TSR Compliance

ANSI N13.1 Quarterly Compliance for AW Exhausters

Tank Farm Maintenance Procedure

AW Farm HMI Exhausters

USQ # N/A-4

CHANGE HISTORY (≤ LAST 5 REV-MODS)

<table>
<thead>
<tr>
<th>Rev-Mod</th>
<th>Release Date</th>
<th>Justification</th>
<th>Summary of Changes</th>
</tr>
</thead>
<tbody>
<tr>
<td>A-4</td>
<td>07/17/2018</td>
<td>Maintenance Request</td>
<td>Changes made to procedure coincide with new software updates.</td>
</tr>
<tr>
<td>A-3</td>
<td>05/03/2018</td>
<td>Periodic Review</td>
<td>Added recording of &quot;as directed&quot; verbal directions of shift manager in shift log book and corrected EINs and reference document title.</td>
</tr>
<tr>
<td>A-2</td>
<td>07/25/2017</td>
<td>Maintenance request</td>
<td>Delete Step 3.4.3 and add new Step 3.4.3. Delete NOTE for Step 3.4.4. Add (first and last) to multiple signature lines. Update Records Section to comply with writer's standard.</td>
</tr>
<tr>
<td>A-0</td>
<td>05/10/2016</td>
<td>New procedure</td>
<td>New procedure</td>
</tr>
</tbody>
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1.0 PURPOSE AND SCOPE

1.1 Purpose

This procedure provides instructions for quarterly checking of exhausters (A-Train and B-Train) stack and sample flow response to comply with requirements of ANSI N13.1, Sampling Airborne Radioactive Materials in Nuclear Facilities (ANSI-N13.1).

1.2 Scope

1.2.1 Performance of this procedure verifies exhauster compliance with ANSI N13.1 as mandated by 40 CFR 61.

1.2.2 This procedure is applicable to both A and B Trains of the AW Farm exhauster. Series 500 numbers identify A-Train components (e.g., AW241-VTP-V-500), and series 600 numbers identify B-Train components (e.g., AW241-VTP-V-600).

1.2.3 Procedure component numbers specify only the instrument/component identifier and the sequential number (e.g., V-500 or V-600). On system drawings and component labels, the component numbers include the applicable tank farm and system designator (e.g., AW241-VTP-).

1.2.4 The performance of this procedure has been determined to fall under the scope of General Hazards Analysis (GHA).

2.0 INFORMATION

2.1 General Information

2.1.1 Subsections 5.1 through 5.4 can be worked independently or concurrently as directed by the Field Work Supervisor. When this procedure is being performed to support maintenance activities, the necessary sections of this procedure will be indicated in the work package, data sheets, or other maintenance procedures.
3.0 PRECAUTIONS AND LIMITATIONS

3.1 Personnel Safety

3.1.1 Industrial Hygiene Technician (IHT) performs Industrial Hygiene (IH) Monitoring per direction from Industrial Hygienist or as specified in an IH Sampling plan.

3.2 Equipment Safety

CAUTION - Exhauster will shut down on a low flow interlock of 700 ACFM or a high flow interlock of 2,940 ACFM.

3.3 Radiation and Contamination Control

3.3.1 When disconnecting, breaching, or opening potentially contaminated systems or system components:
- Continuous HPT coverage is required
- Pre-job and post-job surveys are required
- A rag will be used to contain the breach until radiological verifications have been performed
- Special care shall be taken to ensure contamination control when inserting and withdrawing test equipment
- All test equipment shall be surveyed by Health Physics Technician for contamination when withdrawn from the system
- Externals of caps, plugs, and instrumentation shall be surveyed before and after removal from the system and again after reinstallation.

3.3.2 Prior to, periodically during, and after cleaning sampling components, contamination surveys will be performed.

3.3.3 Work in radiological areas will be performed using a Radiological Work Permit following review by Radiological Control per ALARA Work Planning procedure TFC-ESHQ-RP_RWP-C-03.

3.3.4 All waste materials are to be managed in accordance with TO-100-052.
3.4 Environmental Compliance

3.4.1 In accordance with WAC-246-247, Washington Department of Health (WDOH) must be notified at least 7 calendar days prior to any planned operational tests of new or modified emission units that involve emissions control, monitoring, or containment systems of the emission unit. WDOH reserves the right to witness such tests [WAC-246-247-060 (4)].

3.4.2 To verify reporting requirements are met, all planned and unplanned outages of Tank Farm ventilation systems, abatement control equipment, and exhaust monitoring systems must be immediately reported to affected Shift Office and Environmental per the Environmental On-Call List in accordance with TF-REC-001 and TFC-ESHQ-ENV_FS-C-01.

