Fort Calhoun Station
Unit No. 1

SS-ST-SI-3015

SURVEILLANCE TEST

Title: SAFETY INJECTION TANK DISCHARGE CHECK VALVES TEST

Setpoint/Procedure
Form Number (FC-68): 38552

Reason for Change: To improve the safety injection tank discharge check values test by revising the initial conditions and by providing individual acceptance criteria for each tank.

Contact Person: Ron Lippy

ISSUED: 06-12-92 4:00 pm

R5

SAFETY INJECTION TANK DISCHARGE CHECK VALVES TEST

SAFETY RELATED

1.0 PURPOSE

1.1 To satisfy in part, each refueling outage, the requirements of Technical Specifications 3.3(1)a for the following check valves:

SI-207	SI-211	SI-215	SI-219
SI-208	SI-212	SI-216	SI-220

2.0 REFERENCES

2.1 Technical Specifications:

- 2.1.1: Reactor Coolant System
- 2.8: Refueling Operations
- 3.3: Reactor Coolant System and Other Components Subject to ASME XI Boiler and Pressure Vessel Code Inspection and Testing Surveillance
- 3.6(4): Safety Injection and Containment Spray Systems Tests

2.2 Fort Calhoun Station Inservice Inspection (ISI) Program Plan

2.3 Standing Order G-23, Surveillance Test Program

2.4 Operating Instructions:

- OI-NG-1: Nitrogen System - Normal Operation
- OI-SI-1: Safety Injection System - Normal Operation

2.5 P&ID:

- F-23866-210-130 (Sh 2): Safety Injection and Containment Spray System (File No. 10480)
- E-23866-210-110: Reactor Coolant System (File No. 10475)
- 11405-M-42: Nitrogen Flow Diagram (File No. 10450)
- 11405-A-13: Primary Plant Diagram (File No. 12170)

2.6 Instrumentation and Control Interconnect Diagrams

- 161F561 SHT. 83 File No. 9581
- 161F561 SHT. 84 File No. 9582
- 161F561 SHT. 85 File No. 9583
- 161F561 SHT. 86 File No. 9584
- 161F561 SHT. 99 File No. 9597
- 161F561 SHT. 100 File No. 9598
- 161F561 SHT. 101 File No. 9599
- 161F561 SHT. 102 File No. 9600

2.7 Instrument Loop Drawings

- EM-2901 File No. 20574
- EM-2904 File No. 20592
- EM-2921 File No. 20575
- EM-2924 File No. 20593
- EM-2941 File No. 20576
- EM-2944 File No. 20594
- EM-2961 File No. 20577
- EM-2964 File No. 20595

2.8 USAR:

- 6.2: Safety Injection System

2.9 Calculation:

- FC-05280
- FC-05428, Rev. 1

2.10 Surveillance and Calibration Procedures

- CP-106, Pressurizer Level
- IC-ST-RC-0004, Channel Calibration of Pressurizer Level Instrument Channel L-101X. (If LIC-101X is used)

2.10
- IC-ST-RC-0005, Channel Calibration of Pressurizer level Instrument Channel L-101Y. (If LIC-101Y is used)
- IC-ST-SI-0005, Channel Calibration of SI-Tank SI-6A Nitrogen Pressure, Loop P-2901
- IC-ST-SI-0008, Channel Calibration of SI Tank SI-6A Wide Range Level, Loop P-2904X
- IC-ST-SI-0011, Channel Calibration of SI Tank SI-6B Nitrogen Pressure, Loop P-2921
- IC-ST-SI-0014, Channel Calibration of SI Tank SI-6B Wide Range Level, Loop P-2924X
- IC-ST-SI-0017, Channel Calibration of SI Tank SI-6C Nitrogen Pressure, Loop P-2941
- IC-ST-SI-0020, Channel Calibration of SI Tank SI-6C Wide Range Level, Loop P-2944X
- IC-ST-SI-0023, Channel Calibration of SI Tank SI-6D Nitrogen Pressure, Loop P-2961
- IC-ST-SI-0026, Channel Calibration of SI Tank SI-6D Wide Range Level, Loop P-2964X

2.11 Technical Data Book

- TDB-III.20 Page 1

3.0 DEFINITIONS

SIT - Safety Injection Tank

PT-1 and PT-2 - Points on SIT level trace where SIT Isolation valve is >90% (as determined by valve stroke time). PT-1 and PT-2 represent a period of time when the valve is fully open and fluid is flowing through the check valve at approximately its maximum velocity with the SIT Isolation Valve fully open. PT-1 represents an arbitrary beginning time and PT-2 is an arbitrary end time (usually 1 - 10 secs after PT-1). The time interval between PT-1 and PT-2 is used for calculation for fluid flowrate.

PT-5 - Point midway between PT-1 and PT-2

L_R - Level in Reactor Refueling Cavity (in %)

L_{PT-1} - Level of SIT at PT-1 (in feet)

L_{PT-2} - Level of SIT at PT-2 (in feet)

L_{V1} - Level of SIT at PT-1 (in volts)

L_{V2} - Level of SIT at PT-2 (in volts)

L_{V5} - Level of SIT at PT-5 (in volts)

ΔL - SIT Level change during the time period between PT-1 and PT-2 (in feet)

D - Distance between PT-1 and PT-2 (in mm on the strip chart)

S - Strip Chart Speed (in mm/sec)

R - Rate of SIT level change (in ft/sec)

Q - Calculated flow rate (in gpm)

P_{PT-5} - Total pressure in SIT at time PT-5 (in psig)

P_{v5} - Gas pressure in SIT at PT-5 (in volts)

P_g - Gas pressure in SIT at PT-5 (in psig)

P_H - Head pressure due to level in SIT plus the difference in elevation from the lower SIT level tap to the top of reactor vessel flange (in psig)

P_R - Head pressure due to reactor vessel cavity level (in psig)

3.0 DEFINITIONS (Continued)

ΔP - Difference in pressure between P_{PT-5} and P_R (in psid)

C_v - Flow Coefficient

4.0 EQUIPMENT LIST

4.1 TEST EQUIPMENT REQUIRED/USED:

NOTE: During the course of this procedure, some portable or temporary test equipment may be used to prove operability of a plant component. All such equipment must be entered into the appropriate I&C Instrument Log.

EQUIPMENT	CALIBRATION OPPD NO./ DUE DATE	INITIALS/DATE
LI-106	N/A /	/
PT-2901	N/A /	/
LT-2904X	N/A /	/
PT-2921	N/A /	/
LT-2924X	N/A /	/
PT-2941	N/A /	/
LT-2944X	N/A /	/
PT-2961	N/A /	/
LT-2964X	N/A /	/
Strip Chart Recorder	/	/
	/	/
	/	/

5.0 PRECAUTIONS AND LIMITATIONS

5.1 All anomalies and deficiencies shall be reported immediately to the Shift Supervisor and noted in the Remarks Section. An immediate check shall be made to verify Limiting Conditions for Operation per Technical Specifications, have not been exceeded.

5.2 A Maintenance Work Request (MWR) shall be initiated to correct any reported deficiency and the MWR number shall be referenced on the Comment Sheet/ Chronological Log.

5.3 Test data shall be evaluated by the Special Services Engineer (SS) AND reviewed by the Shift Supervisor for acceptability within 24 hours following completion of this test.

5.4 The System Engineer shall be notified within 24 hours of the completion of this test of any marginal, unexpected, or unacceptable results.

5.5 The use of N/A (not applicable) in this procedure shall be in accordance with the requirements listed in Standing Order G-23.

5.6 The completed Surveillance Test procedure and all applicable attachments shall be signed and dated by the person(s) who actually performed the test.

