**HOPE CREEK GENERATING STATION**

**HC.OP-GP.ZZ-0005(Q) - Rev. 8**

# DRYWELL LEAKAGE SOURCE DETECTION

**USE CATEGORY: II**

- Packages and Affected Document Numbers incorporated into this revision:
  CP No. _____ CP Rev. _____ AD No. _____ Rev No. _____ None ✓
- The following OPEX were incorporated into this revision: None
- The following OTSCs were incorporated into this revision: None

## REVISION SUMMARY

- The description for Computer points A9317 and A9318 has bee corrected per 70093877. The description has been corrected for these points throughout the procedure. This is an editorial change. (70090815-0010)
- Breaks up Step 5.1.7 to have separate signoffs for each of the Drywell Unit Cooler Fans. This is a format change and editorial.
- Updates the title for the Operations Director throughout the procedure.

## IMPLEMENTATION REQUIREMENTS

**Effective Date 11/25/09**

None

# DRYWELL LEAKAGE SOURCE DETENTION

## TABLE OF CONTENTS

**Section Title Page**

## 1.0 PURPOSE

This procedure outlines the methods available to determine the source of an increase in Drywell Floor Drain (unidentified) or Equipment Drain (identified) leakage. This procedure specifies valves to backseat or close that may stop the leakage. It categorizes the effect of this valving on system operability and on Technical Specification Limited Conditions of Operation. This procedure also allows for the implementation of preplanned leak location and isolation actions as required by Technical Specification 3.4.3.2. Action e.

## 2.0 PREREQUISITES

2.1 Trended Drywell leakage data shows that leakage is increasing above a baseline leakage rate. ____

2.2 Operations Director authorization is required before performing Steps 5.2.3, 5.2.5 and 5.2.7 of this procedure. ____

## 3.0 PRECAUTIONS AND LIMITATIONS

### 3.1 Precautions

3.1.1. This procedure, once opened, will remain in effect until the Unit is in shutdown and/or the sources of all the unidentified leaks have been identified and repaired. ____

3.1.2. The Narrative Section should contain a discussion of the steps taken and the conclusion(s) drawn. ____

3.1.3. The Narrative Section should be expanded as necessary to trace steps taken and any conclusions drawn. ____

3.1.4. Attachment 4 will be used for the new monthly recurring task involving data collection for future trending. ____

3.1.5. **REFER** to applicable system operating procedures for guidance on operational impact when operating components addressed by this procedure. ____

3.2 **Limitations**

3.2.1. Technical Specifications 3.4.3.2 requires ACTION
WHEN there is any PRESSURE BOUNDARY LEAKAGE
OR 5 gpm UNIDENTIFIED LEAKAGE
OR 25 gpm IDENTIFIED LEAKAGE averaged over any 24 hr period
OR a 2 gpm increase in UNIDENTIFIED LEAKAGE within any period of 24 hrs or less
OR 5 gpm leakage per nominal inch of valve size from any RCS Pressure Isolation Valve specified in Table 3.4.3.2-1 at rated pressure. ____

3.2.2. Technical Specifications paragraph 3.6.3 requires ACTION within 4 hours
WHEN Primary Containment Isolation Valves are inoperable. This includes cases
WHEN the valve isolation time is effected
AND is not determined by surveillance test. ____

## 4.0 EQUIPMENT REQUIRED

None

**NOTE**

That portion of unidentified leakage in the Drywell that can be identified as to its source and quantified by isolation techniques can be considered as identified leakage.

Once so identified, the leakage may be permitted to exist (within the limits defined by Tech Specs), by releasing the isolation measures if necessary to restore an isolated system to OPERABLE status where that system's associated TS ACTION would otherwise require a plant shutdown.

## 5.0 PROCEDURE

### 5.1 Generally Locating and Quantifying the Leak

5.1.1. **RECORD** all data on Attachment 2 & 3 for future trending reference. ____

5.1.2. **USE** the RM-11 Radiation Monitoring System terminal as necessary to produce daily, hourly, OR 10 minute trends of the following DLD System data:

A. DLD Floor Drain Flow RM-11 Point:
9AX314 ____

B. DLD Equipment Drain Flow
9AX313 ____

C. DLD Sum (Floor + Eq Drain) Flow
9AX319 ____

D. DLD Condensate Cooler Monitor Flow (DLD-CCM) ____
Upper - 9AX317
Lower - 9AX318
Sum - 9AX320

E. DLD Noble Gas RMS (DLD-RMS)
SK-RI4991 or 9RX507 ____

5.1.3. **CHECK** the following CRIDS Points for indication of leakage:

