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1.0 PURPOSE AND SCOPE

1.1 Purpose

This procedure provides instructions for functionally checking the 241-SY A-Train primary exhaust stack AMS-4 CAM interlock system and associated alarms.

1.2 Scope

1.2.1 This procedure covers functionally checking the 241-SY A-Train primary exhaust stack (296-S-25) AMS-4 CAM, interlocks, and alarming functions. The equipment covered is limited to the following:

- Sample monitor cabinet, which includes the exhaust Beta-Gamma CAM and electrical outputs
- Primary stack exhauster
- Associated local and remote alarms.

1.2.2 A CAM detector failure will be simulated and alarms checked for proper response.

1.2.3 A CAM low sample flow rate will be simulated and alarms checked for proper response.

1.2.4 With A-Train Primary Exhaust Stack (296-S-25) running, a radioactive source will be introduced to the primary CAM, verifying the A-Train Primary Exhaust Stack (296-S-25) fan shuts down, alarms activate, and fan cannot be restarted with CAM sensing radiation greater than setpoints.

1.2.5 A CAM power failure will be simulated and alarms checked for proper response.
2.0 INFORMATION

2.1 General Information

2.1.1 During the performance of this test, any step, group of steps or data entry that is not applicable shall be identified by "N/A".

2.1.2 Extreme ambient temperatures may cause the High/Low Cabinet Temp local panel alarm to activate along with the cabinet white strobe.

2.1.3 Use menu button on AMS-4 to enter/exit program and use keypad to navigate.

2.1.4 If the HORN alarm bypass hand switch VTP-HS-3118 and/or the BELL alarm bypass hand switch VTP-HS-3117 on SY296-VTP-ENCL-602 are in the BYPASS position, any alarm which normally would activate the horn/bell is being BYPASSED and will not activate the horn/bell. These switches must be in the NORMAL position to receive the audible alarms.
3.0 PRECAUTIONS AND LIMITATIONS

3.1 Personnel Safety

3.1.1 If during the performance of this procedure any of the following conditions are found immediately stop work, place equipment in a safe condition, notify FWS and proceed as directed:

- Any equipment malfunction which could prevent fulfillment of its functional requirements.
- Procedural inadequacy which could prevent fulfillment of procedural requirements.

3.1.2 Comply with plant/facility specific lock and tag and over-tagging requirements.

3.1.3 Minimum required respiratory protection and voluntary upgrade is identified on the farm specific TVIS.

All general work activities in this procedure are considered SEG-2, unless:

- Breaching the CAM System which is considered a SEG-3 work activity
- Shutdown of the exhauster which is considered a SEG-4 work activity until the tank farm is cleared.

3.1.4 Industrial Hygiene monitoring requirements will be specified in the Industrial Hygiene Sample Plan (IHSP).

3.1.4.1 Contact the facility Industrial Hygienist for the appropriate IHSP.

3.2 Radiation and Contamination Control

3.2.1 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 Environmental Compliance

Tank Farm ventilation systems and exhaust monitoring systems are regulated under Washington State Administrative Code (WAC) Chapters 173-400, 173-401, 173-460 and 246-247 and applicable Notices of Construction (NOC) issued to ensure compliance with these regulations. To ensure reporting requirements are met, all planned and unplanned outages of Tank Farm ventilation equipment and exhaust monitoring systems, including portable exhausters, must be immediately reported to Environmental Compliance (EC) per the Environmental On-Call List. Environmental Compliance will determine and make the required notifications pertaining to ventilation system outages.

If functional checking of the CAM fails, Environmental Compliance shall be notified per the Environmental On-Call List.

3.4 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
4.0 PREREQUISITES

4.1 Special Tools, Equipment, and Supplies

The following supplies may be needed to perform this procedure:

- Beta-Gamma Radiation Source capable of generating $\geq 10,000$ counts per minute as displayed on the CAM
- Two way radio or cellular phone required for personnel inside the farm and 242S
- Hearing protection
- Password for CAM "Air Monitor System-4 (AMS-4) Beta/Gamma Particle Monitor." This may be obtained from the instrument FWS
- Vacuum grease, rags
- Extension handle/rod for handling source
- Handheld calculator.