5.7 To prevent overflow of the Reactor Refueling Cavity and to provide adequate Radiological Shielding in the event of a crud burst, the Reactor Refueling Cavity level must be between 40% and 50% as indicated on LI-106 at the beginning of this test. If LI-106 is unavailable, the Reactor Refueling Cavity must be between 1032 ft and 1034 ft as indicated on LI-199 at the beginning of this test.

5.8 All steps in this procedure shall be conducted in sequence written unless otherwise noted.

5.9 If the procedure becomes contaminated or damaged, the "Lead Person" or designee shall ensure that all data, verifications, or other pertinent information is transcribed to another copy of the procedure, which will become the official copy.

5.10 An Incident Report shall be initiated, in accordance with SO-R-4, to report any anomalies or deficiencies. The Incident Report number shall be recorded on the Comment sheet/Chronological Log.

5.11 No maintenance shall be conducted within this Surveillance Test other than that specifically directed by this procedure.

6.0 INITIAL CONDITIONS

INITIALS/DATE

NOTE: The Initial Conditions may be performed in any sequence.

6.1 Procedure revision verification

Master Revision No._____ _____/_____

INITIALS/DATE

6.2 No other test is in progress which could potentially affect this test, or if this test were performed, could have an effect on that test. _____/_____

6.3 Calibration of test equipment has been verified and procedures listed below have been satisfactorily completed prior to test. _____/_____

PROCEDURE	DATE COMPLETED	
CP-106 (WP-005056)*	_____	_____/_____
IC-ST-SI-0005	_____	_____/_____
IC-ST-SI-0008	_____	_____/_____
IC-ST-SI-0011	_____	_____/_____
IC-ST-SI-0014	_____	_____/_____
IC-ST-SI-0017	_____	_____/_____
IC-ST-SI-0020	_____	_____/_____
IC-ST-SI-0023	_____	_____/_____
IC-ST-SI-0026	_____	_____/_____

* **NOTE:** At the discretion of the Test Coordinator, LI-199 may be used as an alternate level indication for LI-106. Note the Comment Sheet/Chronological Log if this is used.

6.4 A prejob briefing has been conducted prior to the start of this test. **ALL** personnel participating in the performance of this test have read **AND** understand the procedure **AND** have completed the Surveillance Test Signature Sheet. _____/_____

6.5 Control power is available for valve operation. _____/_____

6.6 Safety Injection Tank levels are between 85% and 90%. _____/_____

6.7 Shutdown cooling is not in service. _____/_____

6.8 The Reactor Vessel Head has been removed and core off-loaded. _____/_____

6.9 The pressurizer is vented or the manway removed (Pressurizer pressure is the same as Containment pressure). _____/_____

INITIALS/DATE

6.10 Notify Radiation Protection prior to the start of this test due to the possibility of increasing airborne radiation in containment. _____/_____

6.11 The Reactor Refueling Cavity level is between 40% and 50% as indicated on LI-106. If LI-106 is unavailable the reactor refueling cavity level should be between 1032 ft and 1034 ft elevation on LI-199 sightglass. _____/_____

6.12 Ensure the Strip Chart Recorder is loaded with paper graduated in square centimeters. _____/_____

6.13 If test instrumentation or temporary equipment is expected to be installed for greater than 24 hours, ensure the requirements of SO-O-25 are met. _____/_____

6.14 Complete the activities in Attachment 8 to fill and vent the Safety Injection Tanks, as required.

6.15 Notify Chemistry prior to start to coordinate containment sampling as needed to support containment releases. _____/_____

6.16 Ensure that the instrument lines to the level transmitter for each S.I. Tank have been flushed and filled prior to the test. _____/_____
I&C

6.17 Shift Supervisor authorizes performance of this test.

Shift Supervisor_____Date/Time_____/_____

7.0 PROCEDURE

NOTE: Step 7.1 through 7.4 may be performed in any order at the discretion of the Shift Supervisor. In order to decrease the time between each test, the determination of the flow coefficient (C_v) for each tank need not be completed until all four safety injection tanks have been discharged. (This calculation is located in Steps 18 through 25.1 in Attachments 1, 2, 3, and 4.

7.1 Test SI-6A Discharge Check Valves SI-219 and SI-220 per Attachment 1. _____/_____

INITIALS/DATE

7.2 Test SI-6B Discharge Check Valves SI-215 and SI-216 per Attachment 2. _____/___

7.3 Test SI-6C Discharge Check Valves SI-207 and SI-208 per Attachment 3. _____/___

7.4 Test SI-6D Discharge Check Valves SI-211 and SI-212 per Attachment 4. _____/___

7.5 Position FH-11 as directed by Shift Supervisor. _____/___
OPS

REMARKS _____

_____

_____

_____

Completed by _____ Date/Time _____/___

8.0 RESTORATION

8.1 Shift Supervisor notified this test is completed.

Shift Supervisor _____ Date/Time _____/___

9.0 ACCEPTANCE CRITERIA

9.1 The Flow Coefficients (C_v) calculated in Attachments 1 through 4 are greater than or equal to the values below:

Tank	Minimum C_v
SI-6A	1189
SI-6B	1164
SI-6C	1132
SI-6D	1159

This satisfies the ISI requirement that the discharge check valves were full-stroked open. Acceptance criteria based on Reference 2.9.

10.0 TEST RECORD

10.1 This entire procedure.

10.2 Attach Strip Charts to this procedure.

11.0 REVIEW

11.1 The Supervisor-Special Services is responsible for ensuring this completed surveillance is reviewed in a timely manner and forwarded in accordance with SO-G-23.

Test data shall be evaluated by the Special Services Engineer and reviewed by the Shift Supervisor for acceptability within 24 hours of the completion of this test.

Evaluated by_____Date/Time_____/____
SS Engr

Reviewed by_____Date/Time_____/____
Shift Supervisor

11.2 The Supervisor-Special Services is responsible for ensuring this test is evaluated and reviewed in a timely manner then forwarded in accordance with SO-G-23.

11.2.1 The ISI Coordinator is responsible for reviewing this test to ensure compliance with the FCS ISI Program Plan. This test has been reviewed and found acceptable or the deficiencies have been noted in the Remarks Section.

REMARKS_____

_____

_____

_____

ISI Coordinator_____Date/Time____/____

11.3 The Supervisor-System Engineering is responsible for ensuring this Surveillance Test is evaluated by the System Engineer in a timely manner and forwarded in accordan ith SO-G-23.

11.3.1 The System Engineer is responsible for reviewing the test data and the identified deficiencies noted within the test. This test has been reviewed and found acceptable or deficiencies and actions taken have been noted in the Remarks Section.

REMARKS_____

_____

_____

_____

System Engineer_____Date/Time____/____

ATTACHMENT 1
(SI-219 AND SI-220)

SAFETY RELATED

PROCEDURE

INITIALS/DATE

NOTE: Steps 1 through 10 can be performed in any sequence, but prior to Step 11.

NOTE: This attachment will raise the reactor refueling cavity level by approximately 2% from a 90% initial SIT level.

1. Record the "As Found" position of the following valves, **THEN** Close.

Valve	As Found
HCV-311	_____
HCV-312	_____
HCV-327	_____

_____ / _____
OPS

NOTE: Control Room Indication of SI-6A level is to be used for Step 2.0.

2. Ensure that Safety Injection Tank SI-6A level is between 85% and 90% as indicated on LI-2904X and record.

SI-6A Level _____ %
(85% to 90%)

_____ / _____
OPS

3. Record the Reactor Refueling Cavity level (L_R) as indicated on LI-106.

Reactor Refueling Cavity Level (L_R)

_____ %

_____ / _____
OPS

N/A this step if LI-199 is used.

