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A045

NUCLEAR BUSINESS UNIT  
EMERGENCY PLAN IMPLEMENTING PROCEDURES

February 7, 2000  
CHANGE PAGES FOR  
REVISION #83

PSE&G  
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The Table of Contents forms a general guide to the current revision of each section of the Administrative EPIPs. The changes that are made in this TOC Revision #83 are shown below. Please check that your revision packet is complete and remove the outdated material listed below:

ADD			REMOVE		
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NUCLEAR BUSINESS UNIT EMERGENCY PLAN  
 ADMINISTRATIVE PROCEDURES  
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 February 7, 2000

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EMERGENCY PREPAREDNESS ADMINISTRATIVE PROCEDURES

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EPIP 1001 Revision and Development of PLAN/EPIPs/ECG.....	2	12	02/02/96
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EPIP 1003 Review and Approval of PLAN/EPIPs/ECG.....	11	12	05/10/96
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EPIP 1016 Test Procedures for EOF Backup Generator, Vent System and HVAC Filter Replacement.....	5	49	02/07/00

**PSE&G NUCLEAR BUSINESS UNIT**

**EPIP 1016 – REV. 6**

**Test Procedure for EOF Back Up Generator, Ventilation System & Filter Replacement**

**SPONSOR ORGANIZATION:** Emergency Preparedness

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**REVISION SUMMARY:**

1. Changed Attachment 8 to include upstream and downstream DOP aerosol injection points.
2. Restored Attachment 8 to one entire system test rather than just upper and lower bank tests.
3. Test now includes leakage test of by-pass damper.

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**IMPLEMENTATION REQUIREMENTS:**

Effective Date: 2/7/2000

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**APPROVED: (See last page for signatures)**

**NUCLEAR BUSINESS UNIT EMERGENCY PLAN  
ADMINISTRATIVE PROCEDURE**

**TEST PROCEDURES FOR EOF BACKUP GENERATOR,  
VENTILATION SYSTEM, AND HVAC FILTER REPLACEMENT  
EPIP 1016**

1. Action Level

Required testing per Emergency Preparedness work activity tracking system.

2. Individuals Who Will Implement This Procedure:

Manager CA, EP, & IT (or Designee)  
Administrator - NTC Building Maintenance (or Designee)  
Designated Test Representative(s)  
Technical Analyst - EP Facilities

3. Action Statements

**THE DESIGNATED TEST REPRESENTATIVE SHALL:**

3.1 When directed, record the date and EP work activity number:

Date: \_\_\_\_\_ EP Work Activity #: \_\_\_\_\_

3.2 Refer to Table 1 and select the appropriate attachment for the required equipment test.

3.3 Review all test results ensuring all problems or deficiencies are corrected and documented using the appropriate corrective action log.

3.4 Forward all completed forms and copies of repair requests to Emergency Preparedness; mail code N37.

4. References

1. Nuclear Business Unit Emergency Plan, Section 9, Facilities
2. EP File 5.3.1.1, EOF HVAC System
3. EP File 5.3.1.2, EOF Generator

## 5. Attachments

1. Operational test of the Emergency Generator and Diesel Engine UNDER NO-LOAD conditions.
  - 1a. Monthly Emergency Generator Test Log.
2. Operational test of the Emergency Generator and Diesel Engine UNDER LOAD conditions.
  - 2a. Annual Emergency Generator Test Log.
3. EOF HVAC Test Results Summary Sheet
4. Visual Inspection
  - 4a. Visual Checklist
5. Operational test of the EOF Emergency Ventilation System.
  - 5a. Ventilation System Test Data Sheet.
6. Replacement of the Filters in the Emergency Ventilation System for the EOF.
  - 6a. Filter Replacement Data Sheet.
7. Air Flow Capacity
  - 7a. Air Flow Capacity Data Sheet
8. HEPA Filter DOP Test
  - 8a. HEPA Filter DOP Test Data Sheet
9. Positive Pressure Test
  - 9a. Positive Pressure Test Data Sheet

## 6. Signature Page

**TABLE 1**  
**EMERGENCY SUPPORT EQUIPMENT TESTS**

TEST TITLE	FREQUENCY	ATTACHMENT
1. Engine and Generator Test - (EOF) <b>(Under No-Load)</b>	Monthly	1
2. Generator and Automatic Power Switch Test - (EOF) <b>(Under Load)</b>	Annually	2
3. EOF HVAC Test Result Summary Sheet	Per Inspection Order	3
4. Visual Inspection	Per Inspection Order	4
5. Operational Test of the Emergency Ventilation System. (EOF)	Annually	5
6. Filter Replacement for the Emergency Ventilation System. (EOF)	Annually	6
7. Air Flow Capacity	Per Inspection Order	7
8. HEPA Filter DOP Test for EOF Emergency Ventilation System	Per Inspection Order	8
9. Positive Pressure Test	Per Inspection Order	9

**ATTACHMENT 1  
OPERATIONAL TEST OF THE EMERGENCY GENERATOR AND  
DIESEL ENGINE UNDER NO-LOAD**

**1.0 PURPOSE:**

To test and document operation of the emergency generator for the Emergency Operations Facility (EOF) under **NO-LOAD** conditions.

**2.0 PREREQUISITES:**

- 2.1 Key (CH-751) for the Generator Access Panels is kept in Building Maintenance Office.
- 2.2 **Prior to performing any generator maintenance, place the Manual Control Switch in the STOP position - (center). Verify "switch off" light begins flashing.**

**3.0 PRECAUTIONS AND LIMITATIONS:**

- 3.1 **Check for any leaks or abnormal conditions around the generator perimeter prior to starting the test.**

**4.0 EQUIPMENT REQUIRED:**

- 4.1 Ensure the Emergency Generator Inspection Order and this procedure are in hand for the test.
- 4.2 Ensure the Emergency Generator Maintenance/Run Time-Hours Logbook is within the generator panel.

**5.0 PROCEDURE:**

**NOTE**

This **NO-LOAD** test is not required to be performed if an **UNDER LOAD** run has been performed per Attachment 2 in the same calendar month.

- 5.1 Pre-Operational Lineup and Checks -

**INITIALS:** The Designated Test Representative Shall:

- 5.1.1 Perform alarm panel lamp test - SAT criteria is all lamps light; Replace bulbs as necessary.

INITIALS:

- \_\_\_\_\_ 5.1.2 Locate the Manual Control Switch (Run/ Stop/ Remote) on the generator control panel of the generator. Place the switch in the **STOP** (center) position to prevent startup of the Engine should commercial power be lost during the pre-operational checks.
- \_\_\_\_\_ 5.1.3 Position/Verify the Exciter Breaker located in the generator enclosure is in the **ON (UP)** position.
- \_\_\_\_\_ 5.1.4 Verify Block Heater operation; observe Low Coolant Temperature Light is not lit and that upper portion of engine block is "warm to the touch".
- \_\_\_\_\_ 5.1.5 Check the following and record results on the Monthly Generator Test Log - (Attachment 1a). Fill in accordance with (IAW) Test Log guide.
- \_\_\_\_\_ Fuel level - Sat criteria is  $\geq 3/4$ ; Refuel if Unsat
- \_\_\_\_\_ Coolant level - Sat criteria is  $>$  one inch (1") above the core; Fill to that level if Unsat
- \_\_\_\_\_ Engine Oil level - Sat criteria is Level indicated on dipstick is between Full Range Arrows; fill if Unsat
- \_\_\_\_\_ Condition of Batteries - visually check condition of the batteries; Sat criteria is no visible battery terminal post corrosion; Clean if Unsat

NOTE

Batteries are maintenance free and water caps should not be removed for inspection. If there is evidence of malfunction, batteries may need replacing or under/over charge condition exists.