3.4.3 Report work space air samples to affected Shift Office and Environmental per the Environmental On-Call List for grab air samples equal to or greater than 10 DAC within the work space AND/OR contamination found during post job radiological surveillance of the posted and controlled radiological boundary area that exceeds the Radiological Work Plan (RWP).

3.4.4 Equipment with removable contamination and/or work with removable contamination will be contained per the latest revision of the Containment Selection guide, Attachment A, in TFC-ESHQ-RP_RWP-C-02.

3.4.5 Pre- and post-job surveys (smears) shall be taken.

3.4.6 Notify affected Shift Office and Environmental On-Call List in accordance with TF-REC-001 and TFC-ESHQ-ENV_FS-C-01 for any spills/releases to the environment.
3.5 Limits

HNF-SD-WM-TSR-006, Tank Farms Technical Safety Requirements

LCO 3.1, DST Primary Tank Ventilation Systems

LCO 3.4, DST Induced Gas Release Event Flammable Gas Control

TFC-ESHQ-ENV-STD-06, As Low As Reasonably Achievable Control Technology (ALARACT) Requirements Standard
4.0 PREREQUISITES

4.1 Special Tools, Equipment, and Supplies

The following supplies may be needed to perform this procedure:

- Calculator
- HMI Engineering password
- Communications devices (walkie-talkie, cell phones)
- Calibrated mass flow meter capable of measuring 0-4 scfm in 0.01 scfm increments
- Tygon tubing, ½” diameter
- Other tools, equipment and supplies as identified by FWS/User.

4.2 Performance Documents

The following documents may be needed to perform this procedure:

- TO-060-107, Operate AW Tank Farm Primary Ventilation System (VTP)
- 6-FCD-648, Calibrate Hastings HFC-303 Flow Controller on AN, AW and POR107 Exhausters
- TO-100-052, Perform Waste Generation, Segregation, Accumulation, and Clean-up
- H-14-020102, Ventilation Tank Primary System (VTP) O&M System P&ID.
4.3 Field Preparation

4.3.1 CONFIRM system/equipment is configured to allow performance of this procedure.

4.3.2 REFER to Figure 1 and Figure 2 for guidance on equipment nomenclature and location for each train.

4.3.3 Shift Manager/OE VERIFY that there are no ongoing transfers and no waste disturbing activities in AW Farm that requires this system to be OPERABLE and in operation to meet the requirements of LCO 3.4. (LCO 3.4)

_________________________ / ______________________ / ______________________
Signature                  Print (first and last)          Date
Shift Manager/OE

4.3.4 VERIFY applicable STACK Flow Transmitter is within calibration.

☐ A- Train AW241-VTP-PDIT-551: ET-008296
☐ B- Train AW241-VTP-PDIT-651: ET-008297

_________________________ / ______________________ / ______________________
Signature                  Print (first and last)          Date
FWS

4.3.5 VERIFY applicable Flow Control Valve is within calibration.

☐ A- Train AW241-VTP-FCV-555: ET-009084
☐ A- Train AW241-VTP-FCV-556: ET-009083
☐ B- Train AW241-VTP-FCV-655: ET-009082
☐ B- Train AW241-VTP-FCV-656: ET-009081

_________________________ / ______________________ / ______________________
Signature                  Print (first and last)          Date
FWS
5.0  PROCEDURE

**Special Instructions:**

Depending on the Train in operation, subsections 5.1 through 5.4 can be performed in any logical sequence or individually.

If performance of any steps in this procedure is not required for procedure completion, steps not performed shall be indicated as such by marking "N/A" and explained in the Comments section of the work package.

Exhauster operation should be conducted per TO-060-107, Operate AW Tank Farm Primary Ventilation System (VTP).

The faceplate “APPLY” button will need to be pressed for each command entered.

Component numbers are prefixed AW241-VTP-.

Applicable alarms may be acknowledged.

5.1  A-Train Stack Flow Response Test

**Special Instructions:**

Operation personal will be required to adjust the stack flow set point.

5.1.1  **CONFIRM** A-Train is running per TO-060-107, test procedure, or work package instructions.

5.1.2  **IF** time monitoring has not been initiated, FWS **NOTIFY** Shift Manager to initiate time monitoring per LCO 3.1.A. (LCO 3.1)

5.1.3  **REQUEST** Operations **LOG IN** to HMI.

5.1.4  **GO TO** A-Train Exhauster Process Details screen on the HMI.

5.1.5  **REQUEST** Operations **ENSURE** stack flow set point is \( \geq 900 \) ACFM.

5.1.6  **RECORD** “As-Found” stack flow from A-Train HMI Exhauster Process Details screen.