4.2 Performance Documents

The following documents may be needed to perform this procedure:

- 6-RM-168, Eberline AMS 4 Continuous Air Monitor Calibration and Field Installation
- H-2-93367, 1000 CFM Stack Monitor Cabinet Flow Diagram
- H-14-020131, Sh 1-5, Ventilation Tank Primary System (VTP) O & M System P&ID
- TO-060-245, Operate SY241 Primary Exhaust System.
### 4.3 Field Preparation

The following conditions must be completed before this procedure may commence:

- **4.3.1** ALL discrepancies shall be, **REPORTED** immediately to the OE, upon completion of this procedure.

- **4.3.2** IF equipment is found out of service, **IMMEDIATELY NOTIFY** Shift Manager and OE.

- **4.3.3** IF functional checking cannot be performed in accordance with this procedure the equipment shall be returned to a safe configuration, and the Shift Manager and OE shall be informed.

- **4.3.4** IF this procedure is to be performed stand-alone, **REQUEST** Radiological Control to review the procedure and assign an appropriate Radiation Work Permit.

- **4.3.5** A pre-job safety meeting has been conducted by the FWS prior to starting the test. **All** personnel participating in the test have read and understand the test.

- **4.3.6** The OE has verified the following alarms are clear:
  
  - 241-SY-271 Annunciator 101-2, HIGH PRESSURE TANK 101 (LOW VACUUM) (WST-PAH-313)
  
  - 241-SY-271 Annunciator 102-2, HIGH PRESSURE TANK 102 (LOW VACUUM) (WST-PAH-316)
  
  - 241-SY-271 Annunciator 103-2, HIGH PRESSURE TANK 103 (LOW VACUUM) (WST-PAH-319).

- **4.3.7** Personnel in the SY Farm have been notified of the expected alarms that could be initiated by this procedure and appropriate responses identified.

- **4.3.8** The OE has verified there are no open risers in SY tank farm.
4.3 Field Preparation (Cont.)

4.3.9 Shift Manager/OE **VERIFY** there are no ongoing transfers and no waste disturbing activities that requires this system to be OPERABLE and in operation. (LCO 3.4)

Signature / Print (First & Last) / Date
Shift Manager / OE

4.3.10 The Shift Manager and the TMACS operator have been notified of the scope of this procedure and are aware of the alarms that will be affected. The TMACS operator is notified as a courtesy.

4.3.11 The OE has notified Environmental Compliance per Section 3.3 that exhaust stack CAM functional checking will be conducted.

OE Signature / Print (First & Last) / Date/Time

4.3.12 The Shift Manager has specified which stack exhauster is to be operating upon completion of this procedure.

A-Train Primary Stack Exhauster (296-S-25) _____

B-Train Primary Stack Exhauster (296-P-23) _____
5.0  PROCEDURE

NOTE - The exhauster may shut down unexpectedly during the performance of this procedure. The exhauster may be restarted per operating procedure TO-060-245 (296-S-25) to facilitate completion of this procedure.

- Data recording is done on the data table within this procedure.

- Alarms/annunciators at the following locations may be re-acknowledged:
  - 242-S Evaporator
  - CAM
  - Alarm Cabinet SY241-VTP-ENCL-401
  - Stack Instrument Enclosure SY296-VTP-ENCL-602
  - Local Alarm Panel in CAM cabinet.

- Failed functional checks require documenting results on work record and data sheet and following the requirements in the Tank Farm Contractor Work Control procedure (reference TFC-OPS-MAINT-C-01).