4. If LI-106 is unavailable, ensure the Reactor Refueling Cavity is between 1032 and 1034 ft elevation as indicated on the LI-199 sightglass.

Reactor Refueling Cavity Level

_____ ft
(1032 ft to 1034 ft)

_____ / _____
OPS

N/A this step if LI-106 is used.

ATTACHMENT 1
(Continued)

INITIALS/DATE

5. Use Table 1 in Attachment 5 to determine the test pressure for SI-6A based on the tank level recorded in Step 2. Use the pressure that corresponds to the tank level rounded down to the nearest whole percent.

   SI-6A Test Pressure_____psig _____/_____

   NOTE: Control Room Indication of SI-6A pressure is to be used for Step 6.0.

6. Set pressure of Safety Injection Tank SI-6A as indicated on PT-2901 to pressure recorded in Step 8. N/A if not required. _____/_____ OPS

7. Strip Chart Recorder hooked up as per Attachment 6. _____/_____ I&C

8. Connect the Strip Chart Recorder to the Safety Injection Tank SI-6A ERF computer input terminals located in cabinet PC-15.

   8.1 To record SI-6A pressure, connect one channel to terminals:

   TB402-15(-)

   TB402-16(+) _____/_____ I&C

   Independent Verification _____/_____ I&C

   8.2 To record SI-6A level, connect one channel to terminals:

   TB401-15(-)

   TB401-16(+) _____/_____ I&C

   Independent Verification _____/_____ I&C

9. Adjust Strip Chart Recorder Speed (S) to 10 mm/sec, or as desired, and record.

   (S) = _____mm/sec _____/_____ I&C

INITIALS/DATE

10. Ensure that FH-11 is closed. _____/_____ OPS

11. Start the Strip Chart Recorder. _____/_____ I&C

12. Open HCV-2914 **AND** Mark the Strip Chart to indicate the start of the test (T=O) when HCV-2914 begins to open. _____/_____ OPS

NOTE: HCV-2914 takes approximately 55 seconds to open. When HCV-2914 is full open, only the red light will be on.

13. **WHEN** HCV-2914 indicates full open, **Wait** approximately 10 seconds, **THEN** close HCV-2914. _____/_____ OPS

NOTE: When HCV-2914 is closed only the green light is on.

14. **WHEN** HCV-2914 indicates closed, **THEN** stop the Strip Chart Recorder. _____/_____ I&C

15. Return valves in Step 1 to "As Found" position or as directed by the Shift Supervisor. _____/_____ OPS

16. Restore Safety Injection Tank SI-6A to service as directed by the Shift Supervisor. _____/_____ OPS

17. Remove Strip Chart Recorder from the following ERF Computer terminals:

TB401-15(-)
TB401-16(+)
TB402-15(-)
TB402-16(+)

_____/_____ I&C

Independent Verification _____/_____ I&C

INITIALS/DATE

18. Record the following information on the Strip Recorder Chart:

18.1 Surveillance Test Number
18.2 Attachment Number
18.3 Safety Injection Tank Number
18.4 Date
18.5 Chart Speed (mm/sec)
18.6 Pressure Trace
18.7 Pressure Scale (psig/volt)
18.8 Level Trace
18.9 Level Scale (ft/volt)
18.10 Start of test (T=0)
18.11 Segment of pressure and level traces when HCV-2914 is >90% open: First Point (PT-1), Second Point (PT-2)
18.12 Point (PT-5) on the pressure and level traces halfway between PT-1 and PT-2. _____/_____

19. Measure and record the chart run along the trace (D) between PT-1 and PT-2.

D=_____mm _____/_____

20. Record the level change (ΔL) in SI-6A between PT-1 and PT-2 when HCV-2914 was >90% open.

20.1 Determine the level (L_{PT-1}) of SI-6A at PT-1.

L_{PT-1} = LV_1 (volts) X 3.6042 ft/volt

L_{PT-1} =_____ X 3.6042 ft/volt

L_{PT-1} =_____ ft _____/_____

20.2 Determine the level (L_{PT-2}) of SI-6A at PT-2.

L_{PT-2} = LV_2 (volts) X 3.6042 ft/volt

L_{PT-2} =_____ X 3.6042 ft/volt

L_{PT-2} =_____ ft _____/_____

INITIALS/DATE

20.3 Calculate ΔL for SI-6A.

$\Delta L = L_{PT-1} - L_{PT-2}$ ft

ΔL = _____ - _____ft

ΔL = _____ ft _____/_____

21. Determine the tank level Rate of Change (R) for SI-6A.

R = (ΔL ÷ D) x S ft/sec

R = (_____ ÷ _____) x _____ft/sec

R = _____ft/sec

Where: S = chart speed recorded in Step 9 (mm/sec)

D = chart run recorded in Step 19 (mm) _____/_____

22. Calculate the flowrate (Q) from SI-6A through check valves SI-219 and SI-220 (based on a ~10 second average when HCV-2914 is >90% open).

Q = R x 530.24 gal/ft X 60 sec/min

Q = R x 31,814.4 gal/min

Q = _____ x 31,814.4 gal/min

Q = _____GPM _____/_____

23. Determine the pressure (P_{PT-5}) of SI-6A at PT-5.

23.1 Determine the gas pressure (P_g) in SI-6A at PT-5.

$P_g = PV_5$ (volts) x 75 psig/volt

P_g = _____ x 75 psig/volt

P_g = _____ psig _____/_____

INITIALS/DATE

23.2 Determine the head pressure (P_H) due to the level in SI-6A at PT-5.

P_H = (LV_5 (volts) x 3.6042 ft/volt x .434 psig/ft) + 2.42 psig

P_H = (LV_5 (volts) x 1.56) + 2.42 psig

P_H = (_____ x 1.56) + 2.42 psig

P_H = _____ psig

2.42 = head pressure from 0% level in SI-6A at the Reactor Vessel Flange level (psig) _____/_____

23.3 Calculate the total pressure (P_{PT-5}) of SI-6A at PT-5.

P_{PT-5} = P_g + P_H psig

P_{PT-5} = _____ +_____psig

P_{PT-5} = _____psig _____/_____

24. Determine the head pressure (P_R) due to the reactor refueling cavity level.

P_R = [(L_R(%) x 20) + 11] x .434 psig/ft

P_R = (L_R x 8.68) + 4.77 psig

P_R = (_____ x 8.68) + 4.77 psig

P_R = _____ psig

Where:

L_R = Reactor Cavity level recorded in Step 3 (%).

20 = distance between LI-106 0% and 100% level taps (ft). If LI-199 is used, refer to Attachment 7 for cavity level.

11 = height of 0% level tap above Reactor Vessel Flange (ft) _____/_____

24.1 Determine ΔP for SI-6A at PT-5

ΔP = P_{PT-5} - P_R psid

ΔP = _____ - _____psid

ΔP = _____psid _____/_____

ATTACHMENT 1
(Continued)

INITIALS/DATE

25. Determine the Flow Coefficient (C_v) for SI-6A Discharge Piping.

25.1 Determine the Flow Coefficient (C_v).

$C_v = Q \div (\Delta P)^{1/2}$

$C_v =$ _____ $\div$ (_____)$^{1/2}$

$C_v =$ _____

Where: Q = flowrate calculated in Step 22 _____/____

REMARKS_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Completed by_____Date/Time_____/____

ATTACHMENT 2
(SI-215 AND SI-216)

PROCEDURE

INITIALS/DATE

NOTE: Steps 1 through 10 can be performed in any sequence, but prior to Step 11.

NOTE: This attachment will raise the reactor refueling cavity level by approximately 2% from a 90% initial SIT level.

