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Department of Energy
Carlsbad Field Office
P. O. Box 3090
Carlsbad, New Mexico 88221



APR 28 2016

Mr. Jonathan D. Edwards, Director
Radiation Protection Division
U.S. Environmental Protection Agency
1200 Pennsylvania Ave, NW – MC 6608T
Washington, D.C. 20460

Subject: U.S. DOE/CBFO Response to the U.S. EPA's Request for Documentation of Plans for Testing and Operation of Interim and Supplemental Ventilation Systems at the WIPP

Reference: U.S. EPA Letter from Jonathan D. Edwards, EPA, to Todd A. Shrader, CBFO, dated January 29, 2016

Dear Mr. Edwards:

The U.S. Department of Energy (DOE) Carlsbad Field Office (CBFO) has reviewed the above-referenced January 29, 2016, U.S. Environmental Protection Agency (EPA) request for the DOE/CBFO plans for testing and operation of the Interim Ventilation System (IVS) and Supplemental Ventilation System (SVS) at the Waste Isolation Pilot Plant (WIPP) facility. The DOE/CBFO priorities at the WIPP facility are: (i) responding to the Judgments of Need identified in the Accident Investigation Board Reports from events in February 2014, and (ii) operational readiness and emplacement of waste currently stored in the Waste Handling Building.

Owing to this prioritization, the DOE/CBFO plans to begin operation of the SVS after waste emplacement operations resume no earlier than the first quarter of FY17. Prior to the SVS system start-up, the DOE/CBFO will develop procedures and perform testing to ensure safe operation of the system. Work control documents and procedures will not be developed until SVS system start-up activities are initiated. This letter, therefore, addresses only the status of the IVS Project at the WIPP facility. The DOE/CBFO will provide applicable responsive information for SVS later this year. IVS testing is being performed in late April and early May, and the DOE/CBFO will keep the EPA informed of specific schedules as they are developed.

Responses to the EPA five primary concerns in the above-referenced letter are enclosed. If you have any questions, please contact Mr. George T. Basabilvazo, Director, CBFO Environmental Protection Division, at (575) 234-7488.

Sincerely,

Todd Shrader, Manager
Carlsbad Field Office

Enclosures (5)

cc: w/enclosures

F. Marcinowski, DOE/HQ	*ED
J. Walsh, DOE/HQ	ED
A. Harris, DOE/HQ	ED
G. Basabilvazo, CBFO	ED
R. Patterson, CBFO	ED
A. Stone, CBFO	ED

A. Ward, CBFO	ED
S. Lucas-Kamat, NMED	ED
R. Maestas, NMED	ED
S. Spalding, EPA-R6	ED
N. Stone, EPA-R6	ED
CBFO M&RC	

*ED denotes electronic distribution



EPA Concern #1

Qualification of Station B as the designated point of compliance for the radionuclide NESHAP in 40 CFR Part 61, Subpart H.

DOE Response

The purpose of the Interim Ventilation System (IVS) is to increase filtration airflow. It will utilize two skid-mounted fans and high-efficiency particulate air (HEPA) filtration units to achieve a total ventilation flow of approximately 114,000 cubic feet per minute (cfm). The IVS exhaust air will exit the system through HEPA filters and will be sampled at Station B for radioactive particulates prior to release to the atmosphere. The emission point (exhaust stack) for the upgraded system will be the same as the exhaust point for the existing filtration system, and as labeled in the attached Figure 1. The air-sampling point for the original exhaust-air filtration system and the IVS system will continue to be referred to as Station B, shown in Figure 1.

Station B is the designated sampling point for calculating compliance with Title 40 Code of Federal Regulations (CFR) Part 61, Subpart H, *National Emission Standards for Emissions of Radionuclides Other Than Radon From Department of Energy Facilities* (EPA 2002), implemented through the 1995 Memorandum of Understanding Between the U.S. Environmental Protection Agency (EPA) and the U.S. Department of Energy (DOE) (DOE 1995) and 40 CFR Part 191, Subpart A, *Environmental Standards for Management and Storage* (EPA 1993). Prior to the IVS being put into service, Station B will be qualified in accordance with ANSI/HPS N13.1-1999, *Sampling and Monitoring Releases of Airborne Radioactive Substances from the Stacks and Ducts of Nuclear Facilities* (ANSI 1999), to ensure measurements taken there remain representative of filtered repository exhaust.