- \_\_\_\_\_ 5.1.6 Enter the starting run hours displayed on the hour meter into the Monthly Emergency Generator Test Log; Attachment 1a. Also, verify engine exercise time (run-time hours log book).

5.2 Engine Startup:

- \_\_\_\_\_ 5.2.1 Start the engine by placing the Manual Control Switch to the **RUN** (up) position; observe engine startup and allow to run for thirty (30) minutes.

INITIALS:  
\_\_\_\_\_

5.2.2 After engine has warmed to approximately 180 Deg. F, record coolant temperature and oil pressure on the Emergency Generator Test Log; Attachment 1a and note any out of range values (parameters indicated on log).

5.3 Engine Shutdown:  
\_\_\_\_\_

5.3.1 Turn the engine off by placing the Manual Control Switch to the **STOP** (center) position.

5.3.2 Observe normal shutdown of engine.  
\_\_\_\_\_

5.4 Emergency Generator Restoration:  
\_\_\_\_\_

5.4.1 Place the Manual Control Switch to the **REMOTE** (down) position.

5.4.2 Verify that the Exciter Breaker is left in the **ON** (UP) position.  
\_\_\_\_\_

5.4.3 Enter the ending run hours displayed on the hour meter into the Emergency Generator Maintenance/Run-Time Hours Logbook and attached Monthly Emergency Generator Test Log.  
\_\_\_\_\_

5.4.4 Total the run hours; verify  $\geq$  30 minutes.  
\_\_\_\_\_

5.4.5 Note comments on the Monthly Emergency Generator Test Log (Attachment 1a.)  
\_\_\_\_\_

5.4.6 Secure Generator Access Panels before leaving area and return key to Building Maintenance Office.  
\_\_\_\_\_

5.5 Reporting:  
\_\_\_\_\_

5.5.1 Report any abnormal conditions to the Emergency Preparedness Group and make service requests to the Administrator - Nuclear Training.

5.5.2 Determine whether generator passed or failed test and note result on Attachment 1a, Monthly Emergency Generator Test Log by circling appropriate PASS or FAIL.  
\_\_\_\_\_

5.5.3 Forward all completed forms and repair request copies to the Emergency Preparedness Facilities Technical Analyst; MC N37.  
\_\_\_\_\_

6.0 Attachments

6.1 Attachment 1a, Monthly Emergency Generator Test Log.

**ATTACHMENT 1a  
MONTHLY EMERGENCY GENERATOR TEST LOG**

<b>PRE-OPERATIONAL CHECKS -</b>				
<b>LEVELS AND CHECKS</b>	<b>ALARM PANEL LAMP TEST -</b>	<b>SAT</b>	<b>UNSAT</b>	<b>COMMENTS/ACTIONS:</b>
	<b>(STEP 5.1.1)</b>			
	<b>ENGINE BLOCK HEATER -</b>	<b>SAT</b>	<b>UNSAT</b>	<b>COMMENTS/ACTIONS:</b>
	<b>(STEP 5.1.4)</b>			
	<b>FUEL -</b>	<b>SAT</b>	<b>UNSAT</b>	<b>COMMENTS/ACTIONS:</b>
	<b>(STEP 5.1.5)</b>			
	<b>COOLANT -</b>	<b>SAT</b>	<b>UNSAT</b>	<b>COMMENTS/ACTIONS:</b>
	<b>(STEP 5.1.5)</b>			
<b>OIL</b>	<b>SAT</b>	<b>UNSAT</b>	<b>COMMENTS/ACTIONS:</b>	
<b>(STEP 5.1.5)</b>				
<b>BATTERIES - VISUAL CHECK</b>	<b>SAT</b>	<b>UNSAT</b>	<b>COMMENTS/ACTIONS:</b>	
<b>(STEP 5.1.5)</b>				

<b>INSERVICE CHECKS -</b>		
<b>DEG. F</b>	<b>COOLANT TEMPERATURE</b>	<b>ACCEPTANCE RANGE = 158 – 204 (ALARM 205 / SHUTDOWN 215)</b>
		<b>READING _____ SAT or UNSAT (circle)</b>
<b>PSI</b>	<b>OIL PRESSURE</b>	<b>ACCEPTANCE RANGE = 30 – 80 (ALARM 17 / SHUTDOWN 14)</b>
		<b>READING _____ SAT or UNSAT (circle)</b>
<b>ENDING HOURMETER:</b>	<b>_____ HRS.</b>	<b>ADDITIONAL COMMENTS/ACTIONS:</b>
<b>STARTING HOURMETER:</b>	<b>_____ HRS.</b>	_____
<b>TOTAL RUNTIME =</b>	<b>_____ HRS.</b>	<b>(MINIMUM RUNTIME IS 30 MINUTES)</b>

**NOTE: Fill All Levels in accordance with Manufacturer Specifications  
Monthly Test - Pass / Fail / Not Required (circle one)**

**Test Performed By:** \_\_\_\_\_  
Name (Print/Signature)

**Test Date:** \_\_\_\_\_  
Date

**Test Reviewed By:** \_\_\_\_\_  
Name (Print/Signature)

**Review Date:** \_\_\_\_\_  
Date

**ATTACHMENT 2  
OPERATIONAL TEST OF THE EMERGENCY GENERATOR AND  
DIESEL ENGINE UNDER LOAD CONDITIONS**

**1.0 PURPOSE:**

To test and document the operations of the emergency generator and the emergency automatic transfer switch for the Emergency Operations Facility (EOF).

**2.0 PREREQUISITES:**

- 2.1 **This test should be conducted during off-hours so as not to interfere with normal activities of the Nuclear Training Center (NTC).**
- 2.2 **Advise Salem and Hope Creek Simulator Training Staff of the test prior to starting. Performance of this test is not recommended when the Simulator is being used.**

**3.0 PRECAUTIONS AND LIMITATIONS:**

- 3.1 **Check for any leaks or abnormal conditions around the generator perimeter prior to starting the test.**
- 3.2 **Prior to performing any Generator Maintenance, place the Manual Control Switch in the STOP position - (center). Verify "switch off" light begins flashing.**

**4.0 EQUIPMENT REQUIRED:**

- 4.1 **Key (CH-751) for the Generator Access Panels and the key for the Electrical Room are kept in the Building Maintenance Office.**
- 4.2 **Ensure this procedure is in hand for the test.**
- 4.3 **Ensure the Emergency Generator Maintenance/Run Time-Hours Logbook is within the generator panel.**
- 4.4 **Obtain a stop-watch or wrist watch with a second hand for timing Engine Start/Transfer Switch loading.**

**5.0 PROCEDURE:**

**NOTE**

The monthly **NO-LOAD** test is not required to be performed during the calendar month that the **UNDER LOAD** run is performed per this attachment.

INITIALS:

5.1 Pre-operational lineup and checks -

The Designated Test Representative Shall:

\_\_\_\_\_ 5.1.1 Perform alarm panel lamp test - Sat criteria is all lamps light; Replace bulbs as necessary.

\_\_\_\_\_ 5.1.2 Locate the Manual Control Switch (Run/Stop/Remote) on the generator control panel of the generator. Place the switch in the **STOP** (Center) position to prevent startup of the Engine should commercial power be lost during the pre-operational checks.

\_\_\_\_\_ 5.1.3 Verify Block Heater operation; observe Low Coolant Temperature Light is not lit and that upper portion of engine block is "warm to the touch".

\_\_\_\_\_ 5.1.4 Check the following and record results on the Annual Generator Test Log - (Attachment 2a). Fill in accordance with (IAW) Test Log guide.