1. Record the "As Found" position of the following valves, **THEN** Close.

Valve	As Found
HCV-314	_____
HCV-315	_____
HCV-329	_____

_____/_____
OPS

NOTE: Control Room indication of SI-6B level is to be used for Step 2.0.

2. Ensure that Safety Injection Tank SI-6B level is between 85% and 90% as indicated on LI-2924X and record.

SI-6B Level_____%
(85% to 90%)

_____/_____
OPS

3. Record the Reactor Refueling Cavity Level (L_R) as indicated on LI-106.

Reactor Refueling Cavity Level (L_R)
_____%

_____/_____
OPS

N/A this step if LI-199 is used

4. Record the Reactor Refueling Cavity Level as indicated on LI-199 Sightglass

Reactor Refueling Cavity Level (L_R)
_____ ft

_____/_____
OPS

N/A if LI-106 is used.

5. Use Table 1 in Attachment 5 to determine the test pressure for SI-6B based on the tank level recorded in Step 2. Use the pressure that corresponds to the Tank Level rounded down to the nearest whole percent.

SI-6B Test Pressure_____psig

_____/_____

INITIALS/DATE

NOTE: Control Room indication for SI-6B pressure is to be used for Step 6.0.

6. Set pressure of Safety Injection Tank SI-6B as indicated on PT-2921 to pressure recorded in Step 5. N/A if not required. _____/_____ OPS

7. Strip Chart Recorder hooked up as per Attachment 6. _____/_____ I&C

8. Connect the Strip Chart Recorder to the Safety Injection Tank SI-6B ERF computer input terminals located in cabinet PC-15.

   8.1 To record SI-6B pressure, connect one channel to terminals:

   TB402-17(-)

   TB402-18(+) _____/_____ I&C

   Independent Verification _____/_____ I&C

   8.2 To record SI-6B level, connect one channel to terminals:

   TB401-17(-)

   TB401-18(+) _____/_____ I&C

   Independent Verification _____/_____ I&C

9. Adjust Strip Chart Recorder Speed (S) to 10 mm/sec, or as desired, and record.

   (S) = _____mm/sec _____/_____ I&C

10. Ensure that FH-11 is closed. _____/_____ OPS

11. Start the Strip Chart Recorder. _____/_____ I&C

12. Open HCV-2934 **AND** Mark the Strip Chart to indicate the start of the test (T=0) when HCV-2934 begins to open. _____/_____ OPS

INITIALS/DATE

NOTE: HCV-2934 takes approximately 55 seconds to open. When HCV-2934 is full open only the red light will be on.

13. **WHEN** HCV-2934 indicates full open, **Wait** approximately 10 seconds, **THEN** close HCV-2934. _____/_____ OPS

NOTE: When HCV-2934 is closed only the green light will be on.

14. **WHEN** HCV-2934 indicates closed, **THEN** stop the Strip Chart Recorder. _____/_____ I&C

15. Return valves in Step 1 to "As Found" position or as directed by the Shift Supervisor. _____/_____ OPS

16. Restore Safety Injection Tank SI-6B to service as directed by the Shift Supervisor. _____/_____ OPS

17. Remove Strip Chart Recorder from the following ERF Computer terminals:

    TB401-17(-)

    TB401-18(+)

    TB402-17(-)

    TB402-18(+) _____/_____ I&C

    Independent Verification _____/_____ I&C

18. Record the following information on the Strip Recorder Chart:

    18.1 Surveillance Test Number
    18.2 Attachment Number
    18.3 Safety Injection Tank Number
    18.4 Date
    18.5 Chart Speed (mm/sec)
    18.6 Pressure Trace
    18.7 Pressure Scale (psig/volt)
    18.8 Level Trace
    18.9 Level Scale (ft/volt)
    18.10 Start of test (T=0)
    18.11 Segment of pressure and level traces when HCV-2934 is >90% open: First Point (PT-1), Second Point (PT-2)
    18.12 Point (PT-5) on the pressure and level traces halfway between PT-1 and PT-2. _____/_____

INITIALS/DATE

19. Measure and record the chart run along the trace (D) between PT-1 and PT-2.

D=_____mm ____/____

20. Record the level change (ΔL) in SI-6B between PT-1 and PT-2 when HCV-2934 was >90% open.

20.1 Determine the level (L_{PT-1}) of SI-6B at PT-1.

L_{PT-1} = LV_1 (volts) X 3.6042 ft/volt

L_{PT-1} =_____ X 3.6042 ft/volt

L_{PT-1} =_____ ft ____/____

20.2 Determine the level (L_{PT-2}) of SI-6B at PT-2.

L_{PT-2} = LV_2 (volts) X 3.6042 ft/volts

L_{PT-2} =_____ X 3.6042 ft/volts

L_{PT-2} =_____ ft ____/____

20.3 Calculate ΔL for SI-6B.

ΔL = L_{PT-1} - L_{PT-2} ft

ΔL = _____ - _____ft

ΔL = _____ ft ____/____

21. Determine the tank level Rate of Change (R) for SI-6B.

R = (ΔL ÷ D) x S ft/sec

R = (_____ ÷ _____) x _____ft/sec

R = _____ft/sec

Where: S = chart speed recorded in Step 9 (mm/sec)

D = chart run recorded in Step 19 (mm) ____/____

INITIALS/DATE

22. Calculate the flowrate (Q) from SI-6B through check valves SI-215 and SI-216 (based on a 10 second average when HCV-2934 is >90% open).

Q = R x 530.24 gal/ft X 60 sec/min

Q = R x 31,814.4 gal/min

Q = _____ x 31,814.4 gal/min

Q = _____GPM _____/_____

23. Determine the pressure (P_{PT-5}) of SI-6B at PT-5.

23.1 Determine the gas pressure (P_g) in SI-6B at PT-5.

$P_g = PV_5$ (volts) x 75 psig/volt

P_g = _____ x 75 psig/volt

P_g = _____ psig _____/_____

23.2 Determine the head pressure (P_H) due to the level in SI-6B at PT-5.

$P_H = (LV_5$ (volts) x 3.6042 ft/volt x .434 psig/ft) + 2.42 psig

$P_H = (LV_5$ (volts) x 1.56) + 2.42 psig

P_H = (_____ x 1.56) + 2.42 psig

P_H = _____ psig

2.42 = head pressure from 0% level in SI-6B at the Reactor Vessel Flange level (psig) _____/_____

23.3 Calculate the total pressure (P_{PT-5}) of SI-6B at PT-5.

$P_{PT-5} = P_g + P_H$ psig

P_{PT-5} = _____ +_____psig

P_{PT-5} = _____psig _____/_____

INITIALS/DATE

24. Determine the head pressure (P_R) due to the reactor refueling cavity level.

$P_R = [(L_R(\%) \times 20) + 11] \times .434$ psig/ft

$P_R = (L_R \times 8.68) + 4\ 77$ psig

$P_R = (\_\_\_\_\_ \times 8.68) + 4.77$ psig

$P_R = \_\_\_\_\_$ psig

Where:

L_R = Reactor Cavity level recorded in Step 3 (%).

20 = distance between LI-106 0% and 100% level taps (ft). If LI-199 is used, refer to Attachment 7 for Cavity Level.

11 = height of 0% level tap above Reactor Vessel Flange (ft)

_____/_____

24.1 Determine ΔP for SI-6B at PT-5

$\Delta P = P_{PT-5} - P_R$ psid

$\Delta P = _____ - _____$psid

$\Delta P = _____$psid _____/_____

INITIALS/DATE

25. Determine the Flow Coefficient (C_v) for SI-6B Discharge Piping.

25.1 Determine the Flow Coefficient (C_v).

$C_v = Q \div (\Delta P)^{1/2}$

$C_v =$ _____ $\div$ (_____)$^{1/2}$

$C_v =$ _____

Where: Q = flowrate calculated in Step 22 _____/____

REMARKS_____

_____

_____

_____

_____

_____

_____

_____

_____

Completed by_____Date/Time_____/____

ATTACHMENT 3
(SI-207 AND SI-208)

PROCEDURE

INITIALS/DATE

NOTE: Steps 1 through 10 can be performed in any sequence, but prior to Step 11.