<table>
<thead>
<tr>
<th>As-Found Stack Flow (FI-551A)</th>
<th>ACFM</th>
</tr>
</thead>
</table>
5.1 A-Train Stack Flow Response Test (Cont.)

CAUTION
Exhauster will shut down on a low flow interlock of 700 ACFM or a high flow interlock of 2,940 ACFM.

5.1.7 RECORD As-Found Setpoint (Int Sp) Stack Flow Sp.

| As-Found Set Point (EF_009_PID) | ACFM |

5.1.8 REQUEST Operations ADJUST setpoint value to 100 ACFM above “As-Found” setpoint recorded in Step 5.1.7.

5.1.9 CHECK result of stack flow from HMI A-Train Exhauster Process Details screen ACFM (FI-551A) is tracking satisfactorily above “As-Found” (± 10 ACFM).

Stack Flow Tracking satisfactory above As-Found (± 10 ACFM)?

| Yes | No |

5.1.10 REQUEST Operations RETURN stack flow value to “As-Found” Setpoint value recorded in Step 5.1.7.

5.1.11 REQUEST Operations ADJUST setpoint value to 100 ACFM below “As Found” setpoint recorded in Step 5.1.7.

5.1.12 CHECK result of stack flow from HMI A-Train Exhauster Process Details screen ACFM (FI-551A) tracking satisfactorily below “As-Found” (± 10 ACFM).

Stack Flow Tracking satisfactory below As-Found (± 10 ACFM)?

| Yes | No |

5.1.13 REQUEST Operations RETURN stack flow value to “As-Found” Setpoint (Int Sp) value recorded in Step 5.1.7.

5.1.14 RECORD “As-Left” stack flow from HMI.

| As-Left Stack Flow (FI-551A): | ACFM |
5.2 **A-Train Record Sample/CAM Flow Measurements**

5.2.1 **ENSURE** A-Train is not running.

5.2.2 **CHECK** applicable prerequisites in Section 4.0 are satisfied.

5.2.3 **CONFIRM** HPT is available for survey of all tools, equipment, and parts inserted into and/or removed from potentially contaminated equipment and systems. *(TFC-ESHQ-ENV-STD-06)*

5.2.4 **CONFIRM** IHT is available for monitoring/sampling.

5.2.5 **CHECK** the following supplies are available prior to performing this Section.

- Calculator
- Calibrated mass flow meter capable of measuring 0-4 scfm in 0.01 scfm increments
- Tygon tubing, ½” diameter.

5.2.6 **IF** time monitoring has not been initiated, FWS **NOTIFY** Shift Manager to initiate time monitoring for standby train per LCO 3.1.B. *(LCO 3.1)*

5.2.7 **IF** both exhaust trains are to be shut down, FWS **NOTIFY** Shift Manager to initiate time monitoring per LCO 3.1.A. *(LCO 3.1)*

5.2.8 **IF** not logged in, **LOG IN** to HMI.

5.2.9 **IF** A-Train sample pumps are running, **TURN OFF** sample pumps.

5.2.10 **CLOSE** the following valves in ENCL-550:

- record sample isolation valve V-553
- CAM isolation valve V-554.

5.2.11 **ENSURE** the following sample pump outlet valves are **OPEN**:

- V-562
- V-572.
5.2 A-Train Record Sample/CAM Flow Measurements (Cont.)

**Special Instruction**

Sample cabinet ENCL-550 door should remain closed and latched except when record sampler isolation valve V-553 is being operated in order to keep instruments within allowable temperature range greater than 40°F.

**NOTE** - The purpose of this test is to compare the HMI reading of FI-555 to a calibrated flow device.

5.2.12 **IF** testing Record Sampler flow control valve FCV-555, **PERFORM** the following:

5.2.12.1 **REMOVE** flexible hose from cross fitting at inlet to FCV-555.


5.2.12.3 **SELECT** A-Train Stack Sampler button from the HMI Exhauster Process Detail screen.

5.2.12.4 **ENSURE** AWA-FCV-555 (within block FCV-555) is set to Manual Mode (See Example Screen Shot Figure 3).

5.2.12.5 **ENSURE** AWA-FCV-555 (within block FCV-555) MAN is set to 4, giving an output of ~ 4 SCFM (See Example Screen Shot Figure 3).

5.2.12.6 **ENSURE** pump to be tested is in Manual (P-564 or P-574).

5.2.12.7 **START** Sample Pump to be tested (P-564 or P-574).

**NOTE** - Step 5.2.12.8 may take several iterations due to filter loading.

5.2.12.8 **ADJUST** FCV-555 so FI-555 HMI reading indicates approximately 2 scfm. (A set point of 1 scfm will result in ~ 2 scfm)

5.2.12.9 **WAIT** at least two (2) minutes to reach steady state.
5.2 A-Train Record Sample/CAM Flow Measurements (Cont.)

