If "CART
ENGAGED" lamp does not light:
 - 1. Position HS-1918 to "RAISE." _____
 - 2. Recenter cart against stops. _____
 - 3. Repeat Steps d and e. _____
- f. Position HS-1918 to "HOME." _____

5.2.9 Evacuation of PCS Liquid Sample Section

- a. Rotate MV-1926 (S-23) CCW to 6 o'clock. _____
- b. Rotate MV-1907 (V-23) CW to 3 o'clock. _____
- c. Rotate MV-1906 (E-13) CW to 12 o'clock to
open. _____
- d. Evacuate liquid sample section until stable and
less than 2.0 psia, as indicated on PI-1903,
Channel 2, low range, at EC-168 Panel. _____
- e. Notify Chemistry Supervisor if PI-1903,
Channel 2 does not indicate less than 2.0 psia,
Chemistry Supervisor will determine if you can
proceed with sampling. _____
- f. Rotate MV-1905 (E-15) CCW to 6 o'clock to
close. _____

PALISADES NUCLEAR PLANT
EMERGENCY IMPLEMENTING PROCEDURE

Proc No EI-7.1
Revision 15
Page 13 of 38

**TITLE: POST ACCIDENT SAMPLING - PCS LIQUID/GAS
AND CONTAINMENT AIR**

CHECK

g. Rotate MV-1906 (E-13) CCW to 9 o'clock to close.

h. Close MV-1903 (Q-20).

i. Close MV-1904 (L-20).

5.2.10 Containment Air Evacuation

NOTE: Temperature control TIS-1900 at EC-168 is set for 280°F to 295°F. If heat tracing fails to activate, contact the OCS Chemistry Supervisor

a. On Panel EC-103-1 ensure:

<u>Valve</u>	<u>Coordinates</u>	<u>Position</u>	
MV-1930	V-15	9 o'clock	_____
MV-1932	I-3	6 o'clock	_____
MV-1931	F-3	6 o'clock	_____
MV-1933	F-2	3 o'clock	_____
MV-MGS200	F-7	3 o'clock	_____
MV-1934	H-7	6 o'clock	_____
MV-1943	H-14	9 o'clock	_____

b. Place 14 cc serum vial with septum in sample tong labeled "CONTAINMENT AIR."

c. Place sample tong in guide tube marked "SN-2."

d. Push vial onto needle and rotate sample tong into locked position.

e. Rotate MV-1906 (E-13) CW to 12 o'clock to open.

f. At "PANEL B" of EC-103-1, ensure "SN-2 VAC OK" lamp is lit. If lamp does not light, contact OSC Chemistry Supervisor.

PALISADES NUCLEAR PLANT
EMERGENCY IMPLEMENTING PROCEDURE

Proc No EI-7.1
Revision 15
Page 14 of 38

**TITLE: POST ACCIDENT SAMPLING - PCS LIQUID/GAS
AND CONTAINMENT AIR**

CHECK

- g. Rotate MV-MGS-200 (F-7) CW to 6 o'clock. _____
- h. Rotate MV-1906 (E-13) CCW to 9 o'clock to close. _____
- i. Observe "SN-2 VAC OK" lamp; it should remain lit one minute minimum. If lamp does not remain lit, contact OSC Chemistry Supervisor. _____
- j. Rotate MV-1934 (H-7) CW to 9 o'clock. _____

5.2.11 PASM Setup and Evacuation Completion Notification

- a. Notify OSC Chemistry Supervisor when Grab Sample Panel (PCS Liquid and Gas Sample) and Containment Air Sample Panel setups and evacuations are complete. _____
- b. Notify OSC Chemistry Supervisor when preparation of PASM Panel (PCS Liquid/Gas and Containment Air) and the Analysis Stations (Hot Lab, High Level Count Room, Low Level Count Room, Radwaste Lab) are completed. If sampling is not imminent Techs should move to a low dose area. _____
- c. OSC Chemistry Supervisor instructs to sample:

<u>Time</u>	<u>Check</u>	<u>Sample</u>
_____	_____	Containment Air
_____	_____	PCS Liquid/Gas

- d. If sampling:

PCS Liquid/Gas	Go to Step 5.2.12
Containment Air	Go to Step 5.11

PALISADES NUCLEAR PLANT
EMERGENCY IMPLEMENTING PROCEDURE

Proc No EI-7.1
Revision 15
Page 15 of 38

**TITLE: POST ACCIDENT SAMPLING - PCS LIQUID/GAS
AND CONTAINMENT AIR**

CHECK

5.2.12 Sample PCS Liquid/Gas

a. Analysis Required

1. pH, Boron, Chlorides - 4.0 mL of undiluted PCS liquid in 25 cc tritium vial contained in sample cask. _____
2. Liquid Activity - 10 mL of diluted (1322:1) PCS liquid in 10 cc shielded syringe, transferred to sample cask. _____
3. Dissolved Hydrogen, Offgas Activity - 14 cc of diluted PCS offgas in 14 cc serum vial, transported in sample tong. _____

- b. Ask OSC Chemistry Supervisor which sample stream, PCS or LPSI, to sample. (Circle One)** _____

NOTE: CV-1910 and CV-1911 may have to be jumpered open per Attachment 1 of this procedure, "Jumpering CV-1910 and CV-1911 for PASM Sample."

NOTE: CCW Valve SV-944A closes on a Safety Injection Signal (SIS). This secures cooling to the sample coolers. This valve will need to be reopened by the Control Room prior to obtaining a PCS Hotleg or LPSI sample from the panel.

c.

