

**NRC REGION III**  
**INITIAL LICENSE EXAM**  
**JOB PERFORMANCE MEASURE**

**JPM: SRO ADMIN 1B**

**TITLE: REVIEW A PCS LEAK RATE**

CANDIDATE: \_\_\_\_\_

EXAMINER: \_\_\_\_\_

JOB PERFORMANCE MEASURE  
DATA PAGE

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Task: Review A Primary Coolant System Leak Rate Calculation (DWO-1)

Alternate Path: N/A

Facility JPM #: NEW

K/A: 2.1.25 Importance: SRO: 4.2

K/A Statement: Ability to interpret reference materials, such as graphs, curves, tables, etc.

Task Standard: Review and Approve A Primary System Leakage Calculation (DWO-1, Attachment 8, PCS Inventory Form)

Preferred Evaluation Location: ANY

Preferred Evaluation Method: Perform  Simulate

References: DWO-1, OPERATOR'S DAILY/WEEKLY ITEMS MODES 1, 2, 3, AND 4

Validation Time: 30 minutes Time Critical: NO

Candidate: \_\_\_\_\_

Time Start: \_\_\_\_\_ Time Finish: \_\_\_\_\_

Performance Time: \_\_\_\_\_ minutes

Performance Rating: SAT \_\_\_\_\_ UNSAT \_\_\_\_\_

Comments:

Examiner: \_\_\_\_\_  
Signature

Date: \_\_\_\_\_

**EXAMINER COPY ONLY**

Tools/Equipment/Procedures Needed:

- DWO-1, Attachment 8, PCS Inventory Form completed by NCO-R

Also see **Simulator Operator Instructions** (last page of this document).

READ TO CANDIDATE

DIRECTION TO CANDIDATE:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIAL CONDITIONS:

- DWO-1, Attachment 8, PCS Inventory Form, has been completed
- A 25.1 gallon PMW addition was made to the PCS
- No Boric Acid Additions were made
- Zinc addition is 2.36 liters/day (from the Shift Manager's log)
- Charging Pump Seal leakage (total) is 105 ml/min
- CRDM Seal leakage is 10 ml/min
- No known leakage sources outside the PCPB
- No known leakage sources inside the PCPB

INITIATING CUES:

The NCO-R has just completed a PCS Leak Rate, DWO-1, Attachment 8, PCS Inventory Form, and requests that you review and approve it.

| Proc. Step  | TASK ELEMENT 1   | STANDARD  | Grade |
|---|--|---|-------|
| n/a   | Obtain completed DWO-1, Attachment 8, PCS Inventory Form | SRO obtains completed Working Copy of DWO-1, Attachment 8 | S U   |
| <p><b>Comment:</b><br/> Notes: <i>Evaluator provides candidate with the completed PCS Inventory Form (Attachment 8) Working Copy.</i></p> |  |   |       |

| Proc. Step             | TASK ELEMENT 2   | STANDARD   | Grade |
|------------------------|--|--|-------|
| 5.1.6.f                | IF MODE 1, 2 or 3 AND Pressure is between 2055 and 2065 psia (inclusive), THEN RECORD 0.18201 ft <sup>3</sup> for Pressurizer Vapor Space specific volume on Att. 8, Step 1.f. | SRO ensures <u>0.18021</u> entered in Att. 8, Step 1.f | S U   |
| <p><b>Comment:</b></p> |  |  |       |

| Proc. Step             | TASK ELEMENT 3  | STANDARD   | Grade |
|------------------------|---|--|-------|
| 5.1.6.g                | IF MODE 1, 2 or 3 AND Pressure is between 2055 and 2065 psia (inclusive), THEN RECORD 0.02595 ft <sup>3</sup> /lbm for Pressurizer Liquid Space specific volume on Att. 8, Step 1.g | SRO ensures <u>0.02595</u> entered in Att. 8, Step 1.g | S U   |
| <p><b>Comment:</b></p> |   |  |       |