NOTE: This attachment will raise the reactor refueling cavity level by approximately 2% from a 90% initial SIT level.

1. Record the "As Found" position of the following valves, **THEN** Close.

Valve	As Found
HCV-317	_____
HCV-318	_____
HCV-331	_____

_____/_____
OPS

NOTE: Control Room indication of SI-6C level is to be used for Step 2.0.

2. Ensure that Safety Injection Tank SI-6C level is between 85% and 90% as indicated on LI-2944X and record.

SI-6C Level _____ %
(85% to 90%)

_____/_____
OPS

3. Record the Reactor Refueling Cavity Level (L_R) as indicated on LI-106.

Reactor Refueling Cavity Level (L_R)
_____ %

_____/_____
OPS

N/A this step if LI-199 is used.

4. Record the Reactor Refueling Cavity Level as indicated on LI-199 Sightglass

_____/_____
OPS

Reactor Refueling Cavity Level (L_R)
_____ ft

N/A if LI-106 is used.

5. Use Table 1 in Attachment 5 to determine the test pressure for SI-6C based on the tank level recorded in Step 2. Use the pressure that corresponds to the tank level rounded down to the nearest whole percent.

SI-6C Test Pressure _____ psig

_____/_____

ATTACHMENT 3
(Continued)

INITIALS/DATE

NOTE: Control Room indication of SI-6C pressure is to be used for Step 6.0.

6. Set pressure of Safety Injection Tank SI-6C as indicated on PT-2941 to pressure recorded in Step 5. N/A if not required. _____/_____ OPS

7. Strip Chart Recorder hooked up as per Attachment 6. _____/_____ I&C

8. Connect the Strip Chart Recorder to the Safety Injection Tank SI-6C ERF computer input terminals located in cabinet PC-15.

   8.1 To record SI-6C pressure, connect one channel to terminals:

   TB402-19(-)

   TB402-20(+) _____/_____ I&C

   Independent Verification _____/_____ I&C

   8.2 To record SI-6C level, connect one channel to terminals:

   TB401-19(-)

   TB401-20(+) _____/_____ I&C

   Independent Verification _____/_____ I&C

9. Adjust Strip Chart Recorder Speed (S) to 10 mm/sec, or as desired, and record.

   (S) = _____mm/sec _____/_____ I&C

10. Ensure FH-11 is closed. _____/_____ OPS

11. Start the Strip Chart Recorder. _____/_____ I&C

12. Open HCV-2954 **AND** Mark the Strip Chart to indicate the start of the test (T=0) when HCV-2954 begins to open. _____/_____ OPS

INITIALS/DATE

NOTE: HCV-2954 takes approximately 55 seconds to open. When HCV-2954 is full open only the red light will be on.

13. **WHEN** HCV-2954 indicates full open, **Wait** approximately 10 seconds, **THEN** close HCV-2954.

_____/_____
OPS

NOTE: When HCV-2954 is closed only the green light will be on.

14. **WHEN** HCV-2954 indicates closed, **THEN** stop the Strip Chart Recorder.

_____/_____
I&C

15. Return valves in Step 1 to "As Found" position or as directed by the Shift Supervisor.

_____/_____
OPS

16. Restore Safety Injection Tank SI-6C to service as directed by the Shift Supervisor.

_____/_____
OPS

17. Remove Strip Chart Recorder from the following ERF Computer terminals:

TB401-19(-)

TB401-20(+)

TB402-19(-)

TB402-20(+)

_____/_____
I&C

Independent Verification _____/_____
I&C

INITIALS/DATE

18. Record the following information on the Strip Recorder Chart:

18.1 Surveillance Test Number
18.2 Attachment Number
18.3 Safety Injection Tank Number
18.4 Date
18.5 Chart Speed (mm/sec)
18.6 Pressure Trace
18.7 Pressure Scale (psig/volt)
18.8 Level Trace
18.9 Level Scale (ft/volt)
18.10 Start of test (T=0)
18.11 Segment of pressure and level traces when HCV-2954 is >90% open: First Point (PT-1), Second Point (PT-2)
18.12 Point (PT-5) on the pressure and level traces halfway between PT-1 and PT-2. _____/_____

19. Measure and record the chart run along the trace (D) between PT-1 and PT-2.

D=_____mm _____/_____

20. Record the level change (ΔL) in SI-6C between PT-1 and PT-2 when HCV-2954 was >90% open.

20.1 Determine the level (L_{PT-1}) of SI-6C at PT-1.

L_{PT-1} = LV_1 (volts) X 3.6042 ft/volt

L_{PT-1} =_____ X 3.6042 ft/volt

L_{PT-1} =_____ ft _____/_____

20.2 Determine the level (L_{PT-2}) of SI-6C at PT-2.

L_{PT-2} = LV_2 (volts) X 3.6042 ft/volt

L_{PT-2} =_____ X 3.6042 ft/volt

L_{PT-2} =_____ ft _____/_____

INITIALS/DATE

20.3 Calculate ΔL for SI-6C.

$\Delta L = L_{PT-1} - L_{PT-2}$ ft

ΔL = _____ - _____ft

ΔL = _____ ft _____/_____

21. Determine the tank level Rate of Change (R) for SI-6C.

R = (ΔL ÷ D) x S ft/sec

R = (_____ ÷ _____) x _____ft/sec

R = _____ft/sec

Where: S = chart speed recorded in Step 9 (mm/sec)

D = chart run recorded in Step 19 (mm) _____/_____

22. Calculate the flowrate (Q) from SI-6C through check valves SI-207 and SI-208 (based on a 10 second average when HCV-2954 is >90% open).

Q = R x 530.24 gal/ft X 60 sec/min

Q = R x 31,814.4 gal/min

Q = _____ x 31,814.4 gal/min

Q = _____CPM _____/_____

23. Determine the pressure (P_{PT-5}) of SI-6C at PT-5.

23.1 Determine the gas pressure (P_g) in SI-6C at PT-5.

$P_g = PV_5$ (volts) x 75 psig/volt

P_g = _____ x 75 psig/volt

P_g = _____ psig _____/_____

INITIALS/DATE

23.2 Determine the head pressure (P_H) due to the level in SI-6C at PT-5.

P_H = (LV_5 (volts) x 3.6042 ft/volt x .434 psig/ft) + 2.42 psig

P_H = (LV_5 (volts) x 1.56) + 2.42 psig

P_H = (_____ x 1.56) + 2.42 psig

P_H = _____ psig

2.42 = head pressure from 0% level in SI-6C at the Reactor Vessel Flange level (psig)

_____/_____

23.3 Calculate the total pressure (P_{PT-5}) of SI-6C at PT-5.

P_{PT-5} = P_g + P_H psig

P_{PT-5} = _____ +_____psig

P_{PT-5} = _____ _____psig

_____/_____

24. Determine the head pressure (P_R) due to the reactor refueling cavity level.

P_R = [(L_R(%) x 20) + 11 ft] x .434 psig/ft

P_R = (L_R (%) x 8.68) + 4.77 psig

P_R = (_____ x 8.68) + 4.77 psig

P_R = _____ psig

Where:

L_R = Reactor Cavity level recorded in Step 3 (%).

20 = distance between LI-106 0% and 100% level taps (ft). If LI-199 is used, refer to Attachment 7 for Cavity Level.