\_\_\_\_\_ Fuel level - Sat criteria is  $\geq 3/4$ ; Refuel if Unsat

\_\_\_\_\_ Coolant level - Sat criteria is  $>$  one inch (1') above the core; Fill to that level if Unsat

\_\_\_\_\_ Engine Oil level - Sat criteria is Level indicated on dipstick is between Full Range Arrows; fill if Unsat

\_\_\_\_\_ Condition of Batteries - visually check condition of the batteries; Sat criteria is no visible battery terminal post corrosion; Clean if Unsat

NOTE

Batteries are maintenance free and water caps should not be removed for inspection. If there is evidence of malfunction, batteries may need replacing or under/over charge condition exists.

\_\_\_\_\_ 5.1.4 Enter the starting run hours displayed on the hour meter into the Annual Emergency Generator Test Log; Attachment 2a. Also, verify engine exercise time (run-time hours log book).

5.2 Pre-Test lineup:

\_\_\_\_\_ 5.2.1 Place the Manual Control Switch to the **REMOTE** (Down) position.

INITIALS:

- \_\_\_\_\_ 5.2.2 Position/Verify the Exciter Breaker located in the generator enclosure is in the **ON** (up) position.
- \_\_\_\_\_ 5.2.3 Proceed to the Electrical Room to continue with the test.
- 5.3 Engine and Generator Startup:
- \_\_\_\_\_ 5.3.1 Locate the Normal Power Feed Circuit Breaker, Panel DP-B - Breaker #2 and the Emergency Power Transfer Switch Panel in the Electrical Room (Room 45).
- \_\_\_\_\_ 5.3.2 Move Breaker #2 to the **OFF** (right) position. Immediately start stop-watch or observe second hand position on wrist watch while noting time.
- \_\_\_\_\_ 5.3.3 Verify power is restored in less than 10 seconds (PASS/FAIL criteria) by observing that the Emergency Power Transfer Switch Indicator Light turns from Yellow to **RED**. Stop the stop-watch or note second hand position on wrist watch when light changes to RED.
- \_\_\_\_\_ 5.3.4 Note the approximate time it took for the load to transfer over to emergency power on the Annual Emergency Generator Test Log; (Attachment 2a).
- \_\_\_\_\_ 5.3.5 Return to Generator Enclosure while the emergency generator is loaded and take balance of inservice readings and record data on Attachment 2a; "Annual Emergency Generator Test Log".
- 5.4 Generator Shutdown/System Restoration:
- \_\_\_\_\_ 5.4.1 Upon satisfactory completion of step 5.3.5 above, proceed to Electrical Room, and return to normal power by placing Breaker #2 in the **ON** (left) position.
- \_\_\_\_\_ 5.4.2 Verify Emergency Power Transfer Switch returns to normal power by observing that Red transfer light goes OFF and **YELLOW** availability light comes ON. (Load restoration and Engine shutdown to normal power supplies should occur within 15 - 20 minutes after restoring Breaker #2 to "ON".)
- \_\_\_\_\_ 5.4.3 Enter the ending run hours displayed on the hour meter into the Emergency Generator Maintenance/Run-Time Hours Logbook and attached Annual Emergency Generator Test Log; (Attachment 2a).
- \_\_\_\_\_ 5.4.4 Total the run hours; verify  $\geq$  30 minutes.
- \_\_\_\_\_ 5.4.5 Upon completion of step 5.4.4, secure the Generator Access Panel and return keys to Building Maintenance.

INITIALS:

5.5 Reporting:

\_\_\_\_\_ 5.5.1 Report any failures to the Emergency Preparedness Group and Administrator - Nuclear Training.

\_\_\_\_\_ 5.5.2 Determine whether generator passed or failed test and note result on Attachment 2a, Annual Emergency Generator Test Log by circling appropriate PASS or FAIL.

\_\_\_\_\_ 5.5.3 Sign and forward all completed forms and copies of repair requests to the Emergency Preparedness Facilities Technical Analyst; mail code N37.

Emergency Preparedness Facilities Technical Analyst shall:

\_\_\_\_\_ 5.5.4 Review test package results for completion, and any corrective actions taken/needed.

\_\_\_\_\_ 5.5.5 Initiate any corrective actions needed (if not done previously), close out EP Inspection Order and forward to Supervisor for approval.

6.0 ATTACHMENTS:

2a Annual Emergency Generator Test Log

**ATTACHMENT 2a  
ANNUAL EMERGENCY GENERATOR TEST LOG**

<b>PRE-OPERATIONAL CHECKS -</b>					
<b>LEVELS  AND  CHECKS</b>	<b>ALARM PANEL LAMP TEST -</b>  (STEP 5.1.1)	SAT	UNSAT	<b>COMMENTS/ACTIONS:</b>	
	<b>ENGINE BLOCK HEATER -</b>  (STEP 5.1.3)	SAT	UNSAT	<b>COMMENTS/ACTIONS:</b>	
	<b>FUEL -</b>  (STEP 5.1.4)	SAT	UNSAT	<b>COMMENTS/ACTIONS:</b>	
	<b>COOLANT -</b>  (STEP 5.1.4)	SAT	UNSAT	<b>COMMENTS/ACTIONS:</b>	
	<b>OIL</b>  (STEP 5.1.4)	SAT	UNSAT	<b>COMMENTS/ACTIONS:</b>	
	<b>BATTERIES - VISUAL CHECK</b>  (STEP 5.1.4)	SAT	UNSAT	<b>COMMENTS/ACTIONS:</b>	
	<b>INSERVICE CHECKS -</b>				
	<b>SECONDS</b>	<b>EMERGENCY LOAD TRANSFER TIME</b>	SAT	UNSAT	<b>ACCEPTANCE RANGE IS <math>\leq</math> 10 TRANSFER TIME _____</b>
<b>DEG. F</b>	<b>COOLANT TEMPERATURE</b>	<b>ACCEPTANCE RANGE = 158 - 204 (ALARM 205 / SHUTDOWN 215)</b>			
		<b>READING _____ SAT or UNSAT (circle)</b>			
<b>PSI</b>	<b>OIL PRESSURE</b>	<b>ACCEPTANCE RANGE = 30 - 80 (ALARM 17 / SHUTDOWN 14)</b>			
		<b>READING _____ SAT or UNSAT (circle)</b>			
<b>ENDING HOURMETER: _____ HRS.</b>		<b>ADDITIONAL COMMENTS/ACTIONS:</b>			
<b>STARTING HOURMETER: _____ HRS.</b>		_____			
<b>TOTAL RUNTIME = _____ HRS.</b>		_____			
		<b>(MINIMUM RUNTIME IS 30 MINUTES)</b>			

**\* NOTE: Fill Levels in accordance with Manufacturer Specifications Only**

**Annual Test - PASS / FAIL (circle one)**

**Test Performed By:** \_\_\_\_\_  
Name (Print/Signature)

**Test Date:** \_\_\_\_\_  
Date

**Test Reviewed By:** \_\_\_\_\_  
Name (Print/Signature)

**Review Date:** \_\_\_\_\_  
Date

### ATTACHMENT 3 EOF HVAC TEST RESULTS SUMMARY SHEET

SYSTEM: EOF EMERGENCY HVAC UNIT MANUFACTURER: AAF

Description Test	Acceptance	Results	P/F	Date	Init
Visual Inspection Attachment 4	System SAT for testing				
Operational Test of HVAC System Attachment 5	Actuators Stroke & Fan Auto-Starts				
Filter Replacement Attachment 6	New Filters Installed				
Airflow Capacity Test – Attachment 7	* 6210 – 7590 cfm				
HEPA DOP Test – Attachment 8	< 0.05% penetration	Upper = Lower =			
Positive Pressure Test – Attachment 9	≥ + 0.10" W. C.	Min = Max =			

\* NOTE - Airflow Capacity acceptance range is design CFM +/- 10% or, 6900 cfm +/- 10% = 6210 (90%) to 7590 (110%)

Certified Test Personnel performing the tests:

Name: \_\_\_\_\_ Signature: \_\_\_\_\_ Init: \_\_\_\_\_ Date: \_\_\_\_\_

Component Passed all tests     Component Failed

Initials/Date

The Emergency Preparedness Group was notified if any acceptance criteria was not met.