Station B will undergo Coefficient of Variation (COV) testing, which will be documented in the Qualification Report, *Evaluation of Duct Mixing and Sampling System for Interim Ventilation System at the Waste Isolation Pilot Plant*. The draft Qualification Report has been prepared and will be finalized in the early spring of 2016. On February 8, 2016, the DOE emailed the EPA a copy of the draft Qualification Report minus the pending COV testing results. A copy of the final Qualification Report will be provided to the EPA when available.

EPA Concern #2

Monitoring of the exhaust from the underground, including plans for restoring continuous radiological monitoring of the underground.

DOE Response

Title 40 CFR Part 61.92, *Standard*, states,

Emissions of radionuclides to the ambient air from Department of Energy facilities shall not exceed those amounts that would cause any member of the public to receive in any year an effective dose equivalent of 10 mrem/yr (EPA 2002).

Title 40 CFR Part 61.93, *Emission Monitoring and Test Procedures*, section (b)(4)(i) states,

Radionuclide emission measurements in conformance with the requirements of paragraph (b) of this section shall be made at all release points which have a potential to discharge radionuclides into the air in quantities which could cause an effective dose equivalent in excess of 1% of the standard (EPA 2002).

The estimated abated dose to the Maximally Exposed Offsite Individual (MEOSI) was calculated assuming the source term of the breached drum of the February 2014 radiological event. This source term calculation assumed that all radioactive material was released from the breached drum during normal operations. It does not take credit for control devices and assumes the breached drum remained in the Waste Isolation Pilot Plant (WIPP) underground unsealed. As identified in *Regulatory Assessment of Adding Interim Ventilation, Attachment C, 40 CFR 61 Appendix D Calculation for Breached Drum*, the estimated abated EDE to the MEOSI is 1.0E-04 mrem/yr, which is less than the exemption limit of 0.1 mrem/yr (Chavez 2014). Therefore, only periodic confirmatory measurement is needed to verify the low emissions and satisfy the requirements of 40 CFR Part 61, Subpart H and 40 CFR Part 191, Subpart A.

Currently, and with the addition of the IVS, exhaust air from the WIPP underground is routed through HEPA filtration units that are upstream of Station B. Effluent monitoring of the filtered exhaust air is conducted using a shrouded probe at Station B, which is the sampling point of record for air exhausted from the WIPP underground. The WIPP facility uses skid-mounted Fixed Air Samplers (FASs) at the effluent air monitoring Station B, shown in Figure 2, to collect representative samples of airborne particulates. These FAS filter samples are collected daily. To ensure uniform methods are employed to collect, package, and transport FAS filters, sample collection is performed according to approved and controlled operating procedures. There are two FAS filter sampling procedures; WP 12-HP1305, *Air Sampling Equipment* (NWP 2014) and WP12-HP3500, *Airborne Radioactivity* (NWP 2015). Filter samples are typically analyzed for gross alpha and beta activity. The effluent air sample filters are combined into a composite by Radiological Control and Site Environmental Compliance personnel and submitted to the WIPP Laboratories for isotopic analysis. The list of radioisotopes analyzed for the WIPP Effluent Monitoring Program includes Sr-90, Cs-137, U-233/234, U-238, Pu-238, Pu-239/240, and Am-241. The filter sample results are published annually and biennially in the following reports:

- *Waste Isolation Pilot Plant Annual Site Environmental Report (ASER)*, as required by DOE Order 231.1B(4)(a), *Reporting Annual Site Environmental Information* (DOE 2011)
- *Annual Periodic Confirmatory Measurement NESHAP Compliance Report*, as required by 40 CFR Part 61.94, *Compliance and reporting* (EPA 2002)
- *Waste Isolation Pilot Plant Biennial Environmental Compliance Report (BECR)*, as required by the WIPP Land Withdrawal Act as amended by Public Law 104-201, Section 9(a)(2), *Periodic Oversight by Administrator and State* (U.S. Congress 1996)

Upon qualification of the Station B sampling location with the addition of exhaust air from the IVS, Station B will continue to be the designated point of record with 40 CFR §61,

Subpart H and 40 CFR §191, Subpart A. In addition to the effluent monitoring conducted at Station B, a Canberra iCAM Alpha Continuous Air Monitor is operated per 10 CFR Part 835, *Occupational Radiation Protection* (DOE 1993), and is used to demonstrate the effectiveness of the HEPA filtration. Figure 2 is a schematic diagram of the Station B fixed air samplers and Canberra iCAM. The Station B iCAM is monitored by personnel in the WIPP facility Central Monitoring Room (CMR), fulfilling the objective to detect unplanned releases to the atmosphere. Procedure 12-HP1325, *Station B Canberra iCAM Alpha Continuous Air Monitor*, addresses set points for the Alpha alarm (NWP 2016a). Further, iCAM-HDs Alpha/Beta Continuous Air Monitors will be placed at the bottom of the salt shaft, S-400 near E-300, S-700 near E-300, S-1300 near E-300, S-1950 near E-140, S-1950 near W-30, S-1950 near W 170, Panel 6 inlet, and Panel 6 outlet. In addition, two iCAM-HDs will be placed at the Panel 7 exhaust to notify underground workers of any potential radioactive material releases. The Panel 6 and 7 monitors are scheduled to be networked to the CMR by the end of calendar year 2016. The plant-installed iCAM-HDs are not considered portable, thus installation locations will be long-term and will be controlled by the Engineering Configuration Management process. Except for the waste panel locations noted above, most iCAM-HDs will be within non-waste handling areas of the mine, near transition areas to the waste handling side (i.e. air locks, vents and regulators). The iCAM-HDs will remain at the locations where they are installed until there is a change in the underground ventilation configuration that would necessitate their relocation. Generally, final panel closure means iCAM-HDs can be removed from that location. In the case of Panels 6 and 7, the use of iCAM-HDs will be evaluated on an individual basis, and will only be removed when it is determined that there is no longer a need.

EPA Concern #3

Testing of interim and supplemental ventilation units, including ramp-up procedures and testing criteria (e.g., equipment settings, sequencing and evaluation).

DOE Response

The IVS start-up testing will be done in accordance with the Work Control Document (WCD), *IVS Start-up and Test Procedure* (WCD#1511214). The procedure provides instructions for performing start-up testing of the IVS as a modification to the existing Underground Ventilation System (UVS). This will include instrumentation and control, fans, filter units, and dampers. Integrated functional testing of these components will be completed prior to IVS start-up testing and in accordance with the work document, *Functional Testing of Control Panel 413-CP-32103 for the Interim Ventilation System* (WCD#1616256). The scope of the start-up test will include: inspection of components, testing of components with ventilation flow isolation from the UVS, testing of components with exhaust ventilation flow connected to the filtration exhaust duct at Station B (intake isolated from UVS), and testing of components with intake and exhaust ventilation flow connected to the UVS. These WCDs are currently in review and at present are still being revised.

The IVS start-up test will verify that the 960A and 960B fans, shown in Figure 1, will provide a nominal flow of 27,000 cfm each. The differential pressure across the filter bank, including moderate and high efficiency filters, and HEPA filters, will be verified against the manufacturer's initial resistance values using the local indicating transmitters. Airflow distribution will be performed for the HEPA filter units. Indications for damper

positions, filter differential pressure, fan flow, and Variable Frequency Drive speed will be verified at the local control panel for the IVS and remotely at the CMR. Control logic permissive and interlock conditions for start and stop sequences will be verified in WCD #1511214, including fail-safe configurations of dampers and fans. Fault and common trouble alarms will be verified at the local control panel and remotely at the CMR, using simulation steps in WCD #1511214.