- D2934 Recirc Pump Motor Cooler A Drain ____
- D2935 Recirc Pump Motor Cooler B Drain ____

5.1.4. Using CRIDS Page Display 60,
**OBTAIN** Drywell Area and Drywell Unit Cooler temperatures.
AND **RECORD** data on Attachment 2. ____

A. **ANALYZE** the data with respect to the base line (IF a base line before the leak began is available), to determine the area(s) of the Drywell that may have a steam leak. ____

B. IF __ necessary, **USE** The following drawings to relate areas of the Drywell to equipment locations: ____

- P&ID M-25-1; Sht 1, Plant Leak Detection
- P&ID M-77-1, Drywell Air Flow Diagram
- P&ID M-86-1, Drywell Control Diagram
- P&ID M-87-1; Sht 2 , Chilled Water System Rx Bldg & D/W Chilled Water
- P-1702-1 thru 1708 Piping Area Drawing Rx Bldg Area 17 Plan El (various)
- P-1711-1 thru 1713 Piping Area Drawing Rx Bldg Area 17 Section (various)
- P-9170-1 HVAC Drawing Section Rx Bldg Area 17
- P-9172-1 thru 9179 HVAC Area Dwg Rx Bldg Area 17 Plan EL (various)
- C-0928-0 Cont Vessel Requirements D/W Penetrations Elev & Details

C. IF __ necessary, **USE** P&ID drawing M-61-1 (Sht 1 & 2) to reference potential sources of Floor and Equipment Sump input in the Drywell. ____

**NOTE**

Using Drywell Sump samples for leakage source determination may be unreliable. Variables such as leakage travel time to the sumps, the amount of leakage absorbed in pipe lagging, the Condensate flowpath for steam leaks to the sump, and the location of the leak are all potential contributors to sample unreliability.

5.1.5. **CONSIDER** the following sources while attempting to identify AND quantify the unidentified leakage:

- Chilled Water - monitoring Head Tank assuming no other leaks. ____
- RACS - monitoring Head Tank assuming no other leaks. ____
- CRD - Chemistry sampling, analysis. [70035920] ____
- Reactor Coolant - Chemistry sampling, analysis. ____

**NOTE**

By systematically stopping D/W Unit Cooler Fans and monitoring DLD-CCM flow and D/W Floor Drain flow, the approximate sector and elevation of the leak may be determined. That is, if one D/W Cooler is drawing a suction from the area of the steam leak and then is secured, the CCM and Floor Drain flow will noticeably decrease until the steam diffuses to other areas and other D/W Coolers.

Attachment 1 should be referred to for Drywell Unit Cooler approximate locations and M-77-1, for Drywell Air Flow Diagram.

5.1.6. WHEN securing the Drywell Cooling Unit Fans, **ENSURE** that the Drywell average air temperature does not exceed 135°F as specified in Technical Specification 3.6.1.7. ____

A. **SETUP** Plant Historian to record the following points within the following graphs: ____

| | |
|---|---|
| Graph #1 | A9313 DWED flow<br>A9314 DWFD flow<br>A9317 Upper Condensate Cooler flow<br>A9318 Lower CC Flow |
| Graph #2 | A2264 thru A2266, A2273<br>Local D/W Temperatures |
| Graph #3 | A2267, A2269, A2270, A2271<br>Local D/W Temperatures |
| Graph #4 | A2279 thru A2285<br>Local D/W Temperatures |
| Graph #5 | A2272, A2274 thru A2278, A2286, A2287<br>Local D/W Temperatures |

B. **SECURE** BOTH the X1 and X2 fans at the same time AND **RECORD** Historian time. Expect Condensate Cooler and D/W Floor Drains flows to increase. ____

(continued on next page)

5.1.6 (continued)

C. **MONITOR** average D/W temperature, pressure (SPDS and hardwire), local D/W temperatures when securing fans. **RESTORE** fans if local temperatures exceed 225°F. ____

D. Floor Drain flow increases > 5 gpm OR drain flow > 2 gpm in 24 hours may occur during evolution and has occurred in the past and is attributed to the change in dp in the fan's drain lines. As the dp drops to 0 psig, water that was held in the drain pan of the fan by the dp will drain rapidly giving indication of high flows for several minutes.
IF these flow values do not return to within Tech Spec after the fans have been placed back in service,
THEN **ENTER** the appropriate Tech Spec. ____