\_\_\_\_\_/\_\_\_\_\_  
/

Filter system restored to normal configuration.

\_\_\_\_\_/\_\_\_\_\_  
/

All appropriate test package records and documentation forwarded to EP Group (N37).

\_\_\_\_\_/\_\_\_\_\_  
/

## **ATTACHMENT 4 VISUAL INSPECTION OF THE EOF EMERGENCY VENTILATION SYSTEM**

### **1.0 PURPOSE**

To visually inspect and document the major components associated with the Emergency Operations Facility emergency ventilation system. This inspection shall be conducted every eighteen (18) months and provides instructions for Emergency Preparedness personnel responsible for coordinating documentation and performance of this inspection activity through the use of certified test personnel.

### **2.0 PREREQUISITES**

- 2.1 Emergency Preparedness to be notified prior to entering the ventilation system.
- 2.2 A current copy of this EPIP along with the appropriate attachment should be in hand.

### **3.0 PRECAUTIONS AND LIMITATIONS**

- 3.1 Ensure Booster Fan is OFF prior to opening the filter housing doors. Entry during fan operations may result in injuries from the access doors closing or opening.
- 3.2 Exercise extreme caution when inspecting areas in or near moving parts and machinery.

### **4.0 EQUIPMENT REQUIRED**

- 4.1 A six (6) or seven (7) foot step ladder.
- 4.2 A portable light source such as a flashlight or drop light.
- 4.3 Ratchet wrench with suitable sockets.

### **5.0 PROCEDURE**

#### **5.1 Authorization**

- 5.1.1 Obtain permission from Emergency Preparedness and Nuclear Training to begin the test.
- 5.1.2 Initiate Attachment 4a, Visual Inspection Checklist completing Deficiency Record, if needed.

## 5.2 Inspection

- 5.2.1 Perform a visual inspection of the filter housings and associated component parts using Attachment 4a.
- 5.2.2 Upon completion of the Visual Inspection, complete the Discrepancy Form ensuring that all deficiencies are recorded.
  - a. Notify the EP Group of deficiencies including troubleshooting tactics and recommended corrective action.
  - b. For on-the-spot corrective actions, indicate actions taken on the discrepancy form next to the deficiency.
- 5.2.3 Proceed with additional ventilation testing prior to resolution of the deficiency/defect if in the opinion of the certified test personnel, the problem will not impair the validity of the test results.

## 5.3 Final Conditions

Upon successful completion of this inspection, test personnel shall:

- 5.3.1 Notify Emergency Preparedness that the visual inspection has been completed and the equipment is ready for emergency operation, if needed.
- 5.3.2 Record Pass/Fail status of visual inspection on Attachment 3, "EOF HVAC Test Results Summary Sheet".
- 5.3.3 Attach all documentation generated by this procedure and return to Emergency Preparedness for final review and close out.

## 6.0 ATTACHMENTS

- 6.1 Attachment 4a - Visual Inspection Checklist

**ATTACHMENT 4a  
VISUAL INSPECTION CHECKLIST**

System: EOF EMERGENCY HVAC SYSTEM

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

	SAT	UNSAT	NOTE #
<b>1. MOUNTING FRAMES</b>			
a. Adequate structural rigidity for supporting internal components.			
b. Squareness of members, flatness and condition of component seating surfaces.			
c. No damage to frames			
<b>2. FILTER CLAMPING DEVICES OR BOLTS</b>			
a. Proper adjustment (50 to 80% gasket compression all around); tighten if less.			
b. Sufficient number of adequately sized devices to produce 50 to 80% gasket compression.			
c. Proper condition of clamping devices; (e.g., all nuts in place/tightened).			
d. Adequate clearances between filter elements to tighten clamping devices on all sides.			
e. Freedom from cracks in welds of clamping devices.			
<b>3. HEPA FILTERS</b>			
a. No damage to filter media (tears, cracks, case, case corners on either face of filters). Some damage to separators is permissible.			
b. No damage to or improper seating of gaskets.			
c. No burns of media or case from cutting or welding on either face of filters.			
d. No excessive dirt loading (check differential pressure gauge across filters).			
<b>4. PREFILTERS</b>			
a. No damage to media, case or gaskets.			
b. No excessive dirt loading.			
<b>5. UNIT HOUSING</b>			
a. Adequate space for personnel and equipment for maintenance/testing.			

**ATTACHMENT 4a  
VISUAL INSPECTION CHECKLIST (cont.)**

	SAT	UNSAT	NOTE #
<b>5. UNIT HOUSING (cont)</b>			
b. Housing access adequate for visual inspections; (without filter removal; access is external and from one side only).			
c. Space adjacent to housing amenable to isolation as a contamination zone, adequate space for temporary storage of clean and contaminated filters during filter change.			
d. Adequate latches on doors.			
e. Adequate clearances between banks of components.			
f. Proper location of tracer injection of sample ports.			
g. Other than Pre/Final filter housing, no back to back banks of components.			
h. Housekeeping in and around housing.			
i. All pipe caps and pipe nipples in place before testing.			
<b>6. DAMPERS</b>			
a. No bent shafts, pivot pins or operator linkages.			
<b>7. LIGHTING</b>			
a. Exterior lighting sufficient for visual inspections, maintenance and testing.			
<b>8. RESTORATION – (Complete after in-place DOP testing)</b>			
a. All test equipment and temporary blanks removed.			
b. Doors latched closed.			
c. Sample ports closed or ends capped.			
d. Test plugs installed and tightened.			
e. No damage to components resulted from test operations.			



**ATTACHMENT 5  
OPERATIONAL TEST OF THE EOF EMERGENCY  
VENTILATION SYSTEM**

**1.0 PURPOSE:**

To test and document the EOF Emergency Ventilation System for proper operation and isolation. This test shall be conducted per inspection order.

**2.0 PREREQUISITES:**

This procedure requires two (2) test representatives:

Operator - shall operate the Bypass Switch.

Observer - shall verify Damper Operations.

Always perform "Differential Pressure" reading step 5.1 of this Attachment.

**3.0 PRECAUTIONS AND LIMITATIONS:**

This test should be performed only after a satisfactory differential pressure reading across the filters is obtained which may require implementation of Attachment 6 "Filter Replacement" and/or Attachment 8 "HEPA Filter DOP Test" of this procedure.

**4.0 EQUIPMENT REQUIRED:**

4.1 A six (6) or seven(7) foot step ladder.

**5.0 PROCEDURE:**

5.1 Differential Pressure Reading Across Filters:

INITIALS:

\_\_\_\_\_ 5.1.1 Locate "EOF Bypass Switch #1" (Bypass Switch) on the right hand wall of the "Emergency Ventilation Room" - (Mechanical Room 46).

\_\_\_\_\_ 5.1.2 Locate differential pressure gauge (manometer) on the front center portion of the filter bank.

\_\_\_\_\_ 5.1.3 Position the Bypass Switch to "ON" and observe unit startup.

\_\_\_\_\_ 5.1.4 Allow the unit to run for approximately five (5) minutes and then record the differential pressure reading on Attachment 5a "Data Sheet".

INITIALS:

\_\_\_\_\_ 5.1.5 After recording pressure, observe unit shutdown by moving Bypass Switch to "OFF" position.

**NOTE**

For differential Pressure Readings of less than 1.75 inches (< 1.75") but greater than or equal to ½ inch (≥ 0.5"), proceed directly to Step 5.2.1 of this attachment and continue (unless checking pressure across newly installed filters – then go no further).