EPA Concern #4

Control of exhaust streams during testing to ensure no release of unfiltered exhaust to the surface.

DOE Response

The IVS start-up testing will be performed in two phases, cold start-up and hot start-up. The ductwork for the IVS is currently isolated from the UVS by blind flanges installed in the ductwork. This includes the duct tie-in section at the B-700A fan inlet duct, which will connect the IVS to the Exhaust Shaft, and the duct tie-in section at the B-860C fan discharge duct, which will connect the IVS to the Station B discharge duct, as shown in Figure 1. During cold start-up testing, the IVS ductwork will remain physically isolated at the 700A fan duct tie-in, to prevent underground exhaust air from flowing through the IVS filter units. The cold start-up test is a comprehensive test of the IVS components to ensure the system is ready to exhaust air from the underground. In-place leak testing of the HEPA filters will be performed according to ASME N510, *Nuclear Air Treatment Systems*, prior to hot start-up testing (ASME 2007). The in-place leak test will use aerosol challenge testing to verify the removal efficiency of the system. During the hot start-up testing, the IVS intake ductwork will be connected to the UVS and configured to exhaust air from the underground. The hot start-up testing will verify several of the same performance parameters as the cold testing. The UVS will undergo a final test and balance with the IVS in operation as final commissioning of the system for regular operation and use. This will complete start-up testing of the IVS.

EPA Concern #5

Operating parameters during normal and off-normal situations.

DOE Response

Normal operation and abnormal conditions for the IVS will be addressed in WIPP facility standard operating procedures (SOPs). The following SOPs will also be validated before system turnover to WIPP Facility Operations and will be available for EPA review upon completion.

- WP 04-VU2001, *Normal Interim Ventilation System Operations (currently being developed)*
- WP 04-VU2003, *Abnormal Interim Ventilation System Operation (currently being developed)*
- WP 04-VU4605, *UVFS Alarm Response (NWP 2016b)*

Normal operating parameters will include nominal fan flow, differential pressure across each filter bank, damper position indications, and underground differential pressures.

References

American National Standards Institute (ANSI). 1999. *ANSI N13.1-1999, Sampling and Monitoring Releases of Airborne Radioactive Substance from the Stacks and Ducts of Nuclear Facilities*. January 12, 1999. Health Physics Society.

American Society of Mechanical Engineers (ASME). 2007. *ASME N510, Testing of Nuclear Air Treatment Systems*.

Chavez, R.R. 2014. Letter (with Enclosures) to Mr. G. T. Basabilvazo, Director (Subject: *Regulatory Assessments and Presentations for Recovery-Driven Ventilation Changes*.) September 8, 2014. RES:14:180.

Nuclear Waste Partnership LLC (NWP). 2014. *Air Sampling Equipment (Rev. 12)*. WP 12-HP1305. January 16, 2014. Carlsbad, NM: Carlsbad Field Office.

Nuclear Waste Partnership LLC (NWP). 2015. *Airborne Radioactivity (Rev. 21)*. WP 12-HP3500. November 24, 2015. Carlsbad, NM: Carlsbad Field Office.

Nuclear Waste Partnership LLC (NWP). 2016a. *Station B Canberra iCAM Alpha Continuous Air Monitor (Rev. 5)*. WP 12-HP1325. February 15, 2016. Carlsbad, NM: Carlsbad Field Office.

Nuclear Waste Partnership LLC (NWP). 2016b. *UVFS Alarm Response (Rev. 32)*. WP 04-VU4605. February 15, 2016. Carlsbad, NM: Carlsbad Field Office.

Nuclear Waste Partnership LLC (NWP). *The IVS Start-up and Test Procedure*. Waste Isolation Pilot Plant Work Control Document #1511214.