IF	THEN
Hi-Hi Temperature alarm exists	Go To Step 5.2.12d
Hi-Hi Temperature alarm does not exist	Check HS-1919 and HS-1920 in AUTO. Go to Step 5.2.12e

PALISADES NUCLEAR PLANT
EMERGENCY IMPLEMENTING PROCEDURE

Proc No EI-7.1
Revision 15
Page 16 of 38

**TITLE: POST ACCIDENT SAMPLING - PCS LIQUID/GAS
AND CONTAINMENT AIR**

CHECK

d.

IF	THEN
RC Sample is Required	Place HS-1919 to MANUAL. Go to Step 5.2.12e
LPSI Sample is Required	Place HS-1920 to MANUAL. Go to Step 5.2.12e

e.

IF	THEN
LPSI Sample Required	Go to Step 5.2.13
RC Hot Leg Sample Required	Go to Step 5.2.12f

- f. Have OSC Chemistry Supervisor contact Main Control Room to open CV-1910 and CV-1911 and ensure that CCW isolation valve SV944A is open.

1. At NSSS Panel EC-32, position HS-1901 to #3 (SX-1023).
2. Position control switch CS-5057 (NSSS Panel below HS-1901) solenoid to "ON."
3. At EC-168 Panel, verify CV-1903 open (red position indicator light is lit).
4. At EC-168 Panel, verify CV-1910 and CV-1911 open (red position indicator light is lit).

PALISADES NUCLEAR PLANT
EMERGENCY IMPLEMENTING PROCEDURE

Proc No EI-7.1
Revision 15
Page 17 of 38

**TITLE: POST ACCIDENT SAMPLING - PCS LIQUID/GAS
AND CONTAINMENT AIR**

CHECK

g. At EC-168 Panel:

1. Position HS-1912 to "RC SAMPLE." CV-1912 position indicator should go from green to red. _____
2. Position HS-1916 to "SAMPLE." SV-1916 position indicator should go from green to red. _____

h. At EC-167 Panel:

1. Position OXIT 1900 (Orbisphere DO Analyzer) to "ON" and ensure it is in autorange. _____

i. At Sub Panel C of PASM, obtain PCS pressure from PI-1907 and PI-1908, and record readings.

PI-1907 _____
PI-1908 _____

1. If no pressure is indicated on PI-1907 and PI-1908, obtain PCS pressure from PI-1900 located above NSSS Panel sample coolers. _____

PI-1900 _____

2. Report readings from PI-1907 and PI-1908 (and PI-1900, if applicable) to OSC Chemistry Supervisor. _____

IF	THEN
PI-1907 Pressure > 150 psig	Go to Step 5.2.14
PI-1907 Pressure < 150 psig	Contact OSC Chemistry Supervisor.

PALISADES NUCLEAR PLANT
EMERGENCY IMPLEMENTING PROCEDURE

Proc No EI-7.1
Revision 15
Page 18 of 38

**TITLE: POST ACCIDENT SAMPLING - PCS LIQUID/GAS
AND CONTAINMENT AIR**

CHECK

5.2.13 LPSI Sample Purge (Only)

NOTE: PS-1903 indicator lamp on EC-168 should be lit to obtain LPSI sample.

a. Ensure the following:

CV-1903	CLOSED
CV-1910	CLOSED
CV-1911	CLOSED
HS-1912	OFF
HS-1916	OFF
HS-1920	AUTO
SS-0210	ON

b. Position HS-1912 (EC-168) to "LP INJ."
CV-1913 position indicator should go from green to red.

c. Position sample switch HS-1914 (EC-168) to "SAMPLE." SV-1914 (EC-168) position indicator should go from green to red.

5.2.14 Liquid Sample Purge

<u>IF</u>	<u>THEN</u>
LPSI Sample Required	Open PCV-1916 (P-16) purge for 3 minutes. Go to Step 5.2.15.
RC Hot Leg Sample Required	Open PCV-1916 (P-16) until FI-1912 reads 0.40 gal/min; purge for 3 minutes. Go to Step 5.2.15.

PALISADES NUCLEAR PLANT
EMERGENCY IMPLEMENTING PROCEDURE

Proc No EI-7.1
Revision 15
Page 19 of 38

**TITLE: POST ACCIDENT SAMPLING - PCS LIQUID/GAS
AND CONTAINMENT AIR**

CHECK

5.2.15

IF	<u>THEN</u>
H-Hi Temperature Alarm is Clear	Place Appropriate Hand Switch to AUTO (HS-1919 for RC sample and HS-1920 for LPSI sample) and continue Purge for 27 minutes. Go to Step 5.2.16.
HI-Hi Temperature Alarm is not Clear	Contact Chemistry Supervisor

5.2.16 Sample Purge Start Time: _____

**5.3 OPERATION OF INLINE INSTRUMENTS; pH,
DISSOLVED OXYGEN**

5.3.1 Turn PCV-1916 (P-16) CW until FI-1912 reads 0.05 gal/min. _____

5.3.2 Open MV-1924 (O-18). _____

5.3.3 Open MV-1923 (M-18). _____

5.3.4 Close MV-1920 (N-17). _____

5.3.5 Rotate MV-1939 (R-16) CCW to 6 o'clock to establish flow to pHE-1902 and CE-1902. _____

- a. Slowly increase sample flow by opening PCV-1916 until flow switch FS-1904 on sub panel B lites.