5.1  A-Train Primary Exhaust Stack (296-S-25) AMS-4 Initial Setpoints and Alarms

5.1.1  NOTIFY Shift Manager to initiate time monitoring per LCO 3.1.A. (LCO 3.1)

5.1.2  ENSURE horn alarm bypass hand switch VTP-HS-3118 is in the NORMAL position.

5.1.3  ENSURE bell alarm bypass hand switch VTP-HS-3117 is in the NORMAL position.

5.1.4  ENSURE A-Train primary exhaust stack (296-S-25) is operating.

Verify Calibration

5.1.5  CHECK CAM calibration data.

5.1.6  IF CAM is within calibration, GO TO Step 5.1.8.

5.1.7  IF CAM is not within calibration, REPORT condition to Shift Manager.

5.1.7.1  IF Shift Manager gives any directions that deviate from this procedure DOCUMENT them on Data Sheet 1 AND PROCEED as directed by Shift Manager.

5.1.8  RECORD on Data Table 1 – A-Train Primary Exhauster (296-S-25) the serial number and calibration due date of each CAM being tested.
5.1 A-Train Primary Exhaust Stack (296-S-25) AMS-4 Initial Setpoints and Alarms (Cont.)

Verify Alarm Setpoints

5.1.9 PRESS number [5] key on the CAM keypad.

5.1.10 RECORD the As-Found "SLOW ALARM SETPOINT", as displayed on the top line of the CAM, on Data Table 1 – A-Train Primary Exhauster (296-S-25).

5.1.11 IF As-Found Slow Alarm Setpoint is equal to 300 (299-301) DPM/ft³, GO TO Step 5.1.14.

5.1.12 IF the As-Found Slow Alarm Setpoint is not equal to 300 (299-301) DPM/ft³, RESET slow alarm setpoint using the following menus:

"PASSWORD"

"ALARM PARAMETERS"

"SLOW ALARM SETPOINT"

5.1.12.1 PRESS EDIT AND TYPE "300" to change slow alarm setpoint to 300 DPM/ft³.

5.1.12.2 PRESS ENTER on keypad to accept changed setpoint.

5.1.12.3 PRESS MENU twice to return CAM to operation.


5.1.14 RECORD As-Left Slow Alarm Setpoint on Data Table 1 – A-Train Primary Exhauster (296-S-25).

5.1.15 PRESS number [6] key on the CAM keypad.

5.1.16 RECORD the "FAST ALARM SETPOINT", as displayed on the top line of the CAM, on Data Table 1 – A-Train Primary Exhauster (296-S-25).

5.1.17 IF As-Found fast alarm setpoint is equal to 7,000 (6,999-7,001) DPM/ft³, GO TO Step 5.1.20.
5.1 A-Train Primary Exhaust Stack (296-S-25) AMS-4 Initial Setpoints and Alarms (Cont.)

5.1.18 **IF** the As-Found fast alarm setpoint is not equal to 7,000 (6,999-7,001) DPM/ft³, **RESET** fast alarm setpoint using the following menus:

"PASSWORD"

"ALARM PARAMETERS"

"FAST ALARM SETPOINT"

5.1.18.1 **PRESS EDIT AND**

**TYPE** "7000" to change fast alarm setpoint to 7000 DPM/ft³.

5.1.18.2 **PRESS** ENTER on keypad to accept changed setpoint.

5.1.18.3 **PRESS** MENU twice to return CAM to operation.

5.1.19 **PRESS** number [6] key on the CAM keypad.

5.1.20 **RECORD** As-Left fast alarm setpoint on Data Table 1 – A-Train Primary Exhauster (296-S-25).

5.1.21 **PRESS** number [7] key on the CAM keypad.

5.1.22 **RECORD** the As-Found "BETA ALARM SETPOINT" (Beta Net Count Rate), as displayed on the top line of the CAM, on Data Table 1 – A-Train Primary Exhauster (296-S-25).

5.1.23 **IF** Beta Net Count Rate setpoint value (As-Found) is equal to 3,000 (2,999-3,001) counts per minute, **GO TO** Step 5.1.28.

5.1.24 **IF** Beta Net Count Rate setpoint value (As-Found) is less than 10,000 counts per minute, **GO TO** Step 5.1.26.