| Proc. Step             | TASK ELEMENT 4  | STANDARD   | Grade |
|------------------------|---|--|-------|
| 5.1.6.h                | RECORD 0.01616 ft <sup>3</sup> /lbm for Volume Control Tank specific volume on Att. 8, Step 1.h | SRO ensures <u>0.01616</u> entered in Att. 8, Step 1.i | S U   |
| <p><b>Comment:</b></p> |   |  |       |

| Proc. Step      | TASK ELEMENT 5   | STANDARD   | Grade      |
|-----------------|--|--|------------|
| 5.1.6.i         | <b>DETERMINE</b> Primary Coolant System specific volume from Attachment 13, "Subcooled Specific Volume," <b>AND RECORD</b> on Att. 8, Step 1.i | SRO ensures <u>.021732</u> entered in Att. 8, Step 1.i | <b>S U</b> |
| <b>Comment:</b> |  |  |            |

| Proc. Step      | TASK ELEMENT 6   | STANDARD   | Grade      |
|-----------------|--|--|------------|
| 5.1.6.j         | <b>CALCULATE</b> Pressurizer Vapor Space Volume ( $V_{GPZR}$ ) to the nearest 0.1 ft <sup>3</sup> <b>AND RECORD</b> on Att.8, Step 1.j<br>$V_{GPZR} = (94.3\% - L_{PZR}) (14.370 \text{ ft}^3/\%) + 182.20 \text{ ft}^3$ | SRO ensures <u>703.7</u> entered in Att. 8, Step 1.j | <b>S U</b> |
| <b>Comment:</b> |  |  |            |

| Proc. Step      | TASK ELEMENT 7  | STANDARD   | Grade      |
|-----------------|---|--|------------|
| 5.1.6.k         | <b>CALCULATE</b> Pressurizer Liquid Space Volume ( $V_{FPZR}$ ) to the nearest 0.1 ft <sup>3</sup> <b>AND RECORD</b> on Att.8, Step 1.k<br>$V_{FPZR} = 1547 - V_{GPZR}$ | SRO ensures <u>843.3</u> entered in Att. 8, Step 1.k | <b>S U</b> |
| <b>Comment:</b> |   |  |            |

| Proc. Step             | TASK ELEMENT 8   | STANDARD   | Grade |
|------------------------|--|--|-------|
| 5.1.6.m                | <p><u>IF</u> Primary Makeup Water was added during performance of the test <u>THEN</u>:</p> <ol style="list-style-type: none"> <li>1. DETERMINE the total ... AND <b>RECORD</b> ....on Att. 8, Step 1.m.1</li> <li>2. <b>CALCULATE</b> mass added AND RECORD .... on Att. 8, Step 1.m.3</li> </ol> | <p>SRO ensures:</p> <p><u>25.1</u> entered in Att. 8, Step 1.m.1</p> <p><u>209.1</u> entered in Att. 8, Step 1.m.3</p> | S U   |
| <p><b>Comment:</b></p> |  |  |       |

| Proc. Step   | TASK ELEMENT 9   | STANDARD  | Grade |
|--|--|---|-------|
| 5.1.6.n  | <p><u>IF</u> Boric Acid was added during performance of the test <u>THEN</u>: ....</p> | <p>SRO ensures:</p> <p><u>0</u> entered in Att. 8, Step 1.n.1</p> <p><u>0</u> entered in Att. 8, Step 1.n.3</p> | S U   |
| <p><b>Comment:</b></p> <p><b>Note: No Boric Acid Added</b></p> |  |   |       |