Nuclear Waste Partnership LLC (NWP). *Functional Testing of Control Panel 413-CP-32103 for the Interim Ventilation System*. Waste Isolation Pilot Plant Work Control Document #1616256.

U.S. Congress. 1996. Public Law 102-579. *The Waste Isolation Pilot Plant Land Withdrawal Act, as amended by Public Law 104-201*.

U.S. Department of Energy (DOE). 1993. *10 CFR Part 835: Occupational Radiation Protection*. Federal Register, vol. 58 (December 14, 1993): 65485.

U.S. Department of Energy (DOE). 1995. Letter to E. Ramona Travato, Director (Subject: *Memorandum of Understanding Between the U.S. Environmental Protection Agency and the U.S. Department of Energy concerning the Clean Air Act Emission Standards for Radionuclides 40 CFR Part 61 Including Subparts H, I, Q, & T.*) May 16, 1995.

U.S. Department of Energy (DOE). 2012. *DOE O 231.1B Admin Chg 1, Environment, Safety and Health Reporting*. November 28, 2012.

U.S. Environmental Protection Agency (EPA). 1993. *40 CFR Part 191, Subpart A: Environmental Standards for Management and Storage*. Federal Register, vol. 58 (December 20, 1993): 66398.

* Indicates a reference provided with this enclosure

U.S. Environmental Protection Agency (EPA). 2002. 40 CFR Part 61, Subpart H: National Emission Standards for Emissions of Radionuclides Other Than Radon from Department of Energy Facilities." Federal Register, vol. 67 (September 9, 2002): 57166.