5.2.12.10 **RECORD** the Record Sample flow measurement of FCV-555 from installed inline Mass Flow Meter.

<table>
<thead>
<tr>
<th>Inline Mass Flow Meter (± 0.01 scfm)</th>
<th>Initial Test</th>
<th>Retest, if needed</th>
</tr>
</thead>
<tbody>
<tr>
<td>SCFM</td>
<td>SCFM</td>
<td></td>
</tr>
</tbody>
</table>

5.2.12.11 **RECORD** the HMI Record Sample flow measurement.

<table>
<thead>
<tr>
<th>Record Sampler Flow (FI-555)</th>
<th>Initial Test</th>
<th>Retest, if needed</th>
</tr>
</thead>
<tbody>
<tr>
<td>SCFM</td>
<td>SCFM</td>
<td></td>
</tr>
</tbody>
</table>

5.2.12.12 **STOP** Sample Pump selected to run.

5.2.12.13 **CALCULATE** percent difference.

\[
\% \text{ diff} = \left( \frac{\text{Record Sampler Flow} - \text{Inline Flow Meter}}{\text{Record Sampler Flow}} \right) \times 100
\]

a. **RECORD** the “PASS” or “FAIL” determination.

<table>
<thead>
<tr>
<th>% diff</th>
<th>Initial Test</th>
<th>Retest, if needed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pass</td>
<td>Pass</td>
<td></td>
</tr>
<tr>
<td>Fail</td>
<td>Fail</td>
<td>N/A</td>
</tr>
</tbody>
</table>

FAIL CRITERIA: Fails if % diff ± 10%

5.2.12.14 **REMOVE** in-line Mass Flow Meter **AND**

**CONNECT** flexible hose to cross fitting at INLET to FCV-555.
5.2 A-Train Record Sample/CAM Flow Measurements (Cont.)

**Special Instruction**

Sample cabinet ENCL-550 door should remain closed and latched except when CAM isolation valve V-554 is being operated in order to keep instruments within allowable temperature range greater than 40°F.

**NOTE** - The purpose of this test is to compare the HMI reading of FI-556 to a calibrated flow device.

5.2.13 **IF** testing CAM flow control valve FCV-556, **PERFORM** the following:

5.2.13.1 **REMOVE** flexible hose from cross fitting at inlet to FCV-556.

5.2.13.2 **INSTALL** in-line Mass Flow Meter on cross fitting at INLET side of FCV-556.

5.2.13.3 **SELECT** A-Train Stack Sampler button from the HMI Exhauster Process Detail screen.

5.2.13.4 **ENSURE** AWA-FCV-556 (within block FCV-556) is set to Manual Mode (See Example Screen Shot Figure 3).

5.2.13.5 **ENSURE** AWA-FCV-556 (within block FCV-556) MAN is set to 4, giving an output of ≥ 4 SCFM (See Example Screen Shot Figure 3).

5.2.13.6 **ENSURE** pump to be tested is in Manual (P-564 or P-574).

5.2.13.7 **START** Sample Pump to be tested (P-564 or P-574).

**NOTE** - Step 5.2.13.8 may take several iterations due to filter loading.

5.2.13.8 **ADJUST** FCV-556 so FI-556 HMI reading indicates approximately 2 scfm. (A set point of 1 scfm will result in ~ 2 scfm)

5.2.13.9 **WAIT** at least 2 minutes to reach steady state.
5.2 A-Train Record Sample/CAM Flow Measurements (Cont.)

5.2.13.10 **RECORD** CAM sample flow measurements of FCV-556 from installed inline Mass Flow Meter.

<table>
<thead>
<tr>
<th>Inline Mass Flow Meter (± 0.01 scfm)</th>
<th>Initial Test</th>
<th>Retest, if needed</th>
</tr>
</thead>
<tbody>
<tr>
<td>SCFM</td>
<td>SCFM</td>
<td></td>
</tr>
</tbody>
</table>

5.2.13.11 **RECORD** the HMI CAM Sample flow measurements.

<table>
<thead>
<tr>
<th>CAM Flow (FI-556)</th>
<th>Initial Test</th>
<th>Retest, if needed</th>
</tr>
</thead>
<tbody>
<tr>
<td>SCFM</td>
<td>SCFM</td>
<td></td>
</tr>
</tbody>
</table>

5.2.13.12 **STOP** Sample Pump selected to run.