| Proc. Step  | TASK ELEMENT 10   | STANDARD   | Grade |
|---|---|--|-------|
| 5.1.6.o   | <p><u>IF</u> the Zinc Addition was in service during the performance of the test, <u>THEN</u>: ....</p> <ol style="list-style-type: none"> <li>1. <u>IF</u> Zinc addition rate is less than or equal to 4 liters/day, <u>THEN</u> <b>ENTER</b> 0.0 on Att. 8, Step 1.o.4 <u>AND GO TO</u> Step 5.1.6.p</li> </ol> | <p>SRO ensures:</p> <p><u>2.36</u> entered in Att. 8, Step 1.o.1 (Zinc Injection Rate)</p> <p><u>0</u> entered in Att. 8, Step 1.o.1</p> <p><u>180</u> entered in Att. 8, Step 1.o.2</p> <p><u>0</u> entered in Att. 8, Step 1.o.4</p> | S U   |
| <p><b>Comment:</b></p> <p><b>Note: 2.36 liters/day given in Initial Conditions from Shift Manager's Log</b></p> |   |  |       |

| Proc. Step      | TASK ELEMENT 11   | STANDARD   | Grade      |
|-----------------|---|--|------------|
| 5.1.6.p         | <b>CALCULATE</b> Total Mass added <u>AND RECORD</u> on Att. 8, Step 1.p<br>Total Mass added = 1.m.3 + 1.n.3 + 1.o.4 | SRO ensures <u>209.1</u> entered in Att. 8, Step 1.p | <b>S U</b> |
| <b>Comment:</b> |   |  |            |

| Proc. Step      | TASK ELEMENT 12  | STANDARD  | Grade      |
|-----------------|--|---|------------|
| 5.1.6.q         | <b>CALCULATE</b> Total Uncorrected Leakage <u>AND RECORD</u> to the nearest 0.001 gpm per Att. 8, Step 1.q | SRO ensures <u>.083</u> entered in Att. 8, Step 1.q | <b>S U</b> |
| <b>Comment:</b> |  |   |            |

| Proc. Step  | TASK ELEMENT 13  | STANDARD   | Grade      |
|---|--|--|------------|
| 5.1.7.a   | <b>RECORD</b> Charging Pump seal leakage in ml/min on Att. 8, Step 2.a | SRO ensures <u>105</u> entered in Att. 8, Step 2.a | <b>S U</b> |
| <b>Comment:</b><br><b>Note: 105 ml/min Charging Pump seal leakage given in Initial Conditions</b> |  |  |            |

| Proc. Step          | TASK ELEMENT 14  | STANDARD  | Grade      |
|---------------------|--|---|------------|
| 5.1.7.b             | <b>CONVERT</b> Charging Pump seal leakage to gpm <b>AND RECORD</b> to the nearest 0.001 gpm per Att. 8, Step 2.a | SRO ensures <u>.028</u> entered in Att. 8, Step 2.a | <b>S U</b> |
| <b>Comment:</b><br> |  |   |            |

| Proc. Step   | TASK ELEMENT 15  | STANDARD   | Grade      |
|--|--|--|------------|
| 5.1.7.c  | <b>IF</b> any primary coolant leakage sources outside of Primary Coolant Pressure Boundary ..... | SRO ensures <u>0</u> entered in Att. 8, Step 2.b | <b>S U</b> |
| <b>Comment:</b><br><b>Note: No other leakage sources outside the PCPB given in Initial Conditions.</b> |  |  |            |

| Proc. Step          | TASK ELEMENT 16   | STANDARD   | Grade      |
|---------------------|---|--|------------|
| 5.1.7.d             | <b>CONVERT</b> primary coolant leakage sources outside of the Primary Coolant Pressure Boundary ... | SRO ensures <u>0</u> entered in Att. 8, Step 2.b | <b>S U</b> |
| <b>Comment:</b><br> |   |  |            |

| Proc. Step          | TASK ELEMENT 17  | STANDARD  | Grade      |
|---------------------|--|---|------------|
| 5.1.7.e             | <b>CALCULATE</b> leakage which affects PCS leakrate calculations and is outside of the Primary Coolant Pressure Boundary <b>AND RECORD</b> to the nearest 0.001 gpm per Att. 8, Step 2.d | SRO ensures <u>.028</u> entered in Att. 8, Step 2.c | <b>S U</b> |
| <b>Comment:</b><br> |  |   |            |