**PALISADES NUCLEAR PLANT
EMERGENCY IMPLEMENTING PROCEDURE**

Proc No EI-7.1
Revision 15
Page 20 of 38

**TITLE: POST ACCIDENT SAMPLING - PCS LIQUID/GAS
AND CONTAINMENT AIR**

CHECK

- | | | |
|--------|---|-------|
| 5.3.6 | At C-167 Panel, position pHIT 1902 to "READ" by depressing standardization knob. Ensure proper operation by verifying standardization setting using standardization data kept in Hot Lab or on calibration sticker on instrument. | _____ |
| 5.3.7 | At J-673 Panel (Hot Lab), position pHR 1902 and OXR 1900 to "ON," at a chart speed of 2 cm/hr or notify Hot Lab Analysis Team to perform. | _____ |
| 5.3.8 | Wait five minutes. | _____ |
| 5.3.9 | At C-167 Panel record readings from pHIT 1902 and OXIT 1900. | _____ |
| | pH
Dis O ₂ | _____ |
| 5.3.10 | Place pHIT 1902 to standby. | _____ |
| 5.3.11 | Place the OXIT 1900 to "OFF." | _____ |
| 5.3.12 | Place pHR 1902 and OXR 1900 to "OFF," or notify Hot Lab Analysis Team to perform. | _____ |
| 5.3.13 | Rotate MV-1939 (R-17) CW to 12 o'clock. | _____ |
| 5.4 | CAPTURING THE PRESSURIZED LIQUID SAMPLE IN SF-1 | |
| 5.4.1 | Sample collection is a coordinated effort: | |
| | a. One Chem Tech operates PASM Panel valves and controls per this procedure. | |
| | b. Other Chem Tech reads aloud procedural steps herein including component coordinates when necessary, and operates Panel EC-168. | |
| | c. HP Tech monitors dose rates commensurate with evolutions Chemistry is performing. This includes measuring and recording dose rates of all samples collected. | |

PALISADES NUCLEAR PLANT
EMERGENCY IMPLEMENTING PROCEDURE

Proc No EI-7.1
Revision 15
Page 21 of 38

**TITLE: POST ACCIDENT SAMPLING - PCS LIQUID/GAS
AND CONTAINMENT AIR**

		<u>CHECK</u>
5.4.2	Slowly close PCV 1916 (P-16).	_____
5.4.3	Close MV-1923 (M-18).	_____
5.4.4	Wait approximately 30 seconds.	_____
5.4.5	Close MV-1924 (O-18).	_____
5.4.6	Record time MV-1924 closed as sample time.	
	Sample Time:	_____
5.4.7	Close MV-1909 (S-14).	_____
5.4.8	At EC-168 Panel, Record sample temperature from TI-1902 (PCS sample) or TI-1903 (LPSI sample) as applicable. (Circle One)	
	Sample Temperature:	_____
5.5	TERMINATING SAMPLE FLOW	
5.5.1	Place HS-1916 (EC-168) (or HS-1914 (EC-168), if using LPSI) to "OFF." The SV-1916 (or SV-1914, if using LPSI) pilot lamp should go from red to green.	_____
5.5.2	For a PCS sample only: Have OSC Chemistry Supervisor contact Main Control Room to close CV-1910 and CV-1911. The red valve position indicators for CV-1910 and CV-1911 will not be lit when CV-1910 and CV-1911 are closed.	_____
<u>NOTE:</u>	CV-1903 is left open after sampling to reduce unnecessary radiation doses.	
	CV-1910	_____
	CV-1911	_____

PALISADES NUCLEAR PLANT
EMERGENCY IMPLEMENTING PROCEDURE

Proc No EI-7.1
Revision 15
Page 22 of 38

**TITLE: POST ACCIDENT SAMPLING - PCS LIQUID/GAS
AND CONTAINMENT AIR**

CHECK

5.6 PCS GAS - H₂ AND ACTIVITY

5.6.1 Evacuation of PCS Gas Stripping Section

- a. Place sample tong labeled "PCS GAS SAMPLE" in guide tube marked "SN-1." _____
- b. Push vial onto needle and rotate sample tong into locked position. _____
- c. Rotate MV-1912 (D-17) CW to 9 o'clock to establish flow path to MV-1905 (E-15). _____
- d. Rotate MV-1905 (E-15) CW to 9 o'clock to open. _____
- e. Rotate MV-1906 (E-13) CW to 12 o'clock to open. _____
- f. Rotate MV-1911 (H-17) CCW to 12 o'clock. _____
- g. Using the eductor evacuate sample loop and vial until PI-1903, Channel 1 is stable and less than 2 psia. _____

IF PI-1903 Channel 1 is inoperable, **THEN** use Channel 2 according to the following steps:

- 1. Rotate MV-1911 (E-19) CW to 3 o'clock. _____
- 2. Verify PI-1903, Channel 2 is < 2.0 psia. _____
- h. Rotate MV-1911 (E-19) CW to 3 o'clock. _____
- i. Switch PI-1903 from Channel 1 to Channel 2 and continue evacuation until stable and less than 2 psia. _____
- j. Rotate MV-1905 (E-15) CCW to 6 o'clock to close. _____

PALISADES NUCLEAR PLANT
EMERGENCY IMPLEMENTING PROCEDURE

Proc No EI-7.1
Revision 15
Page 23 of 38

**TITLE: POST ACCIDENT SAMPLING - PCS LIQUID/GAS
AND CONTAINMENT AIR**

CHECK

k. Rotate MV-1906 (E-13) CCW to 9 o'clock to close. _____

l. Verify leak rate less than 0.2 psia/min on PI-1903, Channel 1 and Channel 2. If leakage is greater than 0.2 psia/min; verify needle of SN-1 and vial septum are secure and repeat Steps 5.6.1 e-k. _____

IF PI-1903 Channel 1 is inoperable, **THEN** use Channel 2 according to the following steps:

1. Verify leak rate is less than 0.2 psia/min on PI-1903, Channel 2. _____

2. Rotate MV-1911 (E-19) CCW to 12 o'clock. _____

m. Rotate MV-1912 (D-17) CCW to 6 o'clock. _____

5.6.2 At C-103 Panel:

a. Ensure MV-1911 (H-17) at the 3 o'clock position. _____

b. Slowly open MV-1904 (L-20); record sample pressure reading from PI-1903 Channel 2.