11 = height of 0% level tap above Reactor Vessel Flange (ft)

_____/_____

INITIALS/DATE

24.1 Determine ΔP for SI-6C at PT-5

$\Delta P = P_{PT-5} - P_R$ psid

$\Delta P =$ _____ - _____psid

$\Delta P =$ _____psid _____/____

25. Determine the Flow Coefficient (C_v) for SI-6C Discharge Piping.

25.1 Determine the Flow Coefficient (C_v).

$C_v = Q \div (\Delta P)^{1/2}$

$C_v =$ _____ $\div$ (_____)$^{1/2}$

$C_v =$ _____

Where: Q = flowrate calculated in Step 22 _____/____

REMARKS_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Completed by_____Date/Time_____/____

ATTACHMENT 4
(SI-211 AND SI-212)

PROCEDURE

INITIALS/DATE

NOTE: Steps 1 through 10 can be performed in any sequence, but prior to Step 11.

NOTE: This attachment will raise reactor refueling cavity level by approximately 2% from a 90% initial SIT level.

1. Record the "As Found" position of the following valves **THEN** Close.

Valve	As Found
HCV-320	_____
HCV-321	_____
HCV-333	_____

_____/_____
OPS

NOTE: Control Room indication of SI-6D level is to be used for Step 2.0.

2. Ensure that Safety Injection Tank SI-6D level is between 85% and 90% as indicated on LI-2964X and record.

SI-6D Level_____%
(85% to 90%)

_____/_____
OPS

3. Record the Reactor Refueling Cavity Level (L_R) as indicated on LI-106.

Reactor Refueling Cavity Level (L_R)
_____%

_____/_____
OPS

N/A this step if LI-199 is used.

4. Record the Reactor Refueling Cavity Level as indicated on LI-199 Sightglass

Reactor Refueling Cavity Level (L_R)
_____ _____ ft

_____/_____
OPS

N/A if LI-106 is used.

INITIALS/DATE

5. Use Table 1 in Attachment 5 to determine the test pressure for SI-6D based on the tank level recorded in Step 2. Use the pressure that corresponds to the Tank Level rounded down to the nearest whole percent.

   SI-6D Test Pressure_____psig _____/_____

   NOTE: Control Room indication of SI-6D pressure is to be used in Step 6.0.

6. Set pressure of Safety Injection Tank SI-6D as indicated on PT-2961 to pressure recorded in Step 5. N/A if not required. _____/_____ OPS

7. Strip Chart Recorder hooked up as per Attachment 6. _____/_____ I&C

8. Connect the Strip Chart Recorder to the Safety Injection Tank SI-6D ERF computer input terminals located in cabinet PC-15.

   8.1 To record SI-6D pressure, connect one channel to terminals:

   TB402-21(-)

   TB402-22(+) _____/_____ I&C

   Independent Verification _____/_____ I&C

   8.2 To record SI-6D level, connect one channel to terminals:

   TB401-21(-)

   TB401-22(+) _____/_____ I&C

   Independent Verification _____/_____ I&C

9. Adjust Strip Chart Recorder Speed (S) to 10 mm/sec, or as desired, and record.

   (S) = _____mm/sec _____/_____ I&C

INITIALS/DATE

10. Ensure FH-11 is closed. _____/_____ OPS

11. Start the Strip Chart Recorder. _____/_____ I&C

12. Open HCV-2974 **AND** Mark the Strip Chart to indicate the start of the test (T=0) when HCV-2974 begins to open. _____/_____ OPS

NOTE: HCV-2974 takes approximately 55 seconds to open. When HCV-2974 is full open only the red light will be on.

13. **WHEN** HCV-2974 indicates full open, **Wait** approximately 10 seconds, **THEN** close HCV-2974. _____/_____ OPS

NOTE: When HCV-2974 indicates closed only the green light is on.

14. **WHEN** HCV-2974 indicates closed, **THEN** stop the Strip Chart Recorder. _____/_____ I&C

15. Return valves in Step 1 to "As Found" position or as directed by the Shift Supervisor. _____/_____ OPS

16. Restore Safety Injection Tank SI-6D to service as directed by the Shift Supervisor. _____/_____ OPS

17. Remove Strip Chart Recorder from the following ERF Computer terminals:

TB401-21(-)

TB401-22(+)

TB402-21(-)

TB402-22(+) _____/_____ I&C

Independent Verification _____/_____ I&C

INITIALS/DATE

18. Record the following information on the Strip Recorder Chart:

18.1 Surveillance Test Number
18.2 Attachment Number
18.3 Safety Injection Tank Number
18.4 Date
18.5 Chart Speed (mm/sec)
18.6 Pressure Trace
18.7 Pressure Scale (psig/volt)
18.8 Level Trace
18.9 Level Scale (ft/volt)
18.10 Start of test (T=0)
18.11 Segment of pressure and level traces when HCV-2974 is >90% open: First Point (PT-1), Second Point (PT-2)
18.12 Point (PT-5) on the pressure and level traces halfway between PT-1 and PT-2. _____/_____

19. Measure and record the chart run along the trace (D) between PT-1 and PT-2.

D=_____mm _____/_____

20. Record the level change (ΔL) in SI-6D between PT-1 and PT-2 when HCV-2974 was >90% open.

20.1 Determine the level (L_{PT-1}) of SI-6D at PT-1.

L_{PT-1} = LV_1 (volts) X 3.6042 ft/volt

L_{PT-1} =_____ X 3.6042 ft/volt

L_{PT-1} =_____ ft _____/_____

20.2 Determine the level (L_{PT-2}) of SI-6D at PT-2.

L_{PT-2} = LV_2 (volts) X 3.6042 ft/volt

L_{PT-2} =_____ X 3.6042 ft/volt

L_{PT-2} =_____ ft _____/_____

INITIALS/DATE

20.3 Calculate ΔL for SI-6D.

$\Delta L = L_{PT-1} - L_{PT-2}$ ft

ΔL = _____ - _____ft

ΔL = _____ ft _____/_____

21. Determine the tank level Rate of Change (R) for SI-6D.

R = (ΔL ÷ D) x S ft/sec

R = (_____ ÷ _____) x _____ft/sec

R = _____ft/sec

Where: S = chart speed recorded in Step 9 (mm/sec)

D = chart run recorded in Step 19 (mm) _____/_____

22. Calculate the flowrate (Q) from SI-6D through check valves SI-211 and SI-212 (based on a ~10 second average when HCV-2974 is >90% open).

Q = R x 530.24 gal/ft X 60 sec/min

Q = R x 31,814.4 gal/min

Q = _____ x 31,814.4 gal/min

Q = _____GPM _____/_____

23. Determine the pressure (P_{PT-5}) of SI-6D at PT-5.

23.1 Determine the gas pressure (P_g) in SI-6D at PT-5.

$P_g = PV_5$ (volts) x 75 psig/volt

P_g = _____ x 75 psig/volt

P_g = _____ psig _____/_____

INITIALS/DATE

23.2 Determine the head pressure (P_H) due to the level in SI-6D at PT-5.

P_H = (LV_5 (volts) x 3.6042 ft/volt x .434 psig/ft) + 2.42 psig

P_H = (LV_5 (volts) x 1.56) + 2.42 psig

P_H = (_____ x 1.56) + 2.42

P_H = _____ psig

2.42 = head pressure from 0% level in SI-6D at the Reactor Vessel Flange level (psig)

_____/_____

23.3 Calculate the total pressure (P_{PT-5}) of SI-6D at PT-5.

P_{PT-5} = P_G + P_H psig

P_{PT-5} = _____ +_____psig

P_{PT-5} = _____psig

_____/_____

24. Determine the head pressure (P_R) due to the reactor refueling cavity level.

P_R = [(L_R(%) x 20) + 11] x .434 psig/ft

P_R = (L_R (%) x 8.68) + 4.77 psig

P_R = (_____ x 8.68) + 4.77 psig

P_R = (_____ psig

Where:

L_R = Reactor Cavity level recorded in Step 3 (%).