| Proc. Step             | TASK ELEMENT 18  | STANDARD  | Grade      |
|------------------------|--|---|------------|
| 5.1.7.f                | <b>CALCULATE</b> Corrected PCS Leakage <b>AND RECORD</b> to the nearest 0.001 gpm per Att.8, Step 2.d<br>(Att. 8, Step 1.q – Att. 8, Step 2.c) | SRO ensures <u>.055</u> entered in Att. 8, Step 2.d | <b>S U</b> |
| <p><b>Comment:</b></p> |  |   |            |

| Proc. Step  | TASK ELEMENT 19  | STANDARD  | Grade      |
|---|--|---|------------|
| 5.1.8.a   | <b>RECORD</b> the most recent CRDM seal leakage measurement in ml/min on Att. 8, Step 3.a. | SRO ensures <u>10</u> entered in Att. 8, Step 3.a | <b>S U</b> |
| <p><b>Comment:</b></p> <p><b>Note:</b> Candidate discovers that 105 ml/min has been entered for CRDM seal leakage. Candidate corrects this by entering 10 on Att. 8, step 3.a.</p> <p><b>EVALUATOR:</b> If candidate directs NCO to re-perform calculation, instruct the candidate that the NCO is busy and that they should perform the corrections.</p> <p><b>CRITICAL STEP</b></p> |  |   |            |

| Proc. Step   | TASK ELEMENT 20  | STANDARD  | Grade      |
|--|--|---|------------|
| 5.1.8.b  | <b>COVERT</b> CRDM seal leakage to gpm <b>AND RECORD</b> to the nearest 0.001 gpm per Att. 8, Step 3.a | SRO ensures <u>.003</u> entered in Att. 8, Step 3.a | <b>S U</b> |
| <p><b>Comment:</b></p> <p><b>Note:</b> Candidate discovers that .028 gpm has been entered for CRDM seal leakage. Candidate corrects this by entering .003 gpm on Att. 8, step 3.a.</p> <p><b>CRITICAL STEP</b></p> |  |   |            |

| Proc. Step   | TASK ELEMENT 21   | STANDARD   | Grade |
|--|---|--|-------|
| 5.1.8.c  | IF any primary coolant leakage sources inside the Primary Coolant Pressure Boundary ..... | SRO ensures <u>0</u> entered in Att. 8, Step 3.b | S U   |
| <p><b>Comment:</b><br/> <b>Note: No known leakage sources inside the PCPB given in Initial Conditions.</b></p> |   |  |       |

| Proc. Step             | TASK ELEMENT 22   | STANDARD   | Grade |
|------------------------|---|--|-------|
| 5.1.8.d                | <b>CONVERT</b> primary coolant leakage sources inside of the Primary Coolant Pressure Boundary .... | SRO ensures <u>0</u> entered in Att. 8, Step 3.b | S U   |
| <p><b>Comment:</b></p> |   |  |       |

| Proc. Step  | TASK ELEMENT 23  | STANDARD  | Grade |
|---|--|---|-------|
| 5.1.8.e   | <b>CALCULATE</b> Identified PCS Leakage <b>AND RECORD</b> to the nearest 0.001 gpm per Att. 8, Step 4.a<br>(Att. 8, Step 3.a + Att. 8, Step 3.b) | SRO ensures <u>.003</u> entered in Att. 8, Step 3.c | S U   |
| <p><b>Comment:</b><br/> <b>Note: Candidate discovers that .028 gpm has been entered for Identified leakage. Candidate corrects this by entering .003 gpm on Att. 8, step 3.c.</b></p> <p><b>CRITICAL STEP</b></p> |  |   |       |