MV-1904 Open
READING: psia _____

c. Slowly open MV-1938 (P-20); record reading (sample pressure plus nitrogen pressure) on PI-1903, Channel 2. Pressure should be about 20 - 30 psia.

MV-1938 Open
READING: psia _____

d. After pressure on PI-1903 Channel 2 stabilizes, close MV-1938 (P-20). _____

PALISADES NUCLEAR PLANT
EMERGENCY IMPLEMENTING PROCEDURE

Proc No EI-7.1
Revision 15
Page 24 of 38

**TITLE: POST ACCIDENT SAMPLING - PCS LIQUID/GAS
AND CONTAINMENT AIR**

CHECK

- e. Close MV-1904 (L-20). _____

NOTE: The Position indicator for HS-1926 indicates "ON" when HS-1926 is in the "OFF GAS OPEN" position, and "OFF" when HS-1926 is in the "CONT ON" position.

- f. Position HS-1926 (C-103 Panel B) to "OFF." _____

5.6.3 At GC-1920 in Panel C-167:

- a. Depress "MANUAL" button. _____
- b. Depress "CLEAR" button. _____
- c. Enter Code "23." _____
- d. Verify vacuum indicator lamps switch from "LOW" to "HIGH," wait 10 seconds then enter Code "24" to terminate eductor operation. _____

5.6.4 Rotate MV-1910 (F-19) CW to 12 o'clock. _____

5.6.5 At GC 1920:

- a. Place GCR 1920 chart speed to 120 cm/hr turn recorder to ON and place pen on paper using white lever on top of recorder. _____
- b. Release GC "MANUAL" button. _____
- c. Select 1 x 10 attenuation. _____
- d. Depress "AUTO" button. _____
- e. Depress "SAMPLE" button; release button 10 seconds after "LOW" vacuum lamp is lit. _____
- f. Depress and release "CLEAR" button to initiate analysis. Chromatogram will be complete in about 2 minutes. _____

PALISADES NUCLEAR PLANT
EMERGENCY IMPLEMENTING PROCEDURE

Proc No EI-7.1
Revision 15
Page 25 of 38

**TITLE: POST ACCIDENT SAMPLING - PCS LIQUID/GAS
AND CONTAINMENT AIR**

CHECK

5.6.6 While chromatogram is running, rotate MV-1910 (E-19) CCW to 9 o'clock. _____

5.6.7 When chromatogram is complete, position GCR 1920 chart speed to "OFF," lift pen off paper, and record hydrogen peak height. H₂ Peak Ht _____

5.6.8 Release "AUTO" button, then press "CLEAR" button to secure GC 1920. _____

5.6.9

<u>IF</u>	<u>THEN</u>
If hydrogen peak exceeds chart recorder maximum	Readjust attenuation to 25 X1, and go to Step 5.6.3 and reanalyze. _____
If hydrogen peak does not exceed chart recorder maximum	Go to Step 5.6.10 _____

5.6.10 Rotate MV-1911 (H-17) CCW to 12 o'clock. _____

5.6.11 Rotate MV-1912 (D-17) CCW to 3 o'clock for approximately five seconds, then return it (CW) to 6 o'clock. Record pressure reading from PI-1903 Channel 1. _____

READING: psia _____

5.6.12 Rotate MV-1911 (H-17) CW to 3 o'clock. _____

PALISADES NUCLEAR PLANT
EMERGENCY IMPLEMENTING PROCEDURE

Proc No EI-7.1
Revision 15
Page 26 of 38

**TITLE: POST ACCIDENT SAMPLING - PCS LIQUID/GAS
AND CONTAINMENT AIR**

CHECK

NOTE: In next step when sample tong is removed from SN-1, have HP Tech get contact dose rate on sample. Dose rate is needed to determine if any pre-analyses dilutions are required. If background radiation interferes with this dose measurement, delay measurement until sample is brought to analysis station.

5.6.13 Remove "Diluted" sample tong from SN-1 (J-17).

a. Sample Dose Rate _____ mrem/hr. _____

b. Transport Sample to analysis station. _____

5.6.14 Perform gamma spectral analysis on sample per Emergency Implementing Procedure EI-7.2, "Emergency Post Accident Analysis." If little or no activity is present in sample, report this to OSC Chemistry Supervisor. _____

5.7 PASM LIQUID SAMPLE SECTION FLUSH (DI WATER)

5.7.1 Slowly open MV-1921 (M-16). _____

5.7.2 Open MV-1925 (L-14). _____

5.7.3 Open PCV-1916 (P-16) until FI-1912 reads 0.090 gpm to 0.100 gpm. _____

5.7.4 Wait one minute. _____

5.7.5 Rotate MV-1939 (R-17) CCW to 6 o'clock. If pressure exceeds 40 psi on PI-1909, reduce flow using PCV-1916 (P-16). _____

5.7.6 Wait 3 minutes. _____

5.7.7 Rotate MV-1939 (R-17) CW to 12 o'clock. _____

5.7.8 Open MV-1909 (R-14). _____

PALISADES NUCLEAR PLANT
EMERGENCY IMPLEMENTING PROCEDURE

Proc No EI-7.1
Revision 15
Page 27 of 38

**TITLE: POST ACCIDENT SAMPLING - PCS LIQUID/GAS
AND CONTAINMENT AIR**

CHECK

5.7.9 Open PCV-1916 (P-16) until FI-1912 reads 0.12 gpm
to 0.22 gpm.

5.7.10

<u>IF</u>	<u>THEN</u>	<u>THEN</u>
LPSI Sample Taken	Move HS-1914 (EC-168) to Flush.	SV-1915 Light Goes From Green to Red.
PCS Sample Taken	Move HS-1916 (EC-168) to Flush.	SV-1917 Light Goes From Green to Red.