**CAUTION**

For differential pressure readings of greater than or equal to 1.75 inches (≥ 1.75") or less than ½ inch (< 0.5"), GO NO FURTHER! – Instead, implement Attachment 6 of this procedure – "Filter Replacement".

INITIALS:

5.2 OPERATOR SHALL:

\_\_\_\_\_ 5.2.1 Ensure Observer(s) is in position prior to manipulating Bypass Switch.

\_\_\_\_\_ 5.2.2 Locate "EOF Bypass Switch #1" (Bypass Switch) on the right hand wall of the "Emergency Ventilation Room" - (Mechanical Room 46).

\_\_\_\_\_ 5.2.3 As requested by Observer, position the Bypass Switch (On and Off).

5.3 OBSERVER SHALL:

\_\_\_\_\_ 5.3.1 **Locate the first damper lever and drive** found in the overhead directly above the Bypass Switch on the side of the supply duct near the door - (In Mechanical Room 46).

\_\_\_\_\_ 5.3.2 Record the normal position of lever #1 arm on the Ventilation Data Sheet - (Attachment 5a).

\_\_\_\_\_ 5.3.3 Locate the **second damper lever and drive** for the filter system found above suspended ceiling in hallway opposite Emergency Ventilation Room; a sign is posted in hall.

\_\_\_\_\_ 5.3.4 Record the normal position of Lever #2 arm on the Ventilation Data Sheet.

INITIALS:

- \_\_\_\_\_ 5.3.5 When in position to clearly observe Lever travel, request Operator to move the Bypass Switch from the OFF to the "ON" position.
- \_\_\_\_\_ 5.3.6 Observe both Lever positions and verify start up of Fan Motor (F1).
- \_\_\_\_\_ 5.3.7 Record results on Attachment 5a, Ventilation System Test Data Sheet.
- \_\_\_\_\_ 5.3.8 Upon completion of step 5.2.7, request Operator to move the Bypass Switch back to original "OFF" position.
- \_\_\_\_\_ 5.3.9 Verify Fan Motor (F1) stops and both levers have returned to original positions (as previously entered on Data Sheet).
- \_\_\_\_\_ 5.3.10 Record all final results on Attachment 5a, Ventilation Test Data Sheet.
- \_\_\_\_\_ 5.3.11 Report any failures to Administrator - Nuclear Training.
- \_\_\_\_\_ 5.3.12 Forward all completed forms and copies of repairs to Emergency Preparedness; MC - N37.

**6.0 ATTACHMENTS:**

- 6.1 Attachment 5a - Ventilation System Test Data Sheet.



**ATTACHMENT 6  
REPLACEMENT OF THE FILTERS IN THE EMERGENCY  
VENTILATION SYSTEM FOR THE EOF (ROOM 46 - NTC)**

**1.0 PURPOSE:**

To provide instructions and documentation for the replacement of PRE-FILTERS and HEPA FILTERS in the EOF Emergency Ventilation System. All filters should be replaced as previously determined in Attachment 5 of this procedure.

**2.0 PREREQUISITES:**

Filter replacement determined via  $\Delta P$  reading in Attachment 5.

**OR**

Filter Bank unable to meet DOP test specifications per Attachment 5 of this procedure.

**3.0 PRECAUTIONS AND LIMITATIONS:**

**DO NOT PERFORM THIS PROCEDURE AFTER A RADIOLOGICAL RELEASE HAS TAKEN PLACE. CONTACT RADIATION PROTECTION DEPARTMENT FOR PROPER HANDLING INSTRUCTIONS.**

**Always perform Section 5.1 of Attachment 5 after performing this Attachment to obtain a  $\Delta P$  reading.**

**Always perform Attachment 8 of this procedure - "HEPA Filter DOP Test" after completing this Attachment.**

**4.0 EQUIPMENT REQUIRED:**

- 4.1 A six (6) or seven (7) foot step ladder.
- 4.2 New Astroceal and Vericel Filters (or equivalent).

**5.0 PROCEDURE:**

- 5.1 Locate the pre-filters PF-1 & 2 and HEPA filters FF-1 & 2 in the Mechanical Room (Room 46) near the door on the right side of the entrance; signs are posted.
- 5.2 Place the new sets of filters close to filter housings.
- 5.3 Open the latches of the pre-filters; using the ladder for the upper sections.

- 5.4 Remove the used filters from the filter housing.
- 5.5 Place the new filters in the housing ensuring that the filters are properly aligned (i.e. - indicator arrows on filters face in direction of air flow.)
- 5.6 Close the pre-filter doors and secure the latches.
- 5.7 Unscrew the doors of the HEPA filters; using the ladder for the upper sections.
- 5.8 Remove the used filters from the filter housing.
- 5.9 Place the new HEPA filters in the housing.
- 5.10 Close door of the HEPA filters and secure the doors with the screws.
- 5.11 Check the used filters for any defect or unusual dirt to the filters. Report deficiencies for corrective action/ repair.
- 5.12 Record all final results on Filter Replacement Data Sheet - (Attachment 6a).
- 5.13 Report any deficiencies to the Administrator - Nuclear Training.
- 5.14 Always perform step 5.1 of Attachment 5 upon completion of this Attachment.
- 5.15 Always perform Attachment 8 of this procedure - "HEPA Filter DOP Test" after completing this Attachment.
- 5.16 Forward all completed forms and copies of repair requests to Emergency Preparedness; MC - N37.

## 6.0 ATTACHMENTS:

- 6.1 Attachment 6a - Filter Replacement Data Sheet.

## 7.0 REFERENCES:

- 7.1 American Air Filters Astroceal Data Sheet
- 7.2 American Air Filters Varicel Data Sheet

**ATTACHMENT 6a  
FILTER REPLACEMENT DATA SHEET - (EOF)**

**INITIALS:**

- \_\_\_\_\_ 1. Replace filters in the PF-1 & 2; steps 5.3 - 5.7.
- \_\_\_\_\_ 2. Replace filters in the FF-1 & 2; steps 5.8 - 5.12.
- \_\_\_\_\_ 3. Check the used filters:

	<b>DIRTY</b>	<b>CLEAN</b>	<b>DEFECTIVE</b>	<b>NON-DEFECTIVE</b>
<b>PF-1</b>				
<b>PF-2</b>				
<b>FF-1</b>				
<b>FF-2</b>				

**COMMENTS:**


4. Filter replacement completed by: \_\_\_\_\_  
**NAME**

\_\_\_\_\_

**DATE**

## **ATTACHMENT 7 AIR FLOW CAPACITY TEST FOR EOF EMERGENCY VENTILATION SYSTEM**

### **1.0 PURPOSE**

To verify that the airflow capacity of AC-5 with Booster Fan are in accordance with predetermined specifications. This attachment provides instructions to Emergency Preparedness personnel responsible for coordinating documentation and performance of this test through the use of certified test personnel.

### **2.0 PREREQUISITES**

- 2.1 Test equipment shall be calibrated or certified per vendor procedures, or the M&TE Calibration Lab.
- 2.2 For rectangular duct sections such as the EOF ductwork, establish equal areas where velocity pressure readings will be taken. The number of equal areas established should not be less than 16 and need not be more than 64. The maximum distance between centers of equal areas should not be greater than six inches. The readings closest to the walls should be taken at one half this distance.

**The EOF traverse is located approximately six (6) feet West of the East wall in the Dose Assessment Area of the EOF proper.**

- 2.3 Specific precautions and instructions identified in the applicable test equipment technical manuals should be considered prior to and during testing.
- 2.4 Ensure all valves, dampers and controls involved with testing are operating properly prior to testing. Check with Emergency Preparedness for a copy of the most current Attachment 5, Operational Test of the Emergency Ventilation System (EOF).
- 2.5 Visual Inspection of the air handling system should be completed per Attachment 4, Visual Inspection for EOF Emergency Ventilation System.
- 2.6 Notify Emergency Preparedness prior to entering ventilation system.
- 2.7 Ensure current air flow transducer calibrations have been completed per I.O. to validate that computer generated air flow demand signals match actual air flow field delivery.