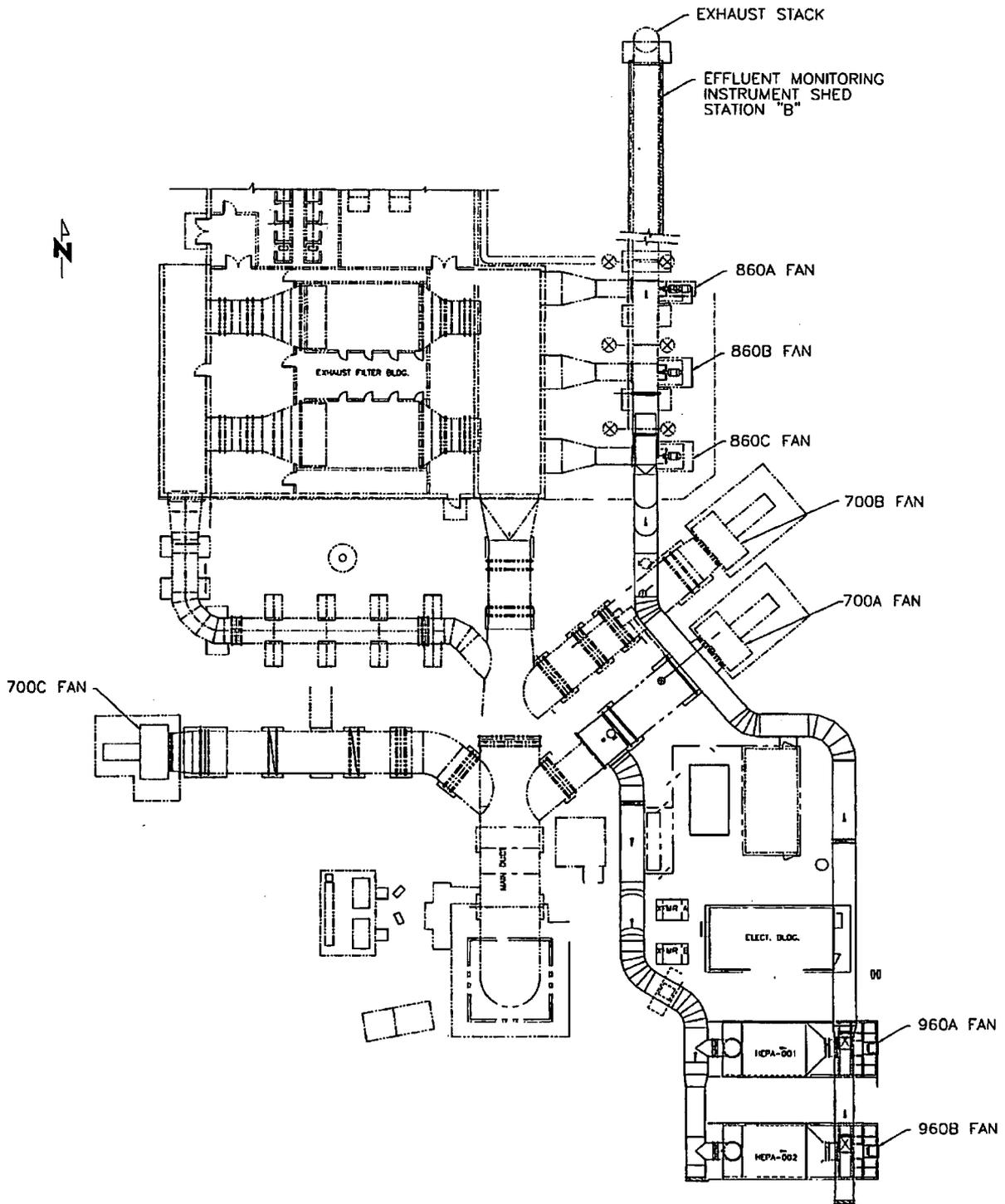


Figure 1 - Emission Point (Exhaust Stack), Station B and Fans

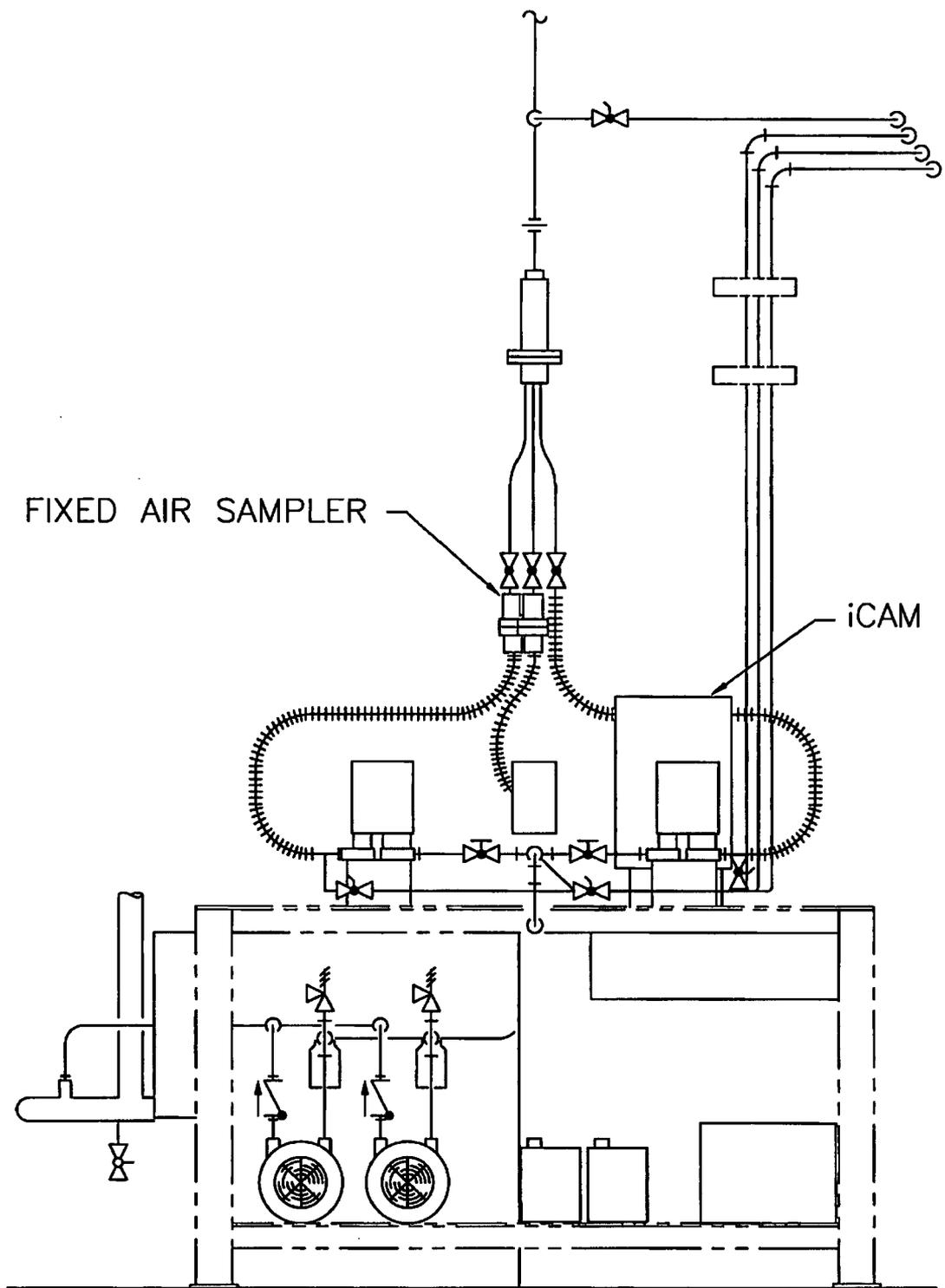


Figure 2 - Station B (Fixed Air Samplers and Canberra iCAM)

ISSUED

WP 04-VU4605

Revision 32

UVFS Alarm Response

Alarm Response Procedure

EFFECTIVE DATE: 02/15/16

Dale Parrish
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CHANGE HISTORY SUMMARY

REVISION NUMBER	DATE ISSUED	DESCRIPTION OF CHANGES
24	11/25/14	<ul style="list-style-type: none"> • In Loss of U/G Filtration Fan section, Immediate Actions: <ul style="list-style-type: none"> — Moved step 1.0 to step 2.0. — Deleted step 2.0 regarding notifying workers of ventilation change. — Deleted step 4.0 regarding checking for possible causes. — Changed steps 5.0 and 6.0 into bullets under new step 2.0. • In Loss of 308 Louver DP section, deleted Subsequent Action 4.0 regarding logging LCO 3.2.1-related actions.
25	02/13/15	<ul style="list-style-type: none"> • Deleted Possible Causes sections globally. • Changed 5.0 inch wg to 4.0 inch wg globally regarding HEPA banks. • Modified wording of Immediate Action notification for evacuating the mine globally. • Deleted requirement for WHT doors and openings inspections globally. • Deleted specific Filter Bank cfm setpoint values globally, allowing COG Engineer to determine appropriate value.
26	03/18/15	<ul style="list-style-type: none"> • Modified wording of Immediate Action notification for evacuating the mine in Loss of Underground Filtration Fan.
27	05/14/15	<ul style="list-style-type: none"> • Added references to ESS-2014-03 and ESS-2014-09 where appropriate throughout document. • Added in Loss of U/G Filtration Fan section, Subsequent Action 2.0.
28	06/12/15	<ul style="list-style-type: none"> • Removed reference to WP 12-ER4907, Protective Actions and Protective Action Recommendations. • Added steps to include precautionary remain indoors measure.
29	10/16/15	<ul style="list-style-type: none"> • Complete rewrite to align with current practices.
30	11/20/15	<ul style="list-style-type: none"> • Changed 308 Louver DP alarm setpoint from -0.08 in wg to -0.161 in wg.
31	01/22/16	<ul style="list-style-type: none"> • Removed from Waste Hoist Tower Alarm section, stationing and monitoring responses for 411-PIT-201-101 alarm when BH 308 is still operable
32	02/15/16	<ul style="list-style-type: none"> • Revised in accord with consolidated ESS-2015-01.