5.7.11 Close MV-1921 (N-16).

5.7.12 Wait two minutes.

5.7.13

<u>IF</u>	<u>THEN</u>
LPSI Sample Taken	Place HS-1914 to OFF.
PCS Sample Taken	Place HS-1916 to OFF.

5.7.14 Position HS-1912 (EC-168) to off.

5.7.15 Verify (at EC-168 Panel) "Green" condition for:

SV-1916

SV-1917

CV-1912

CV-1913

SV-1914

SV-1915

5.7.16 Close MV-1925 (L-14).

5.7.17 Close MV-1909 (R-14).

PALISADES NUCLEAR PLANT
EMERGENCY IMPLEMENTING PROCEDURE

Proc No EI-7.1
Revision 15
Page 28 of 38

**TITLE: POST ACCIDENT SAMPLING - PCS LIQUID/GAS
AND CONTAINMENT AIR**

		<u>CHECK</u>
5.8	DILUTED LIQUID SAMPLE (ACTIVITY) ACQUISITION	
5.8.1	Ensure sample cask labeled "DILUTED LIQUID" sample is prepared per Step 5.2.4b.7 and in position near MC-1.	_____
5.8.2	Ensure MV-1926 (S-23) is at 6 o'clock.	_____
5.8.3	Rotate MV-1910 (E-19) CCW to 6 o'clock.	_____
5.8.4	Open MV-1904 (L-20).	_____
5.8.5	Open MV-1903 (Q-20).	_____
5.8.6	Wait 30 seconds.	_____
5.8.7	Rotate MV-1928 (H-23) CW to 6 o'clock.	_____
5.8.8	Rotate MV-1913 (G-25) CW to 12 o'clock.	_____
5.8.9	Rotate MV-1910 (E-19) CW to 9 o'clock	_____
5.8.10	Inject 23 cc of demin water from syringe on diluter assembly DA-1 into MC1 by pushing down on plunger until it stops against injection stop.	_____
5.8.11	Rotate MV-1913 (G-25) CCW to 9 o'clock.	_____
5.8.12	Open MV-1902 at MC-1 (L-26).	_____
5.8.13	Remove shield from 10 ml aliquoter needle and insert aliquoter needle through MV-1902 at MC-1.	_____
5.8.14	Slowly retract and dispense syringe plunger twice to mix sample within MC-1.	_____
5.8.15	Retract and lock syringe plunger to extract diluted sample from MC-1.	_____

PALISADES NUCLEAR PLANT
EMERGENCY IMPLEMENTING PROCEDURE

Proc No EI-7.1
Revision 15
Page 29 of 38

**TITLE: POST ACCIDENT SAMPLING - PCS LIQUID/GAS
AND CONTAINMENT AIR**

	<u>CHECK</u>
5.8.16 a. Withdraw 10 ml aliquoter from MC-1.	_____
b. Inject sample into vial in sample cask labeled diluted sample.	_____
 NOTE: In next step if radiation fields are high in panel area, may delay bolting the lid to the cask until cask is moved to a lower dose area.	
5.8.17 Place shield cover on cask opening, bolt in position.	_____
5.8.18 Close MV-1902 at MC-1 (L-26).	_____
5.8.19 Rotate MV-1928 (H-23) CCW to 3 o'clock.	_____
5.8.20 Transport sample (in cask) to analysis station.	_____
5.8.21 Analyze sample for PCS Liquid Radioactivity per Emergency Implementing Procedure EI-7.2, "Emergency Post Accident Analysis."	_____
 5.9 UNDILUTED LIQUID SAMPLE (BORON AND CHLORIDES)	
5.9.1 Ensure prepared "UNDILUTED" sample cask is positioned properly in cave; ie, "CART ENGAGED" and "NEEDLE INSERTED" lamps on Needle Control Panel (J-670) are lit.	_____
5.9.2 Rotate MV-1910 (E-19) CCW to 6 o'clock.	_____
5.9.3 Close MV-1903 (Q-20).	_____
5.9.4 Close MV-1904 (L-20).	_____
5.9.5 Rotate MV-1910 (E-19) CW to 9 o'clock.	_____
5.9.6 Rotate MV-1907 (V-23) CCW to 9 o'clock.	_____

PALISADES NUCLEAR PLANT
EMERGENCY IMPLEMENTING PROCEDURE

Proc No EI-7.1
Revision 15
Page 30 of 38

**TITLE: POST ACCIDENT SAMPLING - PCS LIQUID/GAS
AND CONTAINMENT AIR**

CHECK

- 5.9.7 a. Rotate MV-1926 (S-23) CCW to 3 o'clock for one minute. _____
- b. Then rotate MV-1926 CW to 6 o'clock. _____
- 5.9.8 Rotate MV-1907 (V-23) CW to 3 o'clock. _____
- 5.9.9 Rotate MV-1926 (S-23) CW to 12 o'clock. _____
- 5.9.10 On Needle Control Panel (J-670), position HS-1918 to "RAISE." _____
- 5.9.11 When "Cylinder Clear" pilot lamp (J-670) lights, position HS-1918 to "HOME." _____

NOTE: In next step when cask is removed from inside the PASM panel, have HP Tech get contact dose rate on sample prior to replacing shield cover. Dose rate should be recorded and reported to OSC Chemistry Supervisor prior to performing analyses.