E. **MONITOR** SRV tailpipe temperature while D/W Fans are secured. ____

F. After fans are restored **PERFORM** the following:

1. **RECORD** historian time. ____

2. **WAIT** 15 minutes AND **PRINT** Histroian graphs No. 1, 2 and 3. ____

3. **MARK-UP** graphs with start and stop times AND which fans were secured. ____

G. **VERFIY** DWFD and DWED CC flows have been returned to pre-evolution values and have stablized.
**EVALUATE** any deviations against Tech Specs prior to proceeding. ____

H. **WAIT** 30 - 60 minutes before repating for the next fan, unless steady state values are determined by the shift are achived sooner. ____

I. **LOG** actions AND responses in the Attachment 3; Narrative Sheet. ____

- Fan Identification X1 / X2
- Historian time fan secured
- Historian time fan started

5.1.7. **STOP** each Drywell Unit Cooler AVH-212 through DVH-212 one at a time, for approximately 15 minutes each and THEN **RESTART** the fans. **MONITOR** noticeable dip in Drywell unidentified leakage (DLD-CCM or Floor Drain) WHEN the fans are first stopped. **STOP** each pair of Drywell Unit Cooler Fans EVH- 212/FVH-212, and GHV-212/HVH-212 (shared suction lines).
**MONITOR** for a noticeable dip in Drywell unidentified leakage (DLD-CCM or Floor Drain) WHEN the fans are first stopped:

Lower D/W Coolers

- AVH-212 ____
- BVH-212 ____
- CVH-212 ____
- DVH-212 ____

Upper D/W Coolers

- EVH-212 and FVH-212 ____
- GVH-212 and HVH-212 ____

**NOTE**

Drywell Sump sample analysis attempts to determine whether the source of leakage is Reactor water or not by determining whether the sample contains short lived isotopes.

Drywell Sump sample analysis cannot accurately indicate the percentage of Reactor coolant (short lived isotopes) in the sample.

Using Drywell Sump samples for leakage source determination may be unreliable. Variables such as leakage travel time to the sumps, the amount of leakage absorbed in pipe lagging, the Condensate flowpath for steam leaks to the sump, and the location of the leak are all potential contributors to sample unreliability.

The leakage will be Reactor steam, high temp Reactor water that will flash to steam, RACS water, TB Chilled Water, CRD water, CST water (HPCI or RCIC Jockey Pump or ECCS keep fill), or Torus Water (ECCS Jockey Pump).

5.1.8. **PERFORM** the following to obtain samples:

- **REQUEST** Radiation Protection draw a Marinelli Flask sample of the Drywell atmosphere from the Plant Leak Detection (SK) Skid on Rx Bldg El 162'
  AND **DELIVER** to Chemistry Count Room for analysis. ____

- **REQUEST** Chemistry obtain a sample of the Floor or Equipment Drain Sump effluent
  AND perform Count Room analysis.
  **REFER** to Attachment 5 for guidance. [**70035836**] ____

**NOTE**

Section 5.2 deals with valve manipulations that may stop D/W Floor Drain leakage. The system valves can be worked in any sequence. The sequence should be governed by:

- The area in the Drywell that has been determined to have leakage based on the analysis performed in Step 5.1.5.
- The system that is leaking based on the analysis performed in Step 5.1.7.

5.2 **Valving to Stop Leakage to the Floor Drain Sump**

5.2.1. **RECORD** all data on Attachments 2 & 3 for future trending reference. ____

**NOTE**

Operations Director concurrence is required before performing Step 5.2.3.

5.2.2. Prior to performing Step 5.2.3, **OBTAIN** Operations Director concurrence. ____

_____ _____
Operations Director Date/Time

**CAUTION**

**Once these valves are backseated, restoration or stroke timing will cause a system impact. System Operating Procedure should be referred to.**

5.2.3. **ATTEMPT** to isolate a possible valve stem packing leak by backseating the normally open valves listed below. These valves are not containment isolation valves and are not required to automatically operate.
**ALLOW** approx. 30 minutes between valve manipulation to observe the trend of the leakage data in Step 5.2.2.
IF after all listed valves in a system are backseated
AND there is no observed decrease in D/W leakage after approx. one hour,
**RESTORE** the valves to normal operation. ____