20 = distance between LI-106 0% and 100% level taps (ft). If LI-199 is used, refer to Attachment 7 for Cavity Level.

11 = height of 0% level tap above Reactor Vessel Flange (ft)

_____/_____

INITIALS/DATE

24.1 Determine ΔP for SI-6D at PT-5.

$\Delta P = P_{PT-5} - P_R$ psid

$\Delta P =$ _____ - _____psid

$\Delta P =$ _____psid _____/____

25. Determine the Flow Coefficient (C_v) for SI-6D Discharge Piping.

25.1 Determine the Flow Coefficient (C_v).

$C_v = Q \div (\Delta P)^{1/2}$

$C_v =$ _____ $\div$ (_____)$^{1/2}$

$C_v =$ _____

Where: Q = flowrate calculated in Step 22 _____/____

REMARKS_____

_____

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_____

_____

Completed by_____Date/Time_____/____

ATTACHMENT 5
(SAFETY INJECTION TANK TEST PRESSURES)

SAFETY INJECTION TANK LEVEL	TEST PRESSURE (PSIG)
84%	80.0
85%	82.5
86%	87.5
87%	90.0
88%	95.0
89%	100.0
90%	105.0

NOTE: Test Pressures are based on Calculation FC-05280.

NOTE: Set pressure at above test pressure +0 -2.5 psig

ATTACHMENT 6 Page 1 of 2

CALIBRATION CONSTANTS AND REFERENCE VALUES

LOOP INSTRUMENT OUTPUTS - ERF Computer

Tank 6A		
Pressure: P2901	1 - 5 volts	0 - 300 psig
Level L2904X	1 - 5 volts	0 - 100% (173" - 0)
Tank 6B		
Pressure: P2921	1 - volts	0 - 300 psig
Level L2924X	1 - 5 volts	0 - 100% (173" - 0)
Tank 6C		
Pressure: P2941	1 - 5 volts	0 - 300 psig
Level L2944X	1 - 5 volts	0 - 100% (173" - 0)
Tank 6D		
Pressure: P2961	1 - 5 volts	0 - 300 psig
Level L2964X	1 - 5 volts	0 - 100% (173" - 0)

Strip Chart Set-Up Parameters

Speed 10 mm/sec (suggested)

Channel 1 Pressure

Set 1 - 3 Volts to correspond to 0 - 300 psig

Channel 2 Level

Set 1 - 5 Volts to correspond to 0 - 173" (14.42 feet)

CONVERSION FACTORS

Level

14.42 feet/4 Volts

= 3.6042 ft/volt

Pressure

150 psig/2 volts

= 75 psig/volt

Volume

Tank ID = 9'-6"

Volume = $\pi D^2 h/4$

$$= \frac{\pi(9.5 \text{ ft})^2 (1 \text{ ft})}{(4)}$$

= 70.88218 ft^3 per foot of height

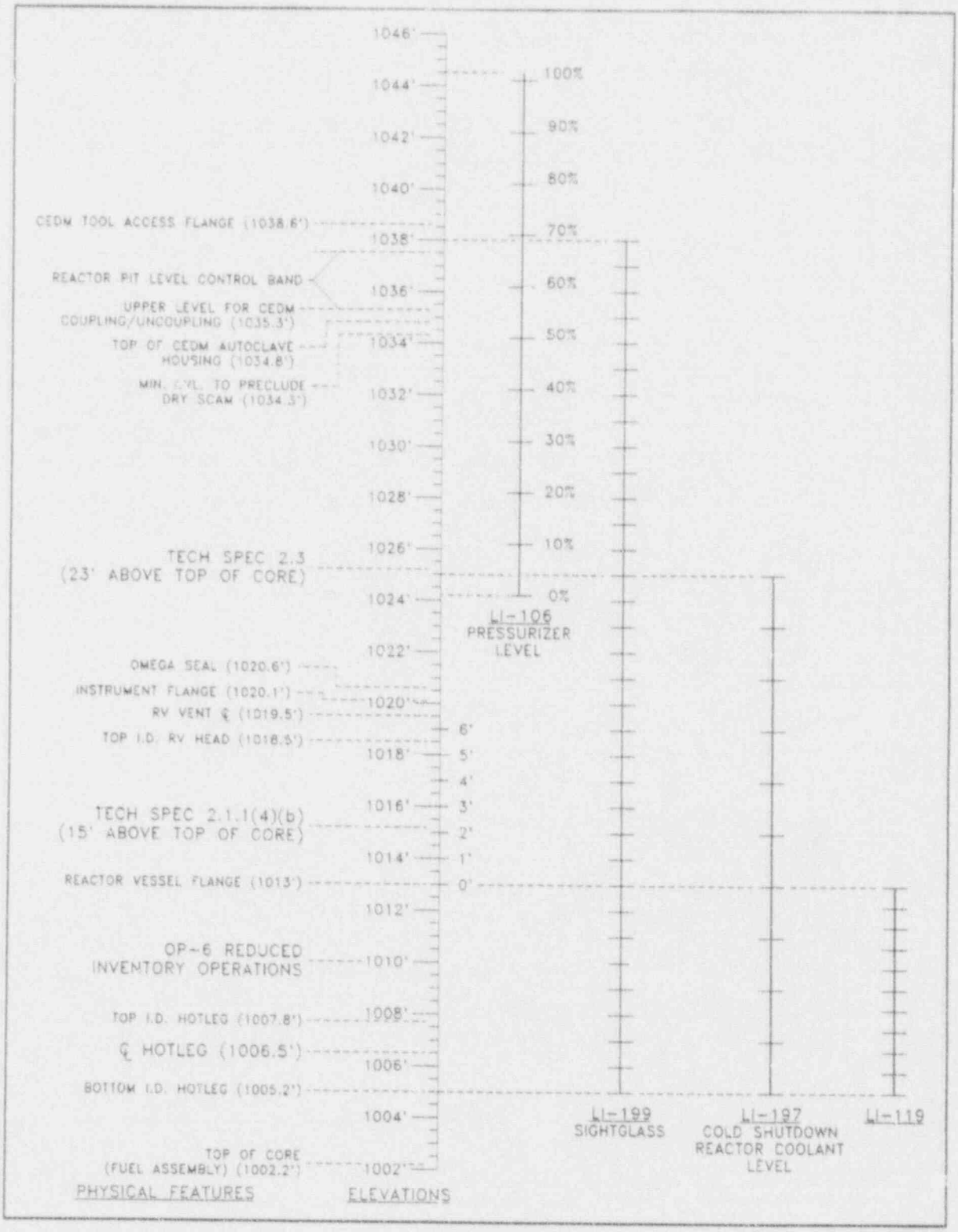
Water volume = 7.48052 gal/ft^3

Tank volume = 7.48052 gal/ft^3 x 70.88218 ft^3

= 530.24 gal/ft of height

ATTACHMENT 7

Page 1 of 1



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ATTACHMENT 8 Page 1 of 8

Depressurizing and Filling SI Tank(s) Using Containment Spray Pumps.

INITIALS/DATE

NOTE: This procedure prevents SDHX AC-41 from being used for Shutdown Cooling.