- 5.9.12 HP Tech measure dose rate on cask by use of remote survey meter as follows:
 - a. While cask is still installed in panel, extend survey meter sensor to area just above cask. Turn meter on to highest measurement range for initial dose rate check. _____
 - b. All personnel in the area of the cask are to position themselves as far away from the cask as tooling and long handles permit, before exposing the cask opening for the dose measurement. Stay low to avoid shine out of top of cask. _____
 - c. Chemistry Tech slowly removes cask from panel as HP Tech monitors dose rate. _____

PALISADES NUCLEAR PLANT
EMERGENCY IMPLEMENTING PROCEDURE

Proc No EI-7.1
Revision 15
Page 31 of 38

**TITLE: POST ACCIDENT SAMPLING - PCS LIQUID/GAS
AND CONTAINMENT AIR**

CHECK

- | | | | |
|--------|---|-----------|-------|
| | d. HP Tech obtains dose measurement, selecting lower ranges on survey meter if Rad Levels permit. | Rad Level | _____ |
| | e. Re-insert cask into panel when measurement is complete. | | _____ |
| 5.9.13 | Insert needle plug in cask cover. | | _____ |
| 5.9.14 | While one Chem Tech pulls cask from cave, the other holds shield cover above cask opening to immediately shield any potential high radiation from the sample. Place cover on cask as it emerges from the panel. | | _____ |
| 5.9.15 | Transport sample cask to Hot Lab. | | _____ |
| 5.9.16 | Bolt cask lid to cask in low dose area using speed wrench. | | _____ |
| 5.9.17 | Analyze the sample for boron and chlorides in accordance with Emergency Implementing Procedure EI-7.2, "Emergency Post Accident Analysis." | | _____ |
| 5.10 | POST SAMPLE FLUSH | | |
| 5.10.1 | <u>Cask Needle and Sample Flask Flush</u> | | |
| | a. Ensure MV-1904 (L-20) closed. | | _____ |
| | b. Ensure MV-1903 (Q-20) closed. | | _____ |
| | c. Open MV-1923 (M-18). | | _____ |
| | d. Open MV-1924 (O-18). | | _____ |
| | e. Open MV-1925 (L-14). | | _____ |
| | f. Adjust PCV-1916 (P-16) to obtain a flow of 0.12 gpm to 0.22 gpm on FI-1912. | | _____ |

PALISADES NUCLEAR PLANT
EMERGENCY IMPLEMENTING PROCEDURE

Proc No EI-7.1
Revision 15
Page 32 of 38

**TITLE: POST ACCIDENT SAMPLING - PCS LIQUID/GAS
AND CONTAINMENT AIR**

	<u>CHECK</u>
g. Wait two minutes.	_____
h. Close MV-1925 (L-14).	_____
i. Close MV-1923 (M-18).	_____
j. Close MV-1924 (O-18).	_____
k. Open MV-1903 (Q-20).	_____
l. Open MV-1904 (L-20).	_____
m. Rotate MV-1910 (E-19) CCW to 6 o'clock.	_____
n. Wait 1 minute.	_____
o. Rotate MV-1910 (E-19) CW to 9 o'clock.	_____
p. Rotate MV-1905 (E-15) CW to 9 o'clock.	_____
q. Rotate MV-1907 (V-23) CCW to 9 o'clock.	_____
r. Close MV-1903 (Q-20).	_____
s. Rotate MV-1917 (V-29) CW to 6 o'clock.	_____
t. Wait 1 minutes.	_____
u. Rotate MV-1926 (S-23) CCW to 6 o'clock.	_____
v. Rotate MV-1917 (V-29) CCW to 3 o'clock.	_____
w. Close MV-1904 (L-20).	_____
x. Close PCV-1916 (P-16).	_____
y. Rotate MV-1907 (V-23) CW to 3 o'clock.	_____

PALISADES NUCLEAR PLANT
EMERGENCY IMPLEMENTING PROCEDURE

Proc No EI-7.1
Revision 15
Page 33 of 38

**TITLE: POST ACCIDENT SAMPLING - PCS LIQUID/GAS
AND CONTAINMENT AIR**

CHECK

5.10.2 MC-1 Flush

- a. Open MV-1927 (L-26). _____
- b. Rotate MV-1928 (H-23) CCW to 12 o'clock. _____
- c. Wait approximately one minute. _____
- d. Rotate MV-1928 (H-23) CCW to 9 o'clock. _____
- e. Wait approximately two minutes. _____
- f. Rotate MV-1928 (H-23) CCW to 3 o'clock. _____
- g. Close MV-1927 (L-26). _____

5.10.3 N₂ Purge to Gas Chromatograph Coalescing Filter

- a. At Panel B of C-103 Panel, position HS-1907 to open. _____
- b. Ensure MV-1911 (H-17) is at 3 o'clock. _____
- c. Rotate MV-1910 (E-19) (CCW) to 6 o'clock. _____
- d. Wait 2 minutes. _____
- e. Rotate MV-1910 (E-19) (CW) to 9 o'clock. _____
- f. Position HS-1907 (Panel B) to closed. _____

5.11 CONTAINMENT AIR SAMPLE

5.11.1 Samples/Analyses Needed:

Grab sample analysis (samples analyzed at designated analysis station).

PALISADES NUCLEAR PLANT
EMERGENCY IMPLEMENTING PROCEDURE

Proc No EI-7.1
Revision 15
Page 34 of 38

**TITLE: POST ACCIDENT SAMPLING - PCS LIQUID/GAS
AND CONTAINMENT AIR**

CHECK

5.11.2 Parameters

Containment Air Activity - 14 cc of diluted Containment air in 14 cc serum vial.