5.2.13.13 **CALCULATE** percent difference.

\[
\text{% diff} = \left( \frac{\text{CAM Flow} - \text{Inline Flow Meter}}{\text{CAM Flow}} \right) \times 100
\]

<table>
<thead>
<tr>
<th>Initial Test</th>
<th>Retest, if needed</th>
</tr>
</thead>
<tbody>
<tr>
<td>% diff</td>
<td>% diff</td>
</tr>
</tbody>
</table>

a. **RECORD** the “PASS” or “FAIL” determination below.

<table>
<thead>
<tr>
<th>Initial Test</th>
<th>Retest, if needed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pass</td>
<td>Pass</td>
</tr>
<tr>
<td>Fail</td>
<td>Fail</td>
</tr>
<tr>
<td>N/A</td>
<td></td>
</tr>
</tbody>
</table>

FAIL CRITERIA: Fails if % diff is > ± 10%

5.2.13.14 **REMOVE** in-line Mass Flow Meter AND

**CONNECT** flexible hose to cross fitting at INLET to FCV-556.
5.2 A-Train Record Sample/CAM Flow Measurements (Cont.)

5.2.14 IF percent difference calculation fails, CONTACT FWS for resolution.

5.2.15 ENSURE the following isolation valves are OPEN:
- V-553
- V-554.

5.2.16 RETURN exhauster system to the desired operating configuration as required by the Shift Manager/OE per TO-060-107, test procedure, or work package instructions.

5.2.17 REMOVE all test equipment.

5.2.18 RESTORE system to original configuration or as directed by Shift Manager AND

RECORD verbal directions in shift log book.
5.3 B-Train Stack Flow Response Test

**Special Instructions:**

Operation personal will be required to adjust the stack flow set point

5.3.1 **CONFIRM** B-Train is running per TO-060-107, test procedure, or work package instructions.

5.3.2 **IF** time monitoring has not been initiated, FWS NOTIFY Shift Manager to initiate time monitoring per LCO 3.1.A. *(LCO 3.1)*

5.3.3 **REQUEST** Operations **LOG IN** to HMI.

5.3.4 **GO TO** B-Train Exhauster Process Details screen on the HMI.

5.3.5 **REQUEST** Operations **ENSURE** stack flow set point is \( \geq 900 \text{ ACFM} \).

5.3.6 **RECORD** “As-Found” stack flow from B-Train HMI Exhauster Process Details screen.

<table>
<thead>
<tr>
<th>As-Found Stack Flow (FI-651A)</th>
<th>ACFM</th>
</tr>
</thead>
</table>
5.3 B-Train Stack Flow Response Test (Cont.)

**CAUTION**

Exhauster will shut down on a low flow interlock of 700 ACFM or a high flow interlock of 2,940 ACFM.

5.3.7 **RECORD** As-Found Setpoint (Int Sp) Stack Flow Sp.

<table>
<thead>
<tr>
<th>As-Found Set Point (EF_010_PID)</th>
<th>ACFM</th>
</tr>
</thead>
</table>

5.3.8 **REQUEST** Operations **ADJUST** setpoint value to 100 ACFM above "As Found" setpoint recorded in Step 5.3.7.

5.3.9 **CHECK** result of stack flow from HMI B-Train Exhauster Process Details screen ACFM (FI-651A) is tracking satisfactorily above “As-Found” (± 10 ACFM).

<table>
<thead>
<tr>
<th>Stack Flow Tracking satisfactory above As-Found (± 10 ACFM)?</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
</table>

5.3.10 **REQUEST** Operations **RETURN** stack flow value to “As-Found” Setpoint value recorded in Step 5.3.7.

5.3.11 **REQUEST** Operations **ADJUST** setpoint value to 100 ACFM below "As Found" setpoint recorded in Step 5.3.7.

5.3.12 **CHECK** result of stack flow from HMI B-Train Exhauster Process Details screen ACFM FI-651A) tracking satisfactorily below “As-Found” (± 10 ACFM).

<table>
<thead>
<tr>
<th>Stack Flow Tracking satisfactory below As-Found (± 10 ACFM)?</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
</table>

5.3.13 **REQUEST** Operations **RETURN** stack flow value to "As Found" Setpoint (Int Sp) value recorded in Step 5.3.7.

5.3.14 **RECORD** “As-Left” stack flow from HMI.