A. RWCU System Valves

- BG-HV-F100 ____
- BG-HV-F101 ____
- BG-HV-F102 ____
- BG-HV-F106 ____

**CAUTION**

**Operation of AE-HV-F011A & B may cause Feedwater and/or Reactor Vessel Transients.**

B. Feedwater Valves that are Red-Tagged Open

- AE-HV-F011A ____
- AE-HV-F011B ____

C. Main Steam, Head Vent to Main Steam Line A

- AB-HV-F005 ____

(continued on next page)

5.2.3 (continued)

**CAUTION**

**Backseating of a Recirculation Pump Suction or Discharge valve may cause a Recirculation Pump Trip.**

**Once a Recirc Pump suction or discharge valve is backseated, restoration will cause a Recirc Pump trip or full runback.**

D. Recirc Pump Suction & Discharge Valves

- BB-HV-F023A ____
- BB-HV-F023B ____
- BB-HV-F031A ____
- BB-HV-F031B ____

**NOTE**

Operations Director concurrence is required before performing Step 5.2.5.

5.2.4. Prior to performing Step 5.2.5, **OBTAIN** Operations Director concurrence. ____

_____ _____
Operations Director Date/Time

**NOTE**

Primary Containment Isolation Valves are required to close on an isolation signal. During this activity Technical Specification 3/4.6.3 shall be complied with.

**CAUTION**

**Once these valves are backseated, restoration or stroke timing will cause a system impact. System Operating Procedure should be referred to.**

5.2.5. **ATTEMPT** to isolate a possible valve stem packing leak by backseating the normally open valves listed below. Backseat one of the listed valves below AND **OBSERVE** the trend of the leakage data in Step 5.2.2.
IF after approximately 30 minutes there is no observed decrease in D/W leakage, **RESTORE** the valve to normal operation. ____

A. Main Steam, Inboard MSIV Before Seat Drain

- AB-HV-F016 ____

B. RWCU Inboard Isolation Valve

- BG-HV-F001 ____

C. RACS Supply & Return for Recirc Motor & Seal

- ED-HV-2554 ____
- ED-HV-2556 ____

D. Drywell Chilled Water Isolation Valves

- GB-HV-9531B-1 ____
- GB-HV-9531B-2 ____
- GB-HV-9531B-3 ____
- GB-HV-9531B-4 ____

(continued on next page)

5.2.5 (Continued)

E. RCIC Steam Line Inboard Isolation Valves
[**PERFORM** Section 5.2.7 (closing) first]

- FC-HV-F007 ____
- FC-HV-F076 ____

F. HPCI Steam Line Inboard Isolation Valves
[**PERFORM** Section 5.2.7 (closing) first]

- FD-HV-F002 ____
- FD-HV-F100 ____

**NOTE**

Operations Director concurrence is required before performing Step 5.2.7.

5.2.6. Prior to performing Step 5.2.7, **OBTAIN** Operations Director concurrence. ____

_____ _____
Operations Director Date/Time

**NOTE**

The valves in Section 5.2.3 can also be closed to stop a leak in the Drywell, but with varying operational consequences.

Technical Specifications should be complied with when closing valves in this step.

**CAUTION**

**All valve operations should be IAW applicable system operating procedure.**

**IF Drywell leakage is not decreased in approximately 30 minutes after closing the following valves by system, open the valve to return the system to operation.**

5.2.7. **CLOSE** the following valves by system as necessary for approximately 30 min. and THEN **REOPEN**. Stem and bonnet leakage in a valve can be stopped by closing the valve with the downstream side depressurized.

A. Main Steam, Inboard MSIV Before Seat Drain

- AB-HV-F016 ____

B. RCIC Steam Line Inboard Isolation Valves

- FC-HV-F007 ____
- FC-HV-F076 ____

C. HPCI Steam Line Inboard Isolation Valves

- FD-HV-F002 ____
- FD-HV-F100 ____

**NOTE**

Since each Drywell Unit Cooler has a Chilled Water Supply Valve to each coil, it is easy to isolate a suspected coil leak with little operational impact. The DLD-CCM should be monitoring the leakage to the Floor Drain Sump unless the leak is not collected with the condensate from the coil. IF the DLD-CCM measures the leakage, then the leaking coil is narrowed down to either the upper or lower unit coolers.