5.1.25 **IF** Beta Net Count Rate setpoint value (As-Found) is greater than 10,000 counts per minute, **NOTIFY** Shift Manager AND

**PERFORM** actions as directed.
5.1 A-Train Primary Exhaust Stack (296-S-25) AMS-4 Initial Setpoints and Alarms (Cont.)

5.1.26 **RESET** Beta Net Count Rate setpoint using the following menus:

"PASSWORD"

"ALARM PARAMETERS"

"NET ALARM SETPOINT"

5.1.26.1 **PRESS EDIT AND**

TYPE "3000" to change net alarm setpoint to 3000 counts per minute.

5.1.26.2 **PRESS ENTER** on keypad to accept changed setpoint.

5.1.26.3 **PRESS MENU** twice to return CAM to operation.

5.1.27 **PRESS** number [7] key on the CAM keypad.

5.1.28 **RECORD** As-Left "BETA ALARM SETPOINT" (Beta Net Count Rate) on Data Table 1 – A-Train Primary Exhauster (296-S-25).

5.1.29 **CHECK** alarm/status indicators are in the status listed in the "Initial Conditions" line of Data Table 1 – A-Train Primary Exhauster (296-S-25) (pages 1, 2, and 3) **AND**

**RESET** the indicator/alarm.
5.2  A-Train Primary Exhaust Stack (296-S-25) AMS-4 Detector Failure

5.2.1 INITIATE failure of the CAM detectors by adjusting the high voltage of the beta detector to zero using the following menus:

"PASSWORD"

"DETECTOR PARAMETERS"

"BETA HIGH VOLTAGE"

NOTE - This value will be used in later steps to reset the voltage to its As-Found value.

5.2.1.1 RECORD the As-Found high voltage on Data Table 1 – A-Train Primary Exhauster (296-S-25).

5.2.1.2 PRESS EDIT AND

TYPE "0" to change voltage to zero.

5.2.1.3 PRESS ENTER on keypad to accept changed voltage.

5.2.1.4 PRESS MENU twice to return CAM to operation.

5.2.1.5 DO NOT perform Step 5.2.2 UNTIL after CAM "MALFUNCTION" light is LIT (normally 1 to 5 minutes).

5.2.2 MOVE horn alarm bypass hand switch VTP-HS-3118 to bypass position.

5.2.3 PRESS red "Alarm Ack" button on CAM to clear audible alarm.

5.2.4 PRESS ACKNOWLEDGE pushbutton to acknowledge annunciator and silence bell at 242-S Evaporator.

5.2.5 CONFIRM alarm and status indicators are in the status listed in the "Fail Test" line of Data Table 1 – A-Train Primary Exhauster (296-S-25) (pages 1, 2, and 3).
5.2 A-Train Primary Exhaust Stack (296-S-25) AMS-4 Detector Failure (Cont.)

5.2.6 RETURN CAM high voltage to the recorded As-Found value using the following menus:

"PASSWORD"

"DETECTOR PARAMETERS"

"BETA HIGH VOLTAGE"

5.2.6.1 PRESS EDIT AND TYPE in recorded As-Found value from Step 5.2.1.1.

5.2.6.2 RECORD the As-Left high voltage on Data Table 1 – A-Train Primary Exhauster (296-S-25).

5.2.6.3 PRESS ENTER on keypad to accept changed voltage.

5.2.6.4 PRESS MENU twice to return CAM to operation.

5.2.6.5 DO NOT perform Step 5.2.7 UNTIL after CAM "MALFUNCTION" light is not LIT (normally 1 to 5 minutes).

5.2.7 PRESS alarm reset push button PB-3143 on alarm cabinet SY241-VTP-ENCL-401.

5.2.8 MOVE horn alarm bypass hand switch VTP-HS-3118 to the NORMAL position.

5.2.9 CONFIRM alarm and status indicators are in the status listed in "Reset 1" line of Data Table 1 – A-Train Primary Exhauster (296-S-25) (pages 1, 2, and 3).
5.3 A-Train Primary Exhaust Stack (296-S-25) Low Sample Flow Rate Alarm