<table>
<thead>
<tr>
<th>As-Left Stack Flow (FI-651A):</th>
<th>ACFM</th>
</tr>
</thead>
</table>
# ANSI N13.1 Quarterly Compliance for AW Exhausters

## 5.4 B-Train Record Sample/CAM Flow Measurements

<table>
<thead>
<tr>
<th>Section</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.4.1</td>
<td><strong>ENSURE</strong> B-Train is not running.</td>
</tr>
<tr>
<td>5.4.2</td>
<td><strong>CHECK</strong> applicable prerequisites in Section 4.0 are satisfied.</td>
</tr>
<tr>
<td>5.4.3</td>
<td><strong>CONFIRM</strong> HPT is available for survey of all tools, equipment, and parts inserted into and/or removed from potentially contaminated equipment and systems. <em>(TFC-ESHQ-ENV-STD-06)</em></td>
</tr>
<tr>
<td>5.4.4</td>
<td><strong>CONFIRM</strong> IHT is available for monitoring/sampling.</td>
</tr>
</tbody>
</table>
| 5.4.5   | **CHECK** the following supplies are available prior to performing Section 5.4.  
- Calculator  
- Calibrated mass flow meter capable of measuring 0-4 scfm in 0.01 scfm increments  
- Tygon tubing, ½” diameter. |
| 5.4.6   | **IF** time monitoring has not been initiated, FWS **NOTIFY** Shift Manager to initiate time monitoring for standby train per LCO 3.1.B. *(LCO 3.1)* |
| 5.4.7   | **IF** both exhaust trains are to be shut down, FWS **NOTIFY** Shift Manager to initiate time monitoring per LCO 3.1.A. *(LCO 3.1)* |
| 5.4.8   | **IF** not logged in, **LOG IN** to HMI. |
| 5.4.9   | **IF** B-Train sample pumps are running, **TURN OFF** sample pumps. |
| 5.4.10  | **CLOSE** the following valves in ENCL-650:  
- record sample isolation valve V-653  
- CAM isolation valve V-654. |
| 5.4.11  | **ENSURE** the following sample pump outlet valves are OPEN:  
- V-662  
- V-672. |
5.4 B-Train Record Sample/CAM Flow Measurements (Cont.)

Special Instruction

Sample cabinet ENCL-650 door should remain closed and latched except when record sampler isolation valve V-653 is being operated in order to keep instruments within allowable temperature range greater than 40° F.

NOTE - The purpose of this test is to compare the HMI reading of FI-655 to a calibrated flow device.

5.4.12 IF testing Record Sampler flow control valve FCV-655, PERFORM the following:

5.4.12.1 REMOVE flexible hose from cross fitting at inlet to FCV-655.


5.4.12.3 SELECT B-Train “Stack Sampler” button from the HMI Exhauster Process Detail screen.

5.4.12.4 ENSURE AWB-FCV-655 (within block FCV-655) is set to Manual Mode (See Example Screen Shot Figure 3).

5.4.12.5 ENSURE AWB-FCV-655 (within block FCV-655) MAN is set to 4, giving an output of ≥ 4 SCFM (See Example Screen Shot Figure 3).

5.4.12.6 ENSURE pump to be tested is in Manual (P-664 or P-674).

5.4.12.7 START Sample Pump to be tested (P-664 or P-674).

NOTE - Step 5.4.12.8 may take several iterations due to filter loading.

5.4.12.8 ADJUST FCV-655 so FI-655 HMI reading indicates approximately 2 scfm. (A set point of 1 scfm will result in ~ 2 scfm)

5.4.12.9 WAIT at least two (2) minutes to reach steady state.
5.4 B-Train Record Sample/CAM Flow Measurements (Cont.)

5.4.12.10 RECORD the Record Sample flow measurement from installed inline Mass Flow Meter.

<table>
<thead>
<tr>
<th>Inline Mass Flow Meter (± 0.01 scfm)</th>
<th>Initial Test</th>
<th>Retest, if needed</th>
</tr>
</thead>
<tbody>
<tr>
<td>SCFM</td>
<td>SCFM</td>
<td></td>
</tr>
</tbody>
</table>

5.4.12.11 RECORD the HMI Record Sample flow measurement.

<table>
<thead>
<tr>
<th>Record Sampler Flow (FI-655)</th>
<th>Initial Test</th>
<th>Retest, if needed</th>
</tr>
</thead>
<tbody>
<tr>
<td>SCFM</td>
<td>SCFM</td>
<td></td>
</tr>
</tbody>
</table>

5.4.12.12 STOP Sample Pump selected to run.

5.4.12.13 CALCULATE percent difference.

\[
\text{% diff} = \left( \frac{\text{Record Sampler Flow} - \text{Inline Flow Meter}}{\text{Record Sampler Flow}} \right) \times 100
\]

a. RECORD the “PASS” or “FAIL” determination.