### **3.0 PRECAUTIONS AND LIMITATIONS**

- 3.1 Caution shall be used when performing inspection/work near rotating fans and moveable dampers.

- 3.2 Do not open filter access doors during Booster Fan operations as injury could occur from swinging doors.

#### **4.0 EQUIPMENT/MATERIAL REQUIRED**

- 4.1 Standard Pitot Tube.

#### **4.0 EQUIPMENT/MATERIAL REQUIRED (cont.)**

- 4.2 Electronic or Inclined Manometer.

- 4.3 Thermo Anemometer

#### **5.0 PROCEDURE**

##### **5.1 Authorization and Preparation**

5.1.1 Obtain Emergency Preparedness and Nuclear Training permission to begin testing IAW Attachment 7, Air Flow Capacity Test for EOF Emergency Ventilation System.

5.1.2 Ensure the Ventilation System is in the correct operating configuration for the test being performed; (in this case, the emergency mode through filter train with Booster Fan ON).

##### **NOTE**

Data not required or available due to equipment substitutions or specific equipment configurations may be documented as N/A.

5.1.3 Record the system, unit and component ID to be tested along with location and date of testing on Attachment 7a, Air Flow Capacity Test Data Sheet.

5.1.4 Record the following information on Attachment 7a:

- a. Fans in service.
- b. The duct size.
- c. Calculated duct areas.
- d. The velocity pressure, or if using Anemometer.
- e. Flowrate required (IAW Manufacturer specification and P&ID's).

## 5.2 Testing

### NOTE

When taking velocity pressure readings with the pitot tube, ensure that probe is held at right angles to the airflow with the probe tip held into the air stream.

- 5.2.1 Check for stable fan operation over a period of 15 minutes and record any problems on Attachment 7a.
- 5.2.2 Measure the velocity pressure readings (or measure velocity if using Anemometer) at the traverse located approximately six (6) feet West of the East wall in the Dose Assessment Area of the EOF.
- 5.2.3 Record readings on Attachment 7a, Section 4.0, in the box representative of the area in which the reading was taken.
- 5.2.4 If the readings in Step 5.2.2 are measured in velocity pressures, convert the measurements to feet per minute (fpm).
- 5.2.5 Calculate the actual average velocity (direct measurements if using an Anemometer) and flowrate IAW Attachment 7a, Section 5.0.
- 5.2.6 Ensure that an independent verification of the calculations on Attachment 7a, Section 5 is performed by another qualified individual.

## 5.3 Final Conditions

- 5.3.1 Upon successful completion of this test, the test personnel shall remove test equipment and return system to normal operations, if all necessary testing is complete.
- 5.3.2 Notify Emergency Preparedness that the Air Flow Capacity Test has been completed and the equipment is ready for emergency operation, if needed.
- 5.3.3 Record Pass/Fail status of visual inspection on Attachment 3, "EOF HVAC Test Results Summary Sheet".
- 5.3.4 Attach all documentation generated by this procedure and return to Emergency Preparedness Group (N37) for final review and close out.

## 6.0 ATTACHMENTS

- 6.1 Attachment 7a - Air Flow Capacity Test Data Sheet

**ATTACHMENT 7a**  
**AIR FLOW CAPACITY TEST SHEET**

1.0 General Information

System ID: EOF EMERGENCY HVAC UNIT

Location: Nuclear Training Center Date: \_\_\_\_\_

2.0 Duct Size (WxH) 48.00 x 22.00 (in)

Area ( $A_d$ ) \_\_\_\_\_ 7.33 (ft<sup>2</sup>)

Required Velocity ( $V_{req}$ ) \_\_\_\_\_ 945 (fpm)

Required Flow ( $Q_{req}$ ) 6900 (+/- 10%) = 6210 (90%) to 7590 (110%) (cfm)

3.0 Test Equipment

Test Equipment	Calibration Date	Calibration Expiration

**ATTACHMENT 7a  
AIR FLOW CAPACITY TEST SHEET (cont.)**

**4.0 Test Data**

Unit/System ID: EOF EMERGENCY HVAC UNIT (W/BOOSTER FAN I/S)

Position		1	2	3	4	5	6	7	8	9	10	SUM
1	V (fpm)											
2	V (fpm)											
3	V (fpm)											
4	V (fpm)											
5	V (fpm)											
6	V (fpm)											
7	V (fpm)											
8	V (fpm)											
9	V (fpm)											
SUM												

V = Velocity calculated (fpm)  
V<sub>t</sub> = Velocity total (fpm)

**TOTAL**

**ATTACHMENT 7a**  
**AIR FLOW CAPACITY TEST SHEET (cont.)**

**5.0**    Calculation

A.    Calculate actual average velocity (fpm)

$$V_a = \frac{V_t}{\#readings} = \left( \frac{\quad}{\quad} \right) = \quad \text{fpm}$$

B.    Calculate actual average flow rate (cfm)

$$Q_a = V_a \times A_d = \quad \text{cfm}$$

**6.0**    Remarks

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---

---

Certified Test Personnel: \_\_\_\_\_ Date: \_\_\_\_\_  
(PRINT)

\_\_\_\_\_  
(SIGNATURE)

Independent Verification of Section 5.0 Calculations:

\_\_\_\_\_ Date: \_\_\_\_\_  
(PRINT)

\_\_\_\_\_  
(SIGNATURE)

## **ATTACHMENT 8 HEPA FILTER DOP TEST FOR EOF EMERGENCY VENTILATION SYSTEM**

### **1.0 PURPOSE**

To test the functionality of the HEPA filter trains. This procedure provides instructions to personnel responsible for coordination, documentation, and performance of this test which will be conducted per inspection order.

### **2.0 PREREQUISITES**

- 2.1 An acceptable differential pressure reading across the filter banks has been taken within the last 3 months per EPIP 1016 Attachment 5, Operational Test of the Emergency Ventilation System (EOF).
- 2.2 All maintenance activity and/or installation of new HEPA filters is completed and system is ready for testing.
- 2.3 Test equipment has been properly warmed up according to manufacturer's recommendation.
- 2.4 All valves, dampers, and controls involved with testing are operating properly prior to testing.
- 2.5 The ventilation system is in the emergency mode (through filter trains with Booster Fan ON) for the test.
- 2.6 Permission is obtained from Emergency Preparedness and Nuclear Training to begin testing IAW this Attachment.

### **3.0 PRECAUTIONS AND LIMITATIONS**

- 3.1 Use caution when performing work near rotating fans and moveable dampers.
- 3.2 Do not open filter access doors during Booster Fan operation as injury could occur from swinging doors.

### **4.0 EQUIPMENT/MATERIAL REQUIRED**

- 4.1 DOP Detector
- 4.2 DOP Generator
- 4.3 DOP - Dioctyl Phthalate

## 5.0 PROCEDURE

### NOTE

Data not required or available due to equipment substitutions or specific equipment configurations may be documented as N/A.