| Proc. Step  | TASK ELEMENT 24  | STANDARD  | Grade      |
|---|--|---|------------|
| 5.1.9.a   | <b>CALCULATE</b> Unidentified PCS Leakage <b>AND RECORD</b> to the nearest 0.001 gpm per Att. 8, Step 4.a<br>(Att. 8, Step 2.d – Att. 8, Step 3.c) | SRO ensures <u>.052</u> entered in Att. 8, Step 4.a | <b>S U</b> |
| <p><b>Comment:</b></p> <p><b>Note:</b> Candidate discovers that .027 gpm has been entered for Identified leakage. Candidate corrects this by entering .052 gpm on Att. 8, step 4.a.</p> <p><b>CRITICAL STEP</b></p> |  |   |            |

| Proc. Step  | TASK ELEMENT 25  | STANDARD  | Grade      |
|---|--|---|------------|
| 5.1.9.b   | <p><u>IF</u> PCS Unidentified Leakage from ..... is greater than or equal to 0.05 gpm, <u>THEN</u> <b>PERFORM</b> the following:</p> <p>1. NOTIFY Chemistry to determine the current steam generator primary to secondary leakage ..... <b>AND RECORD</b> to the nearest 0.001 gpm as identified leakage on Att. 8, Step 3.b</p> | SRO attempts to contact Chemistry for Primary to Secondary leakage calculation. | <b>S U</b> |
| <p><b>Comment:</b></p> <p><b>EVALUATOR QUE:</b> <i>When SRO attempts to contact Chemistry, end the JPM.</i></p> <p><b>CRITICAL STEP</b></p> |  |   |            |

**END OF TASK**

## CANDIDATE CUE SHEET

(TO BE RETURNED TO EXAMINER TO UPON COMPLETION OF TASK)

### INITIAL CONDITIONS:

- DWO-1, Attachment 8, PCS Inventory Form, has been completed
- A 25.1 gallon PMW addition was made to the PCS
- No Boric Acid Additions were made
- Zinc addition is 2.36 liters/day (from the Shift Manager's log)
- Charging Pump Seal leakage (total) is 105 ml/min
- CRDM Seal leakage is 10 ml/min
- No known leakage sources outside the PCPB
- No known leakage sources inside the PCPB

### INITIATING CUES:

The NCO-R has just completed a PCS Leak Rate, DWO-1, Attachment 8, PCS Inventory Form, and requests that you review and approve it.

## **SIMULATOR OPERATOR INSTRUCTIONS**

- NONE

**PCS INVENTORY FORM**

Date: TODAY

TECHNICAL SPECIFICATION REQUIRED

INFORMATION ONLY

**1. TOTAL UNCORRECTED LEAKAGE CALCULATION**  
(Section 5.1.6)

|    | PARAMETER   | TIME 1                                    | TIME 2                                    | DELTA TIME |
|----|---|---|---|------------|
| a. | Leakrate Duration   | -0000                                     | +0300                                     | = 180 min  |
| b. | Pressurizer Level ( $L_{PRZ}$ )<br>PPC PT LPRZC_AVG, LT_0101A_D,<br>LIC-0101A or LIC-0101B                                      | 58.01%                                    | 58.01%                                    |            |
| c. | Pressurizer Pressure ( $P_{PRZ}$ )<br>PPC PT PRZBE, PR-0101A/B  | 2061 psia                                 | 2061 psia                                 |            |
| d. | Volume Control Tank Level ( $L_{VCT}$ )<br>PPC Point LTC0205_AVG or LIC-0205  | 71.09%                                    | 71.39 %                                   |            |
| e. | PCS Avg Coolant Temperature ( $T_{AVE}$ )<br>PPC PT TAVG, TYT_0100 or TYT_0200A,<br>TI-0110 Reactor Reg #___                    | 560.62°F                                  | 560.62°F                                  |            |
| f. | Pressurizer Vapor Space Specific Volume<br>$V_{g_{PZR}} @ P_{PRZ}$  | 0.18021 ft <sup>3</sup> /lb <sub>m</sub>  | 0.18021 ft <sup>3</sup> /lb <sub>m</sub>  |            |
| g. | Pressurizer Liquid Space Specific Volume<br>$V_{f_{PZR}} @ P_{PRZ}$   | 0.02595 ft <sup>3</sup> /lb <sub>m</sub>  | 0.02595 ft <sup>3</sup> /lb <sub>m</sub>  |            |
| h. | Volume Control Tank Specific Volume<br>$V_{f_{VCT}}$  | 0.01616 ft <sup>3</sup> /lb <sub>m</sub>  | 0.01616 ft <sup>3</sup> /lb <sub>m</sub>  |            |
| i. | Primary Coolant System Specific Volume<br>$V_{f_{PCS}} @ P_{PRZ} \& T_{AVE}$  | 0.021732 ft <sup>3</sup> /lb <sub>m</sub> | 0.021732 ft <sup>3</sup> /lb <sub>m</sub> |            |
| j. | Pressurizer Vapor Space Volume ( $V_{GPZR}$ )<br>$V_{GPZR} = (94.3\% - L_{PRZ}) (14.370 \text{ ft}^3/\%) + 182.20 \text{ ft}^3$ | 703.7 ft <sup>3</sup>                     | 703.7 ft <sup>3</sup>                     |            |
| k. | Pressurizer Liquid Space Volume ( $V_{FPZR}$ )<br>$V_{FPZR} = 1547 \text{ ft}^3 - V_{GPZR}$                                     | 843.3 ft <sup>3</sup>                     | 843.3 ft <sup>3</sup>                     |            |
| l. | Repeat data at the end of the time period   |   |   |            |