5.11.3 **Containment Air Sample Purge**

NOTE: Valve position indicators for PL-1918, PL-1919, and PL-1920 will not operate if offsite power is lost.

- a. Have OSC Chemistry Supervisor contact Main Control Room to open SV-2412A, SV-2412B, SV-2414A, and SV-2414B.
 - 1. At Panel EC-168, verify PL-1918 red indicator lamp is lit.
- b. Verify SV-2424A and SV-2424B are open by observing PL-1920 (red) is lit. If not lit, get key from PASM Emergency Cabinet key holder and position KS-2424 (at EC-168) to open.
- c. Purge Sample Lines
 - 1. Position HS-1926 (Panel B) to "ON."
 - 2. Ensure MV-1934 (H-7) is at 9 o'clock.
 - 3. Rotate MV-1930 (V-15) CW to 12 o'clock to open.
 - 4. Rotate MV-1931 (F-3) CW to 9 o'clock to open.
 - 5. Ensure MV-1932 (I-3) is at 6 o'clock.
 - 6. Record Containment pressure from PI-1906 at EC-168.

READING: psia

PALISADES NUCLEAR PLANT
EMERGENCY IMPLEMENTING PROCEDURE

Proc No EI-7.1
Revision 15
Page 35 of 38

**TITLE: POST ACCIDENT SAMPLING - PCS LIQUID/GAS
AND CONTAINMENT AIR**

CHECK

7. Induce sample flow by rotating MV-1933 (F-2) CW to 6 o'clock. _____
8. Verify purge flow is about 6 SLPM as indicated on FI-1927 (C-103-1 Panel A). _____
9. Purge for 8 minutes. _____
Purge Start Time: _____

5.11.4 Grab Sample Collection

a. Sample Isolation

1. Rotate MV-1931 (F-3) CCW to 6 o'clock to close. _____
2. Rotate MV-1933 (F-2) CCW to 3 o'clock to close. _____
3. Rotate MV-1932 (I-3) CW to 9 o'clock to close. _____
4. Record sample pressure from PI-1906 (at EC-168). _____
psia
5. Record Heat Trace Temp from TIS-1900 (at EC-168). _____
Temp
6. Record sample time. _____
Time

b. Sample Collection

1. Rotate MV-1934 (H-7) CCW to 6 o'clock. _____
2. Rotate MV-MGS200 (F-7) CCW to 9 o'clock. _____
3. Wait five seconds. _____

PALISADES NUCLEAR PLANT
EMERGENCY IMPLEMENTING PROCEDURE

Proc No EI-7.1
Revision 15
Page 36 of 38

**TITLE: POST ACCIDENT SAMPLING - PCS LIQUID/GAS
AND CONTAINMENT AIR**

CHECK

4. Rotate MV-1934 (H-7) CW to 9 o'clock. _____
5. Rotate MV-MGS200 (F-7) CCW to 3 o'clock. _____

NOTE: In next step when sample tong is removed from SN-2, have HP Tech get contact dose rate on sample. Dose rate is needed to determine if any pre-analyses dilutions are required. If background radiation interferes with this dose measurement, delay measurement until sample is brought to analysis station.

6. Remove Containment air sample tong from SN-2 (contains sample diluted 870:1).

Sample Dose Rate = _____

7. Transport sample to analysis station. _____
8. Perform gamma spectral analysis on sample per Emergency Implementing Procedure EI-7.2, "Emergency Post Accident Analysis." If little or no activity is present in sample, report this to OSC Chemistry Supervisor. _____

c. Sample line backflush

1. Rotate MV-1931 (F-3) CW to 9 o'clock to open. _____
2. Rotate MV-1933 (F-2) CW to 6 o'clock to open. _____
3. Wait five minutes. _____
4. Rotate MV-1931 (F-3) CCW to 6 o'clock to close. _____

PALISADES NUCLEAR PLANT
EMERGENCY IMPLEMENTING PROCEDURE

Proc No EI-7.1
Revision 15
Page 37 of 38

**TITLE: POST ACCIDENT SAMPLING - PCS LIQUID/GAS
AND CONTAINMENT AIR**

	<u>CHECK</u>
5. Rotate MV-1930 (V-15) CCW to 9 o'clock to close.	_____
6. Rotate MV-1932 (I-3) CCW to 6 o'clock.	_____
7. Wait five minutes.	_____
8. Rotate MV-1933 (F-2) CCW to 3 o'clock to close.	_____
d. Standby mode	
At EC-168 Panel, place system in standby by rotating SV-2424A and SV-2424B to closed. PL-1920 (red) lamp should be "OFF."	_____
e. Have OSC Chemistry Supervisor contact Main Control Room to close SV-2412A, SV-2412B, SV-2414A, and SV-2414B.	_____
5.12 PASM SHUTDOWN	
5.12.1 Close all N ₂ cylinder valves.	_____
<u>NOTE:</u> When N ₂ header pressure drops below 90 psig, an alarm should annunciate at EC-168.	
5.12.2 Bleed off N ₂ pressure, Rotate MV-1906 (E-13) CW to 12 o'clock until PI-1904 reads 0 psig.	_____
5.12.3 Rotate MV-1906 (E-13) CCW to 9 o'clock. Silence low nitrogen pressure alarm at EC-168 Panel.	_____
5.12.4 Close MV-1949 (W-15) demin water inlet valve.	_____
5.12.5 Close HS-1929 (EC-168 Panel).	_____
5.12.6 Close HS-1930 (EC-168 Panel).	_____

PALISADES NUCLEAR PLANT
EMERGENCY IMPLEMENTING PROCEDURE

Proc No EI-7.1
Revision 15
Page 38 of 38

**TITLE: POST ACCIDENT SAMPLING - PCS LIQUID/GAS
AND CONTAINMENT AIR**

CHECK

5.12.7 Place control switch CS-5057 (NSSS Panel below HS-1901) to "OFF" position to close CV-1903.

5.12.8 Notify Control Room of impending PASM trouble alarm due to securing the panel.

5.12.9 Place SS-0210 and SS-0211 in the OFF position.

5.12.10 To disable the alarm function for TIS-1901, perform the following:

a. If the Green LED is not lit, push A/M touch pad to enter the Manual Mode (Green LED on).

b. Push triangular touch pad until output equals 100.0.