### 5.1 Testing

- 5.1.1 Complete Section 1 of Attachment 8a, HEPA Filter Test Sheet.
- 5.1.2 Connect the upstream sample line of the DOP aerosol detector to Port B or C; (refer to Figure 1 - Field Sketch in this procedure for locations).
- 5.1.3 Connect the downstream sample line of one of the traverse ports located approximately six (6) feet west of the East wall in the Dose Assessment area of the EOF.
- 5.1.4 Take background aerosol measurements. If the downstream concentrations are not one ten thousand of measurable upstream injection concentration, purge the system until an acceptable background level is reached.
- 5.1.5 Connect DOP aerosol generator to a compressed air line and then inject through a fire damper inspection door located in hallway overhead, midway between Conference Room 47 and Mechanical Equipment Room, start injection and adjust generator as necessary.
- 5.1.6 Connect DOP aerosol detector to the upstream sample line and allow the reading to stabilize. Record the readings in Section 2.0 of Attachment 8a.
- 5.1.7 Connect DOP aerosol detector to the downstream sample line and allow the reading to stabilize. Record the readings in Section 2.0 of Attachment 8a. Calculate actual readings by multiplying the meter reading by the scale setting.
- 5.1.8 Repeat steps 5.1.6 and 5.1.7 until a minimum of 3 upstream readings and 2 downstream readings and respective readings are within  $\pm 5\%$  of each other.

### NOTE

Final readings recorded shall be used for calculating the leakage (percent penetration).

5.1.9 Calculate and document the leakage (percent penetration) using the following equation.

$$P = \frac{100 \times C_d}{C_u}$$

where: P = percent penetration  
C<sub>d</sub> = downstream concentration  
C<sub>u</sub> = upstream concentration

- a. If the penetration is  $\geq 0.05\%$  while operating at the required flow rates, visually inspect the system (including the bypass damper) for excessive leaks; if none can be located, notify Emergency Preparedness.
- b. If the system does not pass the DOP test, notify Emergency Preparedness, initiate corrective actions, and implement Attachment 6 - "Filter Replacement" if the filters are faulty or dirty. Then, retest the system.

5.1.12 Record the test results on Attachment 3, "EOF HVAC Test Results Summary Sheet".

## 5.2 Final Conditions

Upon successful completion of this test, test personnel shall:

- 5.2.1 Remove test equipment and restore system to normal configuration if all necessary testing is complete.
- 5.2.2 Notify Emergency Preparedness that testing is complete and the system is ready to be returned to normal service.
- 5.2.3 Forward all documentation generated per this procedure to the Emergency Preparedness Group; MC - N37.

## 6.0 ATTACHMENTS

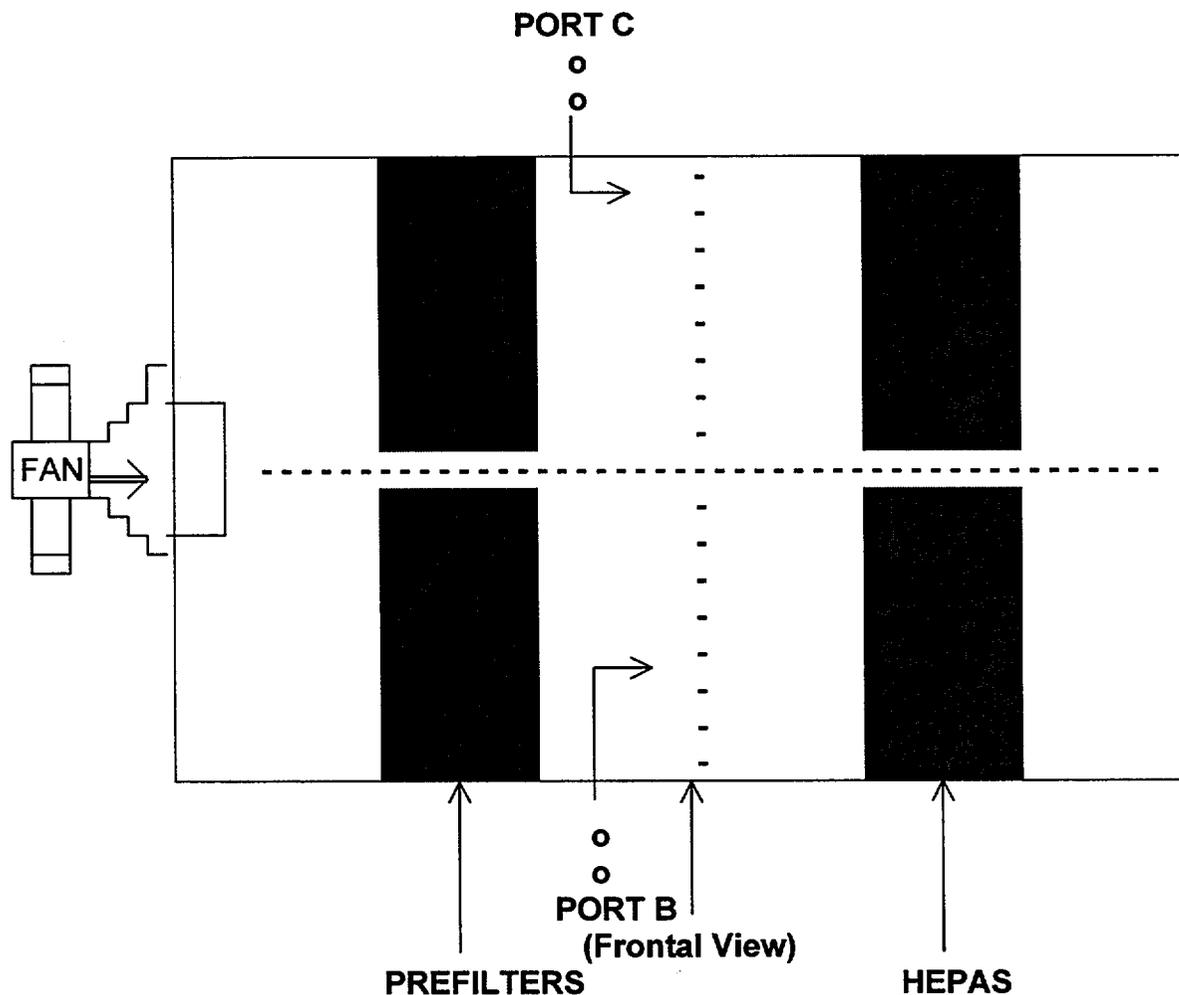
- 6.1 Figure 1 - Field Sketch of HEPA Filter Banks/Sample Ports
- 6.2 Attachment 8a, HVAC Filter Test Sheet

**FIGURE 1**  
**FIELD SKETCH OF HEPA FILTER BANKS/SAMPLE PORTS**

LOCATION: NTC EMERGENCY HVAC ROOM 46 UNIT MANUFACTURER: AFF

NUMBER OF HEPA FILTERS: 8 MANUFACTURER: AAF ASTROCEL

NUMBER OF PREFILTERS: 8 MANUFACTURER: AFF VARICEL



**PORT A** - Injection port for HEPAs (use fire damper inspection door or an adjacent port located in hallway overhead, midway between Conference Room 47 and Mechanical Equipment Room)

**PORT B & C** - Upstream HEPA concentration sample port (Use One)

**PORT D** - Downstream HEPA concentration sample port (Use one of the traverse ports located approximately six (6) feet west of the east wall in the Dose Assessment area of the EOF)

**ATTACHMENT 8a  
HEPA FILTER TEST SHEET**

1.0 General Information

System ID: EOF EMERGENCY HVAC UNIT

Fans in Service: AC-5 W/BOOSTER FAN ON

Manufacturer: AAF Type: 1000 cfm

Model #: 105-1003052-17 # HEPA Filters in Unit: 8 per Bank

Test Date: \_\_\_\_\_ Last Test Date: \_\_\_\_\_

2.0 Test Data

A. Required HEPA filter flow (cfm):  
6900 (+/- 10%) = 6210 (90%) to 7590 (110%)

B. DP across HEPA (in. w.g.) \_\_\_\_\_

C. Upstream Concentration ( $C_u$ )

1. Range \_\_\_\_\_ (Full Scale)

2. Meter Reading (% Full Scale)

- a. \_\_\_\_\_
- b. \_\_\_\_\_
- c. \_\_\_\_\_
- d. \_\_\_\_\_

Downstream Concentration ( $C_d$ )

1. Range \_\_\_\_\_ (Full Scale)

2. Meter Reading (% Full Scale)

- a. \_\_\_\_\_
- b. \_\_\_\_\_
- c. \_\_\_\_\_
- d. \_\_\_\_\_

**ATTACHMENT 8a (Continued)**  
**HEPA FILTER TEST SHEET**

**NOTE**

Upstream and downstream concentration readings must be taken until the respective readings are within ± 5% of each other.