**PCS INVENTORY FORM**

m. Primary Makeup Water Addition

|    |   |  |
|----|---|--|
| 1. | Volume (FIC-0210A)  | 25.1 gal                                 |
| 2. | Specific Volume of water at room temperature  | 0.01605 ft <sup>3</sup> /lb <sub>m</sub> |
| 3. | Mass added = volume (gal) x 0.13368 ft <sup>3</sup> /gal ÷ 0.01605 ft <sup>3</sup> /lb <sub>m</sub> | 209.1 lb <sub>m</sub>                    |

n. Boric Acid Solution Addition

|    |   |  |
|----|---|--|
| 1. | Volume (FIC-0210B)  | 0 gal                                    |
| 2. | Specific Volume of water at 160°F   | 0.01639 ft <sup>3</sup> /lb <sub>m</sub> |
| 3. | Mass added = volume (gal) x 0.13368 ft <sup>3</sup> /gal ÷ 0.01639 ft <sup>3</sup> /lb <sub>m</sub> | 0 lb <sub>m</sub>                        |

o. Zinc Addition

|    |   |  |
|----|---|--|
| 1. | Zinc Injection Rate:<br>( <u>2.36</u> liters/day x 0.000183)<br>[conversion units are gal day/liter min]                              | 0 gpm                                    |
| 2. | Leak rate duration from 1.a   | 180 min                                  |
| 3. | Specific Volume of water at room temperature  | 0.01605 ft <sup>3</sup> /lb <sub>m</sub> |
| 4. | Mass added = injection rate (gpm) x leakrate duration (min) x 0.13368 ft <sup>3</sup> /gal ÷ 0.01605 ft <sup>3</sup> /lb <sub>m</sub> | 0 lb <sub>m</sub>                        |

p. Total Mass added = 1.m.3 + 1.n.3 + 1.o.4 209.1 lb<sub>m</sub>

q. Total Uncorrected Leakage Calculation .083 gpm

$$\left( \frac{\text{Total PCS Leak Rate}}{\text{Time}} \right) = \frac{0.1201}{\text{Time}} \left[ \left( -9136 .8 \left( \frac{1}{Vf_{PCS 2}} - \frac{1}{Vf_{PCS 1}} \right) \right) - \left[ \left( \frac{V_{GPZR 2}}{Vg_{PZR 2}} + \frac{V_{FPZR 2}}{Vf_{PZR 2}} \right) - \left( \frac{V_{GPZR 1}}{Vg_{PZR 1}} + \frac{V_{FPZR 1}}{Vf_{PZR 1}} \right) \right] - 4.588 \left( \frac{L_{VCT 2}}{Vf_{VCT}} - \frac{L_{VCT 1}}{Vf_{VCT}} \right) \right] + \text{Total Mass Added}$$