<table>
<thead>
<tr>
<th>% diff</th>
<th>Initial Test</th>
<th>Retest, if needed</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>% diff</td>
<td>% diff</td>
</tr>
</tbody>
</table>

FAIL CRITERIA: Fails if % diff is > ±10%

<table>
<thead>
<tr>
<th></th>
<th>Initial Test</th>
<th>Retest, if needed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pass</td>
<td>Pass</td>
<td></td>
</tr>
<tr>
<td>Fail</td>
<td>Fail</td>
<td>N/A</td>
</tr>
</tbody>
</table>

5.4.12.14 REMOVE in-line Mass Flow Meter AND CONNECT flexible hose to cross fitting at INLET to FCV-655.
5.4 B-Train Record Sample/CAM Flow Measurements (Cont.)

Special Instruction

Sample cabinet ENCL-650 door should remain closed and latched except when CAM isolation valve V-654 is being operated in order to keep instruments within allowable temperature range greater than 40°F.

NOTE - The purpose of this test is to compare the HMI reading of FI-656 to a calibrated flow device.

5.4.13 IF testing CAM flow control valve FCV-656, PERFORM the following:

5.4.13.1 REMOVE flexible hose from cross fitting at inlet to FCV-656.

5.4.13.2 INSTALL in-line Mass Flow Meter on cross fitting at INLET side of FCV-656.

5.4.13.3 SELECT B-Train “Stack Sampler” button from the HMI Exhauster Process Detail screen.

5.4.13.4 ENSURE AWB-FCV-656 (within block FCV-656) is set to Manual Mode (See Example Screen Shot Figure 3).

5.4.13.5 ENSURE AWB-FCV-656 (within block FCV-656) MAN is set to 4, giving an output of ≅ 4 SCFM (See Example Screen Shot Figure 3).

5.4.13.6 ENSURE pump to be tested is in Manual (P-664 or P-674).

5.4.13.7 START Sample Pump to be tested (P-664 or P-674).

NOTE - Step 5.4.13.8 may take several iterations due to filter loading.

5.4.13.8 ADJUST FCV-656 so FI-656 HMI reading indicates approximately 2 scfm. (A set point of 1 scfm will result in ~ 2 scfm)

5.4.13.9 WAIT at least 2 minutes to reach steady state.
5.4 B-Train Record Sample/CAM Flow Measurements (Cont.)

5.4.13.10 **RECORD** CAM sample flow measurements of FCV-656 from installed inline Mass Flow Meter.

<table>
<thead>
<tr>
<th>Inline Mass Flow Meter (± 0.01 scfm)</th>
<th>Initial Test</th>
<th>Retest, if needed</th>
</tr>
</thead>
<tbody>
<tr>
<td>SCFM</td>
<td>SCFM</td>
<td></td>
</tr>
</tbody>
</table>

5.4.13.11 **RECORD** the HMI CAM Sample flow measurement.

<table>
<thead>
<tr>
<th>CAM Flow (FI-656)</th>
<th>Initial Test</th>
<th>Retest, if needed</th>
</tr>
</thead>
<tbody>
<tr>
<td>SCFM</td>
<td>SCFM</td>
<td></td>
</tr>
</tbody>
</table>

5.4.13.12 **STOP** Sample Pump selected to run.

5.4.13.13 **CALCULATE** percent difference.

\[
\% \text{ diff} = \left( \frac{\text{CAM Flow} - \text{Inline Flow Meter}}{\text{CAM Flow}} \right) \times 100
\]

<table>
<thead>
<tr>
<th>% diff</th>
<th>Initial Test</th>
<th>Retest, if needed</th>
</tr>
</thead>
<tbody>
<tr>
<td>% diff</td>
<td>% diff</td>
<td></td>
</tr>
</tbody>
</table>

a. **RECORD** the “PASS” or “FAIL” determination.

<table>
<thead>
<tr>
<th></th>
<th>Initial Test</th>
<th>Retest, if needed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pass</td>
<td>Pass</td>
<td></td>
</tr>
<tr>
<td>Fail</td>
<td>Fail</td>
<td>N/A</td>
</tr>
</tbody>
</table>

**FAIL CRITERIA:** Fails if % diff ± 10%

5.4.13.14 **REMOVE** in-line Mass Flow Meter **AND**

**CONNECT** flexible hose to cross fitting at INLET to FCV-656.
5.4 B-Train Record Sample/CAM Flow Measurements (Cont.)

5.4.14 IF percent difference calculation fails, CONTACT FWS for resolution.

5.4.15 ENSURE the following isolation valves are OPEN:
   • V-653
   • V-654.

5.4.16 RETURN exhauster system to the desired operating configuration as required by the Shift Manager/OE per TO-060-107, test procedure, or work package instructions.

5.4.17 REMOVE all test equipment.

5.4.18 RESTORE system to original configuration or as directed by Shift Manager AND

RECORD verbal directions in shift log book.
5.5 Restoration

5.5.1 **DISCONNECT** and remove all M&TE connected for testing.