1. Ensure SI Tank level and pressure instrumentation is operable by completing applicable portions of OI-SI-1-CL-C. _____ / _____ OPS

2. Verify SIRWT is at Refueling Boron Concentration. _____ / _____

3. If on shutdown cooling ensure the following valves are CLOSED:

Valve	Description	(√)
SI-306	SIRWT Fill Valve	_____
HCV-349	Cooled Water Suction to HPSI Pump SI-2B	_____
HCV-2914	SI Tank 6A Discharge Isolation Valve	_____
HCV-2934	SI Tank 6B Discharge Isolation Valve	_____
HCV-2954	SI Tank 6C Discharge Isolation Valve	_____
HCV-2974	SI Tank 6D Discharge Isolation Valve	_____
SI-170	Crosstie from SDHX 4A to 4B	_____
SI-174	SD Cooling Discharge Isolation Valve	_____

_____ / _____ OPS

INITIALS/DATE

4. If not on shutdown cooling ensure the following valves are CLOSED:

Valve	Description	(√)
SI-306	SIRWT Fill Valve	_____
SI-183	Containment Spray Flow Test Stop Valve	_____
HCV-349	Cooled Water Suction to HPSI Pump SI-2B	_____
HCV-350	HPSI Pumps SI-2A and C Alternate Suction valve	_____
HCV-2914	SI Tank 6A Discharge Isolation Valve	_____
HCV-2934	SI Tank 6B Discharge Isolation Valve	_____
HCV-2954	SI Tank 6C Discharge Isolation Valve	_____
HCV-2974	SI Tank 6D Discharge Isolation Valve	_____
HCV-335	Shutdown Cooling Heat Exchanger Inlet Header Isolation Valve	_____
HCV-2983	Safety Injection Leakage To CVCS Isolation Valve	_____
HCV-341	Shutdown Cooling Heat Exchanger Outlet Temperature Control Valve	_____

5. Ensure the following SDC Hx AC-4A Isolation Valves are open:

SI-171 _____/_____
OPS

SI-172 _____/_____
OPS

INITIALS/DATE

6. Uncap SI Tank(s) Vent Line(s):

Tank	(√)	
SI-6A	_____	
SI-6B	_____	
SI-6C	_____	
SI-6D	_____	_____/_____ PE

7. Throttle SI Tank(s) Manual Vent Valves:

Tank	Valve	(√)	
SI-6A	NG-171	_____	
SI-6B	NG-172	_____	
SI-6C	NG-173	_____	
SI-6D	NG-174	_____	_____/_____ OPS

8. Open SI Tank Vent to atmosphere valves as required to lower tank pressure to no lower than 25 psig then close valve:

Tank	Valve	(√)	
SI-6A	HCV-2630	_____	
SI-6B	HCV-2632	_____	
SI-6C	HCV-2634	_____	
SI-6D	HCV-2636	_____	_____/_____ OPS

INITIALS/DATE

9. Ensure the SIRWT Suction to SI Pumps is OPEN for the desired Containment Spray Pump:

Containment Spray Pump _____

Pump	Valve	(√)	
SI-3A	LCV-383-2	_____	
SI-3B	LCV-383-1	_____	
SI-3C	LCV-383-1	_____	_____/_____ OPS

10. Open the Suction Valve for the desired Containment Spray Pump:

Pump	Valve	(√)	
SI-3A	HCV-2957	_____	
SI-3B	HCV-2967	_____	
SI-3C	HCV-2977	_____	_____/_____ OPS

11. Open the Discharge Valve for the desired Containment Spray Pump:

Pump	Valve	(√)	
SI-3A	HCV-2958	_____	
SI-3B	HCV-2968	_____	
SI-3C	HCV-2978	_____	_____/_____ OPS

INITIALS/DATE

12. Open the Recirculation Isolation Valve to SIRWT for the desired Containment Spray Pump:

Pump	Valve	(√)	
SI-3A	SI-138	_____	
SI-3B	SI-146	_____	
SI-3C	SI-152	_____	_____/_____ OPS

13. Ensure the Minimum Recirculation Stop Valve for the inservice LPSI Pump is closed: (N/A if SDC not in service)

Pump	Valve	(√)	
SI-1A	SI-132	_____	
SI-1B	SI-124	_____	_____/_____ OPS

14. Open both SI Minimum Recirculation to SIRWT Isolation Valves:

HCV-385 _____/_____ OPS

HCV-386 _____/_____ OPS

15. Verify both Containment Spray Valve Test Switches are in TEST:

HCV-344 Test Switch _____/_____ OPS

HCV-345 Test Switch _____/_____ OPS

INITIALS/DATE

16. Verify both HCV-344/345 SET SPRAY PUMPS TEST PERMIT annunciators are IN ALARM:

    A33-1, H-5 _____ / _____ OPS

    A34-1, H-3 _____ / _____ OPS

17. Start the desired Containment Spray Pump. _____ / _____ OPS

18. Open the Fill and Drain Valve(s) for the Tank(s) to be filled:

Tank	Valve	(√)
SI-6A	HCV-2916	_____
SI-6B	HCV-2936	_____
SI-6C	HCV-2956	_____
SI-6D	HCV-2976	_____

    _____ / _____ OPS

19. Unlock and open SI Tank Fill Isolation Valve SI-185. _____ / _____ OPS

20. Unlock and throttle open Containment Spray to SI Check Valve Leakage Header Valve SI-342. _____ / _____ OPS

CAUTION

As SI Tank level increases SI Tank pressure will also increase. Do not allow tank pressure to exceed 260 psig.

21. Fill and/or vent SI Tanks as necessary to achieve a level and pressure as indicated on Attachment 5 of this procedure. _____ / _____ OPS

INITIALS/DATE

22. When SI Tank(s) reach desired indicated level, THEN close their respective Fill and Drain Valve. Repeat as necessary for subsequent tank fillings.

Tank	Valve	(√)	
SI-6A	HCV-2916		
SI-6B	HCV-2936		
SI-6C	HCV-2956		
SI-6D	HCV-2976		/ OPS

23. LOCK CLOSED SI-342. / OPS

24. Stop the Containment Spray Pump. / OPS

25. LOCK CLOSED the Minimum Recirculation Isolation Valve for the Containment Spray Pump used.

Pump	Valve	(√)	
SI-3A	SI-138		
SI-3B	SI-146		
SI-3C	SI-152		/ OPS

26. Ensure SI Tank Vent to Atmosphere Valve(s) are closed:

Tank	Valve	(√)	
SI-6A	HCV-2630		
SI-6B	HCV-2632		
SI-6C	HCV-2634		
SI-6D	HCV-2636		/ OPS

ATTACHMENT 8
(Continued)

INITIALS/DATE

27. Close SI Tank Manual Vent Valves (N/A if valves are desired to remain open at Shift Supervisor's discretion):

Tank	Valve	(√)	
SI-6A	NG-171	____	
SI-6B	NG-172	____	
SI-6C	NG-173	____	
SI-6D	NG-174	____	____/____ OPS

28. Replace caps on SI Tank Vent Lines (N/A if caps are desired to remain off at the discretion of the Shift Supervisor):

Tank	(√)	
SI-6A	____	
SI-6B	____	
SI-6C	____	
SI-6D	____	____/____ PE

29. LOCK CLOSED SI-185.

____/____ OPS

____/____ IND VER

30. Close the Discharge Valve opened in Step 10 (N/A if desired to remain open at Shift Supervisor's discretion).

____/____ OPS

31. Open SI-170.

____/____ OPS

32. Open SI-174.

____/____ OPS

SURVEILLANCE TEST SIGNATURE SHEET

All persons participating in the performance of this test shall enter their printed name, signature and initials below.

NAME (PRINT)	SIGNATURE	INITIALS

COMMENT SHEET/CHRONOLOGICAL LOG

(Left Blank Intentionally)