5.2.8. **CLOSE** each of the following D/W Unit Cooler Chilled Water Isolation Valves as necessary for approximately 30 min and THEN **REOPEN** the valve.
**MONITOR** for a decrease in D/W unidentified leakage (DLD-CCM or Floor Drain). ____

| | | | |
|---|---|---|---|
| A. | Lower D/W Coolers (Lower DLD-CCM) | AVH-212 | GB-HV-9510A1 |
| | | | GB-HV-9510A2 |
| | BVH-212 | | GB-HV-9510B1 |
| | | | GB-HV-9510B2 |
| | CVH-212 | | GB-HV-9510C1 |
| | | | GB-HV-9510C2 |
| | DVH-212 | | GB-HV-9510D1 |
| | | | GB-HV-9510D2 |
| B. | Upper D/W Coolers (Upper DLD-CCM) | EVH-212 | GB-HV-9510E1 |
| | | | GB-HV-9510E2 |
| | | FVH-212 | GB-HV-9510F1 |
| | | | GB-HV-9510F2 |
| | | GVH-212 | GB-HV-9510G1 |
| | | | GB-HV-9510G2 |
| | | HVH-212 | GB-HV-9510H1 |
| | | | GB-HV-9510H2 |

**NOTE**

Operations Director concurrence is required before performing Step 5.2.10.

5.2.9. Prior to performing Step 5.2.10, **OBTAIN** Operations Director concurrence. ____

_____ _____
Operations Director Date

**CAUTION**

**This section deals with actions that will lead to a plant shutdown or cause single loop operation until restoration is made. Therefore, these actions may be useful in preparing for the drywell entry to look for the leak while the plant is headed toward cold shutdown.**

**All valve operations should be IAW applicable system operating procedure.**

5.2.10. **CLOSE** the following valves as necessary for system isolation AND leak detection:

A. RWCU System ____

After removing the RWCU System from service the Drywell RWCU piping can be isolated by closing the following valves. The system can then be vented from outside the Drywell to depressurize the piping. ____

BG-HV-F100 ____

BG-HV-F106 ____

BG-HV-F101 ____

BG-HV-F102 ____

BG-HV-F039 ____

IF Drywell leakage does not decrease after one hour the system may be restored to operation. ____

Continued next page

5.2.10 (continued)

**NOTE**

The Recirc Pump suction and discharge valves are double disc gate valves, a stem packing or bonnet leak can be stopped by closing the valve. Step 5.2.3 (backseating of these valves) should have been performed first. IF there is still leakage, THEN a suspected bonnet leak or a suspected stem packing leak coincident with a leaking backseat would be stopped by performing Step 5.2.10.B.

**CAUTION**

**Recirculation Pump Suction or Discharge valve(s) < 90% open will cause a Recirc Pump trip.**

**To prevent overpressurization of Recirc Pump suction piping and pump casing, the applicable Recirc Pump seal purge flow should be secured prior to closing valves BB-HV-F023A & BB-HV-F031A (BB-HV-F023B & BB-HV-F031B).**

B. Recirc System

1. **REMOVE** a Recirculation Pump from service IAW HC.OP-SO.BB-0002(Q). ____

2. **REFER TO** CAUTION 5.2.10. ____

3. **CLOSE** the appropriate loop valves below AND **OBSERVE** Drywell leakage. ____

   - A Recirc Pump

     BB-HV-F023A Pump A Suct Valve ____

     BB-HV-F031A Pump A Disch Valve ____

   - B Recirc Pump

     BB-HV-F023B Pump B Suct Valve ____

     BB-HV-F031B Pump B Disch Valve ____

**NOTE**

This section deals with the limited actions that can be done to troubleshoot the source of D/W Equipment Drain leakage.

5.3 **D/W Equipment Drain Sump (Identified) Leakage High**

5.3.1. **RECORD** all data on Attachments 2 & 3 for future trending reference. ____

5.3.2. Using the following CRIDS points **DETERMINE** if Recirculation Pump seal stage flow OR leakage is high: ____

- D2924, Recirc Pump A Seal Leakage Flow ____
- D2925, Recirc Pump B Seal Leakage Flow ____
- D2926, Recirc Pump A Seal Stage Flow ____
- D2927, Recirc Pump B Seal Stage Flow ____

**NOTE**

D/W Equipment Drain Sump Chilled Water Cooling Coil has dual supply capability from either the A or B Chilled Water Loops.