5.5.2 **FWS INFORM** responsible Shift Manager status of maintenance activities.

5.5.3 **IF** system/component passed testing **AND**

**IF** time monitoring was started per LCO 3.1, **NOTIFY** Shift Manager to stop time monitoring. (LCO 3.1)

5.5.4 **CHECK** all test ports are plugged/capped.

5.5.5 **RESTORE** work area to normal conditions (remove barricades, etc.).

5.5.6 **RECORD** M&TE information and calibration status.

<table>
<thead>
<tr>
<th>A-Train and/or B-Train</th>
</tr>
</thead>
<tbody>
<tr>
<td>TOOL NAME</td>
</tr>
<tr>
<td>------------</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

Comments:

_____________________/  ________________________/  ______________________/
Signature                        Print (first and last)              Date
Instrument Technician
**5.5 Restoration (Cont.)**

5.5.7 **CHECK** equipment system restoration by observing indications are consistent with expected conditions.

5.5.8 **NOTIFY** Operations testing is complete and system may be returned to desired configuration.

5.5.9 **RECORD** Radiological Survey Report (RSR) number(s).

<table>
<thead>
<tr>
<th>RSR Number</th>
<th>RSR Number</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**5.6 Acceptance Criteria**

Comparison and verification of data in applicable steps of the procedure with the limits of the Data Tables satisfies the Acceptance Criteria for this procedure.

<table>
<thead>
<tr>
<th>Check Train(s) for AW Exhauster Submitted For Approved</th>
</tr>
</thead>
<tbody>
<tr>
<td>Train A ✓ ☐</td>
</tr>
</tbody>
</table>

**DISPOSITION**

**CHECK** appropriate work has been performed correctly and completely. Ventilation system has been restored to operating configuration. Sign when complete.

__________________________ / __________________________ /
Signature Print (first and last) Date

**FWS REVIEW** for completeness. Review will include verification of documentation completion.

__________________________ / __________________________ /
Signature Print (first and last) Date

**Environmental CONFIRM** appropriate tables are filled out correctly and are accurate, complete, and legible. Sign when complete.

__________________________ / __________________________ /
Signature Print (first and last) Date

**Engineering Comments:**
5.7 Review

5.7.1 INFORM FWS test is complete.

5.7.2 FWS REVIEW AND CONFIRM the following:
- Steps meet the acceptance criteria
- Comments sections are filled out appropriately
- Work requests needed as a result of this procedure are identified and generated
- Work request number(s) of any work documents generated as a result of this procedure, are recorded in the Comments/Remarks section of the Data Tables.

5.8 Records

This procedure is performed within a work package, as such, the procedure in its entirety will be maintained as a record per the Work Control process.

The record custodian identified in the Company Level Records Inventory and Disposition Schedule (RIDS) is responsible for record retention in accordance with TFC-BSM-IRM_DC-C-02.
Figure 1 - A-Train Stack Sample and Flow System Configuration

A-TRAIN

NOTE: Equipment EIN preceded by AW241-VTP-

Sample Return

Stack 296-A-44

CAM Sample

Record Sample

Re-554A Shrouded Probes

RE-554A

FTP-557
FTP-563
FTP-553
FTP-551

Record Sample Holder
PI 553
FCV 555
PI 554
FCV 556

Sample Cabinet
ENCL-550

V-555

Panel Heater
HTR-550A
HTR-550B

Panel Fan
F-550

Sample Return

V-581 V-586 V-584
TE-551
VERABAR
FE-551

FTP-561
FTP-560
FTP-562
FTP-563

PDIT 551

V-582 V-583 V-585

FTP-559
FTP-558

Stack 296-A-44

V-580

RE-554A

Shrouded Probes

FTP-562 FTP-563
Figure 2 - B-Train Stack Sample and Flow System Configuration

B-TRAIN
NOTE: Equipment EIN preceded by AW241-VTP-

Stack 296-A-
45

Sample Return

Record Sample

CAM Sample

Sample Cabinet
ENCL-650

Panel Heater
HTR-650A

Panel Fan
F-650

Sample Holder
PI 654

FCV 655

FCV 656

RE-654A

Shrouded Probes

FTP-657
FTP-663
FTP-653
FTP-651

FTP-659
FTP-658

FTP-660
FTP-662
FTP-663

VERABAR
FE-651

PDIT 651

V-684

V-680

V-685

V-681

V-686

P-664

MUF

V-661

V-674

V-671

V-662

V-672

PDIT 651

V-681

V-680

V-685

V-684

V-686

P-664

MUF

V-661

V-674

V-671

V-662

V-672
Figure 3 – AWA-FCV-556 (Example Screen Shot)