PCS INVENTORY FORM

$$\left( \begin{array}{l} \text{Total\_PCS} \\ \text{Leak\_Rate} \end{array} \right) = \frac{0.1201}{a} \left[ \left( -9136.8 \left( \frac{1}{i_2} - \frac{1}{i_1} \right) \right) - \left[ \left( \frac{j_2}{f_2} + \frac{k_2}{g_2} \right) - \left( \frac{j_1}{f_1} + \frac{k_1}{g_1} \right) \right] - 4.588 \left( \frac{d_2}{0.01616} - \frac{d_1}{0.01616} \right) + p \right]$$

$$\left( \begin{array}{l} \text{Total\_PCS} \\ \text{Leak\_Rate} \end{array} \right) = \frac{0.1201}{180} \left[ \left( -9136.8 \left( \frac{1}{.021732} - \frac{1}{.021732} \right) \right) - \left[ \left( \frac{703.7}{.18021} + \frac{843.3}{.02595} \right) - \left( \frac{703.7}{.18021} + \frac{843.3}{.02595} \right) \right] - 4.588 \left( \frac{71.39}{0.01616} - \frac{71.09}{0.01616} \right) + 209.1 \right]$$



**PCS INVENTORY FORM**

**2. LEAKAGE CORRECTION CALCULATION**  
 (Section 5.1.7)

|    |  |          |
|----|--|----------|
| a. | Charging Pump Seal Leakage:<br>( <u>  105  </u> ml/min x 0.0002642 gal/ml)   | .028 gpm |
| b. | Other known leakage sources outside the PCPB;<br>list source and rate:<br>Source:<br>Rate: ( <u>  0  </u> ml/min x 0.0002642 gal/ml) | 0 gpm    |
| c. | Leakage outside the PCPB which affects the PCS<br>leakrate calculation: (2.a + 2.b)  | .028 gpm |
| d. | Corrected PCS Leakage: (1.q - 2.c)   | .055 gpm |

**3. IDENTIFIED PCS LEAKAGE CALCULATION**  
 (Section 5.1.8)

|    |   |   |
|----|---|---|
| a. | CRDM Seal Leakage:<br>( <u>  105  </u> ml/min x 0.0002642 gal/ml)   | .028 gpm  |
| b. | Other known leakage sources inside the PCPB;<br>list source and rate:<br>Source:<br>Rate: ( <u>  0  </u> ml/min x 0.0002642 gal/ml) | 0 gpm   |
| c. | Identified PCS Leakage: (3.a + 3.b)   | .028 gpm<br>(If >10.0 gpm - refer to<br>Step 5.1.10b) |

**4. UNIDENTIFIED PCS LEAKAGE CALCULATION**  
 (Section 5.1.9)

|    |  |   |
|----|--|---|
| a. | Unidentified PCS Leakage:<br>(2.d - 3.c) | .027 gpm<br>(If $\geq 0.05$ gpm, refer to Steps 5.1.9b through<br>5.1.9f, 5.1.10b)<br>(If >1.0 gpm - refer to Step 5.1.10b) |
|----|--|---|

**5. PCS LEAKAGE CALCULATION COMPLETION**  
 (Section 5.1.10)

- a.1 Record positive values ( $\geq 0$  gpm) as calculated on Attachment 1, Step 5.1.
- a.2 Record negative values ( $< 0$  gpm) as 0 gpm on Attachment 1, Step 5.1.

|               |         |             |      |      |
|---------------|---------|-------------|------|------|
| Pat Person    | / Today |             | /    |      |
| Calculated By | Date    | Reviewed By | Date | Date |

**PCS INVENTORY FORM**

**Proc No DWO-1  
Attachment 8  
Revision 82  
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