5.3.3. **SWAP** D/W Chilled Water to the opposite loop. ____

**NOTE**

The following valves have Miller actuators. The Manual Override Hydraulic Pump BYPASS and NEEDLE valves should be left in the OPEN position to allow normal actuator operation for the following valves (IAW VTD PP326A-0203)

H1GB-GB-HV-9511A1 H1GB-GB-HV-9511A2
H1GB-GB-HV-9511B1 H1GB-GB-HV-9511B2

5.3.4. **ISOLATE** Coil Supply and Return Isolation Valves to determine IF coil is leaking using the following valves. (Panel 10C650) ____

- HV-9511 A1/A2 Loop A Supply and Return ____
- HV-9511 B1/B2 Loop B Supply and Return ____

A. **MONITOR** Drywell leakage. IF there is no decrease in leakage after approximately 1 hour, Chilled Water can be returned to the original loop. ____

**NOTE**

The following RHR normally closed valves supply the Drywell Spray Header. The header is kept dry using a hard piped drain to the Equipment Drain Sump. Leakage through both RHR valves would pass directly to the sump.

BC-HV-F016A AND BC-HV-F021A

OR

BC-HV-F016B AND BC-HV-F021B.

5.3.5. **MONITOR** Temperature Recorder TR-R614, Point TE-B21-N064 on Panel 10C650 for evidence of leaking through the normally closed Head Vent Valves BB-HV-F001 and BB-HV-F002. ____

## 6.0 RECORDS

6.1 **RETAIN** the following IAW RM-AA-101; Records Management Program:

- Entire procedure (with the exception of the Attachment 1 Drywell Unit Cooler Location)

- Historian graphs

## 7.0 REFERENCES

7.1 **P&IDs**:

- M-25-1; Sh 1
- M-53-1
- M-41-1
- M-61-1
- M-43-1
- M-77-1
- M-44-1
- M-86-1
- M-51-1
- M-87-1; Sh 2

7.2 **Piping Drawings:**

- P-1702-1 thru P-1713-1
- P-9170-1 thru P-9179-1 (HVAC Dwgs)

7.3 **Civil Drawing:**

- 7C-0928-0

7.4 **Letters**:

- Letter from R.W. Beckwith (Station Licensing Engineer) to
  Bill O'Malley (Operating Engineer);
  Subject: Identified/Unidentified Leakage
  Dated: September 12, 1990

- HSR-91-036 - SRG Review of the Drywell Unidentified Leakage Investigation Preceding the November 4, 1990 Scram.

7.5 **Commitment Documents**

- CD-921E
- CD-191F

7.6 **Other Documents**

- 70035920
- 70035836 - added Attachment 5; Leakage Source Determination Guideline

**ATTACHMENT 1**
**DRYWELL UNIT COOLER LOCATION**

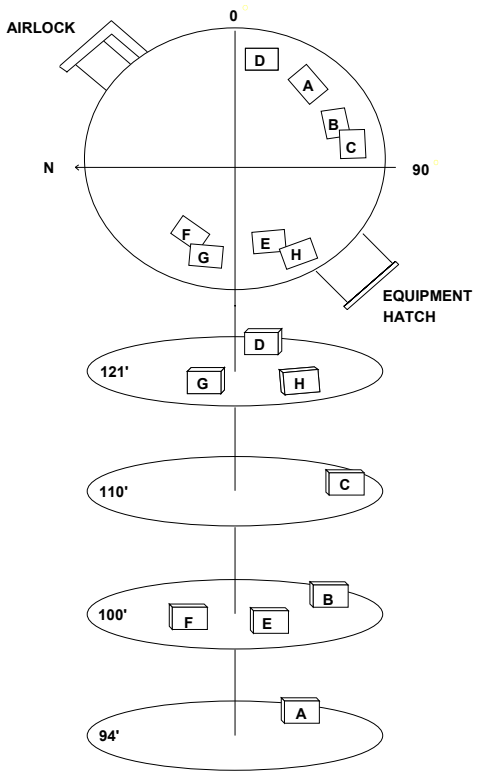
**NOTES**

**AVH-212 THROUGH DVH-212**
DRYWELL UNIT COOLERS SUCTIONS ARE AT THE COOLERS.

**EVH-212 & FVH-212**
DRYWELL UNIT COOLERS SHARE A COMMON SUCTION WHICH DRAWS FROM 170' EL. AND UPPER DRYWELL HEAD AREA VOLUME ABOVE DIAPHRAGM Az 180° TO 360°

**GVH-212 & HVH-212**
DRYWELL UNIT COOLERS SHARE A COMMON SUCTION WHICH DRAWS FROM 170' EL. AND UPPER DRYWELL HEAD VOLUME ABOVE DIAPHRAGM Az 0° TO 180°

SEE P&ID M-77-1



**ATTACHMENT 2**
**DATA COLLECTION SHEET**
**DRYWELL LEAKAGE SOURCE DETECTION**

DATE _____

| STEP | PARAMETER(S) | TIME/INTERVALS | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
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**NOTE** - **ENSURE** Attachment 3 is completed in conjunction with this Data Table.