5.3.1 CLOSE valve SY241-VTP-V-608 in SY296-VTP-ENCL-602.

5.3.1.1 DO NOT perform Step 5.3.2 UNTIL after CAM "MALFUNCTION" light is LIT (normally 1 to 5 minutes).

5.3.2 MOVE horn alarm bypass hand switch VTP-HS-3118 to the BYPASS position.

5.3.3 PRESS red "Alarm Ack" pushbutton located on CAM.

5.3.4 PRESS ACKNOWLEDGE pushbutton to acknowledge annunciator and silence bell at 242-S Evaporator.

5.3.5 CONFIRM alarm and status indicators are in the status listed in the "Low Sample Flow" line of Data Table 1 – A-Train Primary Exhauster (296-S-25) (pages 1, 2, and 3).

5.3.6 POSITION hand switch SY296-VTP-HS-602 on stack monitor cabinet (SY296-VTP-ENCL-602) to the BYPASS position.

5.3.7 OPEN valve SY241-VTP-V-608 AND ALLOW flow to stabilize.

5.3.8 RECORD stack flow in SCFM from the stack Masstron II (SY296-VTP-FIT-632) display.

5.3.8.1 IF the flow is varying, RECORD the approximate average value and variance observed.

Stack Flow \[ \text{\pm \phantom{T}}} \text{SCFM} \]

5.3.9 CALCULATE the optimum Beta CAM flow rate by using the stack flow value obtained in Step 5.3.8 (See Attachment 1)

5.3.9.1 DIVIDE the stack flow from Step 5.3.8 by the R factor (596) AND RECORD.

Optimum Beta CAM Flow Rate = \left( \frac{\text{Stack Flow from Step 5.3.8}}{596} \right) \text{SCFM}
5.3 A-Train Primary Exhaust Stack (296-S-25) Low Sample Flow Rate Alarm (Cont.)

5.3.10 RECORD the Beta CAM flow rate from the Masstron II (SY296-VTP-FIT-631) display.

5.3.10.1 IF the flow is varying, RECORD the approximate average value and variance observed.

Beta CAM Flow _______ ± _______ SCFM

5.3.11 CALCULATE the ratio of the stack flow rate to the Beta CAM flow rate (See Attachment 1).

\[
\text{Ratio} = \frac{\text{Stack Flow Rate (step 5.3.8)}}{\text{Beta CAM Flow Rate (step 5.3.10)}} = \frac{656}{536} \text{ Acceptance range 536 to 656}
\]

5.3.12 IF the ratio is not within the acceptance range, PERFORM the following:

5.3.12.1 VERIFY the non-isokinetic beta cam flow alarm (SY296-VTP-FFA-631) indicator (located on SY296-VTP-ENCL-602) is ILLUMINATED.

5.3.12.2 NOTIFY the Shift Manager to repair the isokinetic control.

5.3.12.3 CONTINUE with functional check.

5.3.13 PRESS alarm reset push button PB-3143 on alarm cabinet SY241-VTP-ENCL-401.

5.3.14 MOVE horn alarm bypass hand switch VTP-HS-3118 to the NORMAL position.

5.3.15 POSITION hand switch SY296-VTP-HS-602 on the Stack Monitor Cabinet (SY296-VTP-ENCL-602) to the ENABLE position.

5.3.16 CONFIRM alarm and status indicators are in the status listed in the "Reset 2" line of Data Table 1 – A-Train Primary Exhauster (296-S-25) (pages 1, 2, and 3).
5.4 A-Train High Radiation Alarms and Interlock for Primary Exhaust Stack (296-S-25)

5.4.1 PREPARE for a HIGH alarm status on the CAM using the following menus:

"PASSWORD"

"INSTRUMENT PARAMETERS"

"GAMMA SUBTRACT FACTOR"

NOTE - This value will be used in later steps to reset the "GAMMA SUBTRACT FACTOR" to its As-Found value.