Final Upstream Reading ( $C_u$ )

$(C_u) = \text{Meter Reading} \times \text{Scale}$

Upper  $(C_u) = \underline{\quad} \times \underline{\quad} = \underline{\quad}$

Final Downstream ( $C_d$ )

$(C_d) = \text{Meter Reading} \times \text{Scale}$

Upper  $(C_d) = \underline{\quad} \times \underline{\quad} = \underline{\quad}$

% Penetration =  $\frac{C_d}{C_u} \left( \frac{\quad}{\quad} \right) \times 100 = \underline{\quad} \%$  penetration

Is a retest necessary? Yes  No

3.0 Remarks: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Certified Test Personnel:

\_\_\_\_\_  
Print Date

\_\_\_\_\_  
Signature Date

Independent Verification of Calculations:

\_\_\_\_\_  
Print Date

\_\_\_\_\_  
Signature Date

**ATTACHMENT 8a (Continued)**  
**HEPA FILTER TEST SHEET**

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

Filter Bank/Component ID: EOF EMERGENCY HVAC UNIT

Filters

Quantity: 8 per Bank

Size: 1000 cfm

Test Instruments

Detector: \_\_\_\_\_ Last Calibration Date: \_\_\_\_\_

Calibration Due Date: \_\_\_\_\_

DOP Generator: \_\_\_\_\_

Test Data for Bank Test

Flow, CFM \_\_\_\_\_

Pressure Drop, Inches W.G. \_\_\_\_\_

Upstream DOP Concentration, % \_\_\_\_\_

Downstream DOP Penetration, % \_\_\_\_\_

Final Filter System Efficiency, % \_\_\_\_\_

Comments:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

\_\_\_\_\_  
Certified Test Signature

## **ATTACHMENT 9 POSITIVE PRESSURE TEST FOR EOF EMERGENCY VENTILATION SYSTEM**

### **1.0 PURPOSE**

This procedure verifies the capability of the emergency ventilation system to deliver and maintain a positive pressure within the EOF space. The procedure provides instructions to Emergency Preparedness (EP) personnel responsible for coordination, documentation and performance of this test through the use of certified test personnel.

### **2.0 PREREQUISITES**

- 2.1 Visual Inspection for EOF Emergency Ventilation System has been completed per Attachment 4.
- 2.2 Air Flow Capacity Test for EOF Emergency Ventilation System has been completed per Attachment 7.
- 2.3 Test equipment shall be calibrated or certified in calibration per vendor procedure, or M&TE Calibration Lab.
- 2.4 Ensure all valves, dampers and controls involved with testing are operating properly prior to testing; (contact EP for copy of most current Attachment 5, Operational Test of the Emergency Ventilation System (EOF).
- 2.5 Ensure the magnehelic pressure gauge are in current calibration.

### **3.0 PRECAUTIONS AND LIMITATIONS**

- 3.1 Caution shall be used when performing inspections/work near rotating fans and moveable dampers.

### **4.0 EQUIPMENT/MATERIAL REQUIRED**

None.

### **5.0 PROCEDURE**

#### **5.1 Authorization**

- 5.1.1 Obtain permission from Emergency Preparedness and Nuclear Training to begin testing.

- 5.1.2 Ensure the ventilation is in the correct operational configuration for the test being performed; (in this case, emergency mode through filter bank with booster fan ON).

## 5.2 Testing

NOTE

Data not required or available due to equipment substitutions or specific equipment configurations may be documented as N/A.

- 5.2.1 Record the following information in Section 1.0 of Attachment 9a, Positive Pressure Test Sheet. Record:
- a. System/Unit ID to be tested.
  - b. Date of test.
  - c. Date of last test.
  - d. System operating mode.
  - e. Fan(s) in service.
  - f. Other system components in service.
- 5.2.3 Record the following additional information in Section 1.0 of Attachment 9a. Record:
- a. Test equipment used (permanently installed magnehelic gauge in Room 42a).
  - b. Calibration date.
  - c. Calibration expiration date.
- 5.2.4 Measure from the permanently installed magnehelic pressure gauge (Room 42A) or test equipment, the differential pressure reading between the EOF space and the balance of the Nuclear Training Center space.
- 5.2.5 Record the five readings obtained in step 5.2.4 above, in Section 2.0 of Attachment 9a.
- a. Observe the differential pressure between the two spaces and record the value (acceptance criteria is  $\geq +0.100$ " w.g.).

- b. If the differential pressure shows a negative value for the EOF space or is less than +0.100" w.g., notify Emergency Preparedness immediately.

5.2.6 Record any comments, problems or recommended courses of corrective action on Section 3 of Attachment 9a.

### 5.3 Final Conditions

- 5.3.1 Notify Emergency Preparedness that testing is complete and the system is ready to be returned to normal service or is ready for the next test series.
- 5.3.1 Upon successful completion of this test, test personnel shall remove any portable test equipment if installed, and return the system to normal operating mode (Booster Fan OFF) if all necessary testing is complete.
- 5.3.3 Attach and forward all documentation generated IAW this procedure and ensure results are recorded on Attachment 3, "EOF HVAC Test Results Summary Sheet".

## 6.0 ATTACHMENTS

- 6.1 Attachment 9a, Positive Pressure Test Sheet

**ATTACHMENT 9a  
POSITIVE PRESSURE TEST SHEET**

**1.0 General Information**

System ID: EOF EMERGENCY HVAC UNIT

Test Date: \_\_\_\_\_ Last Test Date: \_\_\_\_\_

System Mode: EMERGENCY Fan In Service: AC-5 W/BOOSTER FAN ON

Retest: [ ] Yes [ ] No

Magnehelic Gauge Used (42A) Cal Date: \_\_\_\_\_ Cal Due Date: \_\_\_\_\_

Other Test Equip. \_\_\_\_\_ Cal Date: \_\_\_\_\_ Due Date: \_\_\_\_\_

**2.0 Test Data**

TEST POINT	READING (in. w.g.)					AVERAGE READING
	#1	#2	#2	#4	#5	
1						P1 =
Test Point 1 uses the installed Dwyer Gauge on Wall of EOF						

**3.0 Remarks:** \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Certified Test Personnel

_____	_____
Print	Date
_____	_____
Signature	Date

**SIGNATURE PAGE**

Prepared By: Raymond Reece (R. Reece) 10/05/99  
(If Editorial Revisions Only, Last Approved Revision) Date

Reviewed By: William A. Weckstein (William A. Weckstein) 10/6/99  
Station Qualified Reviewer Date

Reviewed By: C. W. Banner 10/7/99  
Department Manager Date

Reviewed By: C. W. Banner 10/7/99  
Manager - CA, EP, & IT Date

Reviewed By: N/A N/A  
Manager - Quality Assessment - NBU Date  
(If Applicable)

**SORC Review and Station Approvals**

N/A  
Mtg. No. Salem Chairman

N/A  
Mtg. No. Hope Creek Chairman

N/A  
Date

N/A  
Date

Michael B. Byrd  
Vice President - Operations

1/27/00  
Date

Effective Date of this Revision: 2/7/2000