**ATTACHMENT 3**
**NARRATIVE SHEET**
**Page ____ of ____**

NAME: _____ DATE: _____

REASON FOR TAKING DATA: _____

STEPS TAKEN/CONCLUSIONS DRAWN: _____

**ATTACHMENT 3**
**NARRATIVE SHEET**
**Page ____ of ____**

# ATTACHMENT 4
# MONTHLY DATA TRENDING SHEET

Date _____

Reason for Taking Data _____

_____

| DRYWELL TEMPERATURE ( SPDS ) 5070 | | | | | |
|---|---|---|---|---|---|
| #FANS | I/S | INLET | | OUTLET | |
| DRYWELL COOLER TEMP A | | A3261 | | A3269 | |
| DRYWELL COOLER TEMP B | | A3262 | | A3270 | |
| DRYWELL COOLER TEMP C | | A3263 | | A3271 | |
| DRYWELL COOLER TEMP D | | A3264 | | A3272 | |
| DRYWELL COOLER TEMP E | | A3265 | | A3273 | |
| DRYWELL COOLER TEMP F | | A3266 | | A3274 | |
| DRYWELL COOLER TEMP G | | A3267 | | A3275 | |
| DRYWELL COOLER TEMP H | | A3268 | | A3276 | |

| | | | | |
|---|---|---|---|---|
| DRYWELL FLOOR DRAIN SUMP FLOW | ( RM11 ) | 9314 | | |
| DRYWELL EQUIP DRAIN SUMP FLOW | ( RM11 ) | 9313 | | |
| COOLER COND MONITOR (CCM) | ( RM11 ) | 9318 | | |
| COOLER COND MONITOR (CCM) | ( RM11 ) | 9317 | SUM | |

| | | | |
|---|---|---|---|
| CORE FLOW | ( CRIDS) | A3190 | A3189 |
| RX RECIRC LOOP FLOW | ( CRIDS ) | A208 A209 | |
| | | A210 | A211 |
| RECIRC PMP MOTOR CLR | ( CRIDS ) | D2934 D2935 | |

| | | |
|---|---|---|
| STEAM FLOW | FI-603A-C32 | |
| | FI-603B-C32 | |
| | FI-603C-C32 | |
| | FI-603D-C32 | |

**ATTACHMENT 5**
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**LEAKAGE SOURCE DETERMINATION GUIDELINE**

| **Source** | **Noble Gas** | **Tritium** | **Short Lived** | **Long Lived** |
|---|---|---|---|---|
| Xe-135 9.1h<br>Xe-135m 15.3m | | H-3 12.3a | Na 15h<br>TC-99 6h<br>I-133 21h | MN-54 312d<br>Co-58 71d<br>Co-60 5.3a<br>Zn-65 244d |
| Main Steam | Yes | Yes | No | No |
| Reactor Water | Yes | Yes | Yes | Yes |
| Feedwater No | | Yes | No | No |
| CRD No | | Yes | No | No |
| Torus No | | Yes | No | Yes |
| SACS No | | No | No | No |
| Chilled Water | No | No | No | No |

When samples of the Drywell atmosphere taken from the DLD skid are analyxed, short-lived non-condensable gases like Xenon and Krypton indicate leakage from the Reactor or Main Steam System. The steam generated by these leaks would be condensed by the Room Coolers and directed to the Floor Drain Sump. The Tritium would be transported in the steam and show up in the sump as well. A significant fraction of the remaining impurities would also be transported to the sump

Feedwater and CRD are basically the same water except at different temperatures. A Feedwater leak would produce steam, which would condense in the Room Coolers and transport Tritium into the Floor Drain Sump. While some CRD would be absorbed by the Drywell atmosphere and removed by the coolers, the majority would go directly to the sump.

Torus water will contain Tritium and long lived activity.

SACS and Chilled Water leaks would not contain radionuclides.

**REFER** to M-61-1 for inputs to sumps.