5.4.1.1 RECORD the As-Found Gamma Subtract Factor value on the Data Table 1 – A-Train Primary Exhauster (296-S-25).

5.4.1.2 PRESS EDIT AND

TYPE "0" to change value to zero.

5.4.1.3 PRESS ENTER on keypad to accept changed value.

5.4.1.4 PRESS MENU twice to return CAM to operation.

NOTE - Tank pressurization alarm may sound when exhaust fan is shut down.

5.4.2 USE an extension handle AND

PLACE AND HOLD Beta-Gamma source (V-block) at the Primary Exhaust Stack (296-S-25) CAM detector head.
5.4 A-Train High Radiation Alarms and Interlock for Primary Exhaust Stack (296-S-25) (Cont.)

5.4.3 WAIT for CAM to alarm AND

REMOVE the source from CAM detector head.

5.4.4 PRESS ACKNOWLEDGE pushbutton to acknowledge annunciator and silence bell at 242-S Evaporator.

5.4.5 MOVE horn alarm bypass hand switch VTP-HS-3118 to the BYPASS position.

NOTE - Initially red light on CAM will strobe, then it will stop strobing and CAM will fail due to loss of flow.

5.4.6 CONFIRM red light on CAM is flashing.

5.4.7 PRESS red "Alarm Ack" pushbutton on CAM to silence horn.

5.4.8 CONFIRM Primary Exhaust Stack (296-S-25) fan has SHUT DOWN.

5.4.9 CONFIRM Primary Exhaust Stack (296-S-25) Beta and Record Sample vacuum pumps (SY296-VTP-P-614 and SY296-VTP-P-624) are not OPERATING.

NOTE - Amber beacon and horn on stack instrument enclosure SY296-VTP-ENCL-602 will be received after or simultaneously with the vacuum pump shutdown.

5.4.10 MOVE horn alarm bypass hand switch VTP-HS-3118 to the BYPASS position.

5.4.11 PRESS ACKNOWLEDGE pushbutton to acknowledge annunciator and silence bell at 242-S Evaporator.

5.4.12 CONFIRM alarm and status indicators are in the status listed in the "High Radiation" line of Data Table 1 – A-Train Primary Exhauster (296-S-25) (pages 1, 2, and 3).

5.4.13 ATTEMPT to start the Primary Exhaust Stack (296-S-25) fan by pressing FAN START push button PB-3146 (located on SY241-VTP-ENCL-401).
5.4 A-Train High Radiation Alarms and Interlock for Primary Exhaust Stack (296-S-25) (Cont.)

5.4.14 CONFIRM Primary Exhaust Stack (296-S-25) fan does not start.

5.4.15 AFTER CAM is back to ready and green light is ON, PRESS beta CAM high radiation reset push button PB-3119 on SY296-VTP-ENCL-602.

5.4.16 PRESS alarm reset push button PB-3143 on alarm cabinet SY241-VTP-ENCL-401.

5.4.17 PRESS interlock reset push button PB-3141 on alarm cabinet SY241-VTP-ENCL-401.

5.4.18 MOVE horn alarm bypass hand switch VTP-HS-3118 to the NORMAL position.

5.4.19 MOVE bell alarm bypass hand switch VTP-HS-3117 to the NORMAL position.

5.4.20 START A-Train primary exhaust stack (296-S-25) in accordance with TO-060-245.

5.4.21 CONFIRM Primary Exhaust Stack (296-S-25) Beta and Record Sample vacuum pump (either SY296-VTP-P-614 or SY296-VTP-P-624) is OPERATING.

5.4.22 PRESS alarm reset push button PB-3143 on alarm cabinet SY241-VTP-ENCL-401.

5.4.23 CONFIRM alarm and status indicators are in the status listed in the "Reset 3" line of Data Table 1 – A-Train Primary Exhauster (296-S-25) (pages 1, 2, and 3).
5.4 A-Train High Radiation Alarms and Interlock for Primary Exhaust Stack (296-S-25) (Cont.)