5.12.11 Notify OSC Chemistry Supervisor sampling is complete.

5.12.12 Unless instructed otherwise, return to your assembly area.

5.12.13 OSC Chemistry Supervisor shall notify TSC Chemistry Team Leader when sampling is complete.

NOTE: If this sampling procedure was not performed under emergency conditions, perform PI 1900 pressure check and CV 1910 and CV 1911 weekly leak rate checks as required by COP-1.

6.0 ATTACHMENTS

6.1 Attachment 1, "Jumpering CV-1910 and CV-1911 for PASM Sample"

JUMPERING CV-1910 AND CV-1911 FOR PASM SAMPLE

1.0 PURPOSE

This attachment describes the method to be used to jumper containment isolation valves CV-1910 and CV-1911 should they become closed during accident conditions (Containment Isolation). In order to sample the Primary Coolant System (PCS) through PASM, CV-1910 and CV-1911 must be open.

2.0 REFERENCES

- 2.1 Palisades Administrative Procedure 9.31, "Temporary Modification Control"

3.0 INITIAL CONDITIONS AND/OR REQUIREMENTS

- 3.1 CV-1910 and CV-1911 are the containment isolation valves on the PCS chemistry sample lines. In the event of a containment isolation signal due to Containment High Pressure (CHP) and/or Containment High Radiation (CHR), CV-1910 and CV-1911 will close.

- 3.2 To obtain a sample of the PCS under accident conditions using the NSSS panel or the PASM panel, it will be necessary to bypass the CHP and/or CHR relay contacts to open these valves.

4.0 PROCEDURE

- 4.1 The following steps are to be used as a guide under emergency conditions. When time permits and conditions stabilize, Palisades Administrative Procedure 9.31, "Temporary Modification Control," should be followed. The OSC Chemistry Supervisor shall contact I&C or Electrical Maintenance for installation of jumpers when the PASM panel is being prepared for sampling.
- 4.2 I&C or Electrical Maintenance may obtain jumper set and #10 link nuts from Emergency Maintenance Kit 9 in the Operations Support Center (OSC).
- 4.3 I&C or Electrical Maintenance obtain permission from Shift Supervisor to install jumpers on CV-1910 and CV-1911.

Approved By: _____ / _____ / _____
Shift Supervisor Date Time

JUMPERING CV-1910 AND CV-1911 FOR PASM SAMPLE

4.4 Have Operations place HS-1910 and HS-1911 in the open position (CV-1910 and CV-1911 should remain shut.) Advise Operations that while jumpers are being placed, they will lose valve indications. Valve indications will be restored after jumpers are in place.

4.5 Inside C-13 Panel

NOTE: Circuits involved labeled P1 are 125 VDC positive supply to valve position indication.

- a. Locate 13TV4-28 (P1) scheme S-21 (M201, Sheet 40), open link and attach appropriate end of jumper to P1 side to link using #10 nut and link wrench.

Performed By _____ Verified By _____

- b. Locate 13TV6C-19 (91) scheme S-21 (M201, Sheet 113), string jumper so that it is out of the way so as not to be pulled apart, and attach other end of jumper using #10 nut and link wrench.

Performed By _____ Verified By _____

- c. Close link at 13TV4-28 (P1) scheme S-21 (opened in a). Verify position indication restored and CV-1910 still closed.

Performed By _____ Verified By _____

- d. Locate 13TV11-112 (P1) scheme S-22 (M201, Sheet 35), open link and attach appropriate end of jumper to P1 side of link using #10 nut and link wrench.

Performed By _____ Verified By _____

- e. Locate 13TV8C-24 (91) scheme S-22 (M201, Sheet 113), string jumper along floor under grating so it is out of the way and attach other end of the jumper using #10 nut and link wrench.

Performed By _____ Verified By _____

- f. Close link at 13TV11-112 (P1) scheme S-22 (opened in d). Verify position indication restored and CV-1911 still closed.

Performed By _____ Verified By _____

JUMPERING CV-1910 AND CV-1911 FOR PASM SAMPLE

- 4.6 Inform Operations that jumpering operation is complete and to place HS-1910 and HS-1911 in the closed position. Returning either handswitch back to the open position after completing Step 4.6 will now cause valves to open.

CAUTION

Once sampling valves are open, a potential exists for High Radiation Fields to be created at the NSSS Panel and/or the Post Accident Sample Panel.

- 4.7 Ask Operations to caution tag HS-1910 and HS-1911 indicating that CHP and CHR relay contacts are jumpered out for CV-1910 and CV-1911.
- 4.7.1 Since jumpers are installed per this approved procedure, caution tags are not required on jumpers.
- 4.7.2 Sampling requirements after an accident requires sample collection once a day for seven days and once per week thereafter until conditions are restored to normal. Therefore, jumpers may be in place for some time. Actual opening of CV-1910 and CV-1911 will be when requested by Chemistry.
- 4.8 When conditions permits, appropriate paper work for restoration (removal of jumpers) and documentations should be filled out per Palisades Administrative Procedure 9.31, "Temporary Modification Control."