5.4.24 **RESET** the "GAMMA SUBTRACT FACTOR" to its previous value using the following menus:

"PASSWORD"

"INSTRUMENT PARAMETERS"

"GAMMA SUBTRACT FACTOR"

5.4.24.1 **PRESS EDIT AND**

**TYPE** the previously recorded As-Found value from Data Sheet.

5.4.24.2 **RECORD** the As-Left Gamma Subtract Factor value on Data Table 1 – A-Train Primary Exhauster (296-S-25).

5.4.24.3 **PRESS ENTER** on keypad to accept changed value.

5.4.24.4 **PRESS MENU** twice to return CAM to operation.
5.5 **A-Train Primary Exhaust Stack (296-S-25) AMS-4 Power Failure**

5.5.1 **MOVE** horn alarm bypass hand switch VTP-HS-3118 to the BYPASS position.

5.5.2 **TURN** CAM power switch to OFF.

5.5.3 **PRESS** ACKNOWLEDGE pushbutton to acknowledge annunciator and silence bell at 242-S Evaporator.

5.5.4 **CHECK** chamber and detectors clear **AND**

**RECORD** on Data Table 1 – A-Train Primary Exhauster (296-S-25).

5.5.5 **CHECK AND LUBE** O-rings **AND**

**RECORD** on Data Table 1 – A-Train Primary Exhauster (296-S-25).

5.5.6 **CONFIRM** alarm and status indicators are in the status listed in the "Power Off" line of Data Table 1 – A-Train Primary Exhauster (296-S-25) (page 1, 2, and 3).

5.5.7 **WAIT** approximately one (1) minute before power restoration.

5.5.8 **TURN** CAM Power switch to ON.

5.5.9 **IF** fan shuts down, **PERFORM** the following:

5.5.9.1 **PRESS** ACKNOWLEDGE pushbutton to acknowledge annunciator and silence bell at 242-S Evaporator.

5.5.9.2 **PRESS** Beta CAM high radiation reset push button PB-3119.

5.5.9.3 **PRESS** alarm reset push button PB-3143.

5.5.9.4 **PRESS** interlock reset push button PB-3141.

5.5.9.5 **START** A-Train primary exhauster per TO-060-245.

5.5.9.6 **CONTINUE** test.
5.5 A-Train Primary Exhaust Stack (296-S-25) AMS-4 Power Failure (Cont.)

5.5.10 **DO NOT VERIFY** alarm and status indicators until "READY" green light on CAM is LIT.

5.5.11 **MOVE** horn alarm bypass hand switch VTP-HS-3118 to the NORMAL position.

5.5.12 **PRESS** alarm reset push button PB-3143 on alarm cabinet SY241-VTP-ENCL-401.

5.5.13 **CONFIRM** alarm and status indicators are in the status listed in the "Reset 4" line of Data Table 1 – A-Train Primary Exhauster (296-S-25) (pages 1, 2, and 3).

5.5.14 **INITIAL AND DATE** in the last column of Data Table 1 – A-Train Primary Exhauster (296-S-25) (pages 1, 2, and 3) to satisfy the verification steps for the CAM test.
5.6 Restoration

5.6.1 **RESTORE** 241-SY primary exhauster to operating condition specified by Shift Manager in Step 4.3.12 per procedure TO-060-245.

5.6.2 **VERIFY** the primary (296-S-25) exhaust stack radiation monitor components have been restored to the pre-test configuration, or as directed by the Shift Manager.

_________________________ / ______________________ / ______________________
Signature  Print (First & Last)  Date
Instrument Tech

5.6.3 **NOTIFY** all SY Farm personnel testing is completed.

5.6.4 **NOTIFY** Shift Manager, WFO Health Physics management and the TMACS operator the status of the 241-SY exhaust stack CAM testing.

5.7 Acceptance Criteria

5.7.1 **VERIFY** Sections 5.1 through 5.6 of this procedure have been completed and systems/components performed as specified.

_________________________ / ______________________ / ______________________
Signature  Print (First & Last)  Date
FWS

5.7.2 **IF** CAM passed test, **NOTIFY** Shift Manager to stop time monitoring per LCO 3.1.A.

5.7.3 **RETURN** this procedure to the Shift Manager for completion of the review Section 5.8.

5.8 Review

5.8.1 The Engineer shall **REVIEW AND EVALUATE** the test data.

_________________________ / ______________________ / ______________________
Signature  Print (First & Last)  Date
Engineer
5.9 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.
### Data Table 1 – A-Train Primary Exhauster (296-S-25)

<table>
<thead>
<tr>
<th>Test Steps</th>
<th>&quot;READY&quot; Green Light on CAM</th>
<th>&quot;MALFUNCTION&quot; Amber Light on CAM</th>
<th>Red Strobe Light on CAM</th>
<th>Audible Alarm on CAM</th>
<th>242-S Annunciator Panel F</th>
<th>Init. And Date</th>
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<tbody>
<tr>
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<th>As-Found</th>
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<tr>
<td>Slow alarm setpoint (DPM/ft³)</td>
<td>300 (299-301) DPM/ft³</td>
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<td>Fast alarm setpoint (DPM/ft³)</td>
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<td>Beta alarm setpoint (cpm)</td>
<td>3000 (2,999-3,001) cpm</td>
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### Test Steps
- **CAM Power Failure:**
  - CAM Detector Failure:
    - High Voltage
    - High Radiation: Gamma Subtract Factor
  - Check Chamber and Detector clear: Yes No
  - Check and Lube O-Rings (as reqd.): Yes No

<table>
<thead>
<tr>
<th>Type</th>
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<th>Rev/Mod</th>
<th>Release Date</th>
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## 241-SY A-Train Primary Exhaust Stack CAM Interlock Functional Check

Data Table 1 – A-Train Primary Exhauster (296-S-25) (Cont.)

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## 241-SY A-Train Primary Exhaust Stack CAM Interlock Functional Check

### Data Table 1 – A-Train Primary Exhauster (296-S-25) (Cont.)

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<tr>
<th>TEST STEPS</th>
<th>PUMP P-614 ON YL-3151 AND PUMP P-614 ON LEAD YL-3150 OR PUMP 2 ON YL-3152</th>
<th>Non-Isokinetic Record Sample Flow Alarm SY296-VTP-FFA-621</th>
<th>Non-Isokinetic Beta CAM Flow Alarm SY296-VTP-FFA-631</th>
<th>Amber Beacon</th>
<th>Horn</th>
<th>Red Beacon</th>
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# Data Sheet 1 - Information Record Sheet

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**Shift Manager**
- Review
- Sign/Date
Attachment 1 - Beta CAM Isokinetic Flow Rate

The Air Monitor Corporation Isokinetic Air Sampling System is designed to control the sample air velocity to be within 10% of the stack air velocity. This is achieved when the ratio of the stack flow rate to the sample flow rate is equal to the ratio of the square of the diameter of the stack to the square of the diameter of the sample nozzle. This is given by:

\[
\frac{Q_k}{Q_s} = \left(\frac{d_k}{d_s}\right)^2 = R
\]

where:
- \(Q\) = flow rate
- \(d\) = diameter
- \(k\) = stack
- \(s\) = sample

For the 296-S-25 ventilation system, \(d_k\) is a constant at 7.981 inches. For the Beta/Gamma CAM sample nozzle, \(d_s\) is 0.327 inches. The value for \(R\) is:

\[
R = \left(\frac{7.981}{0.327}\right)^2 = 596
\]

Therefore, if the stack flow rate is 1000 SCFM, the sample flow rate should be 1000/596 or 1.7 SCFM. The controller is designed to control within 10% of the correct ratio. Thus, the sample flow could be out by as much as 0.17 SCFM.