NOTE

The following set points have been established for the Underground Ventilation Filtration System (UVFS). If Central Monitoring System (CMS) is lost, the Local Alarm Panel in Building 413 will be used to monitor Underground (U/G) Filter Differential Pressures (DPs). If any of these DP readings reach the alarm value, it is an indication of a potential abnormal condition in the U/G, and/or an indication of a potential abnormal condition associated with the filters or an instrument malfunction.

NOTE

Adjusting the flow on the in-service filtration fan above or below fan set values may be required to maintain listed 41-B-856/857 Filter DPs, or as directed by COG Engineer.

NOTE

Changes to the Filter Alarm High set points that go above 3.0 inch wg require approval from CBFO.

HEPA FILTER UNIT CMS HIGH SET POINT ALARM

	LOCAL ALARM PANEL	HIGH SET POINT
ESS	(\$) PDAH-056-004/008 1st HEPA FILTER HEPA UNIT 41-B-856/857 [ESS-2015-01, 3a.B]	3.0 inch wg
ESS	(\$) PDAH-056-005/009 2nd HEPA FILTER HEPA UNIT 41-B-856/857 [ESS-2015-01, 3a.B]	3.0 inch wg
	CMS ALARM	HIGH SET POINT
ESS	(\$) 413 UVFS 1ST HEPA 856/857 [ESS-2015-01, 3a.B]	3.0 inch wg
ESS	(\$) 413 UVFS 2ND HEPA 856/857 [ESS-2015-01, 3a.B]	3.0 inch wg

AUTOMATIC ACTIONS

- NONE

IMMEDIATE ACTIONS

1.0 CMRO, **PERFORM** the following announcement:

- May I have your attention please (REPEAT)

There is a ventilation system irregularity at the WIPP Site.

All U/G personnel suspend work activities and report to the underground egress hoist stations for a controlled egress.

Suspend all site activities.

All non-essential personnel remain indoors as a precautionary measure.

- **REPEAT PREVIOUS MESSAGE**

2.0 FSM, SEND Facility Operations Technician (FOT) to Exhaust Filter Building (EFB) 413 to verify 41-B-856/957 local readings.

SUBSEQUENT ACTIONS

1.0 **IF** local readings are NORMAL (less than 3.0 inch wg),
THEN PERFORM the following:

- 1.1 FOT, **MONITOR** local readings.

REFERENCE USE

- 1.2 FSM, **CONTACT** COG Engineer and Operations Manager for recommendations on continued actions.
- 2.0 **IF** local HEPA filter bank readings confirm CMR alarm condition of greater than 3.0 inch water gauge for EITHER filter bank 41-B-856 OR filter bank 41-B-857 **THEN PERFORM** the following:
 - 2.1 FOT, visually **CHECK** 41-B-856/857 filter banks for abnormal conditions to include no visual change in configuration or obvious system deterioration.
 - 2.2 FOT, **CHECK** for high fan flow above fan set values (57,000 to 63,000 cfm).
 - 2.3 FOT, with FSM approval, **DECREASE** running fan 41-B-860A (41-B-860B) [41 B-860C] flow by rotating vortex manual handwheel CW (desired flow with both filter banks [41 B 856/41-B-857] I/S is 57,000 to 63,000 cfm, or as by COG Engineer).
 - 2.4 FOT, **IF** running fan 41-B-860A (41-B-860B) [41-B-860C] exhibits excessive vibration, **THEN NOTIFY** FSM immediately by voice.
 - 2.5 FSM, **IF** notified of excessive vibration, **THEN PERFORM** the following:
 - 2.5.1 **INSTRUCT** CMRO to CLOSE 308 dampers (if remote capability is available from CMR).
 - 2.5.2 **ENSURE** the Salt Shaft and AIS are covered.
 - 2.5.3 **ENSURE** the AAIT louvers are in the CLOSED position and inlet grating and damper openings are sealed.
 - 2.5.4 **INSTRUCT** RadCon to evaluate Station A and Station B filters, **AND PLACE** a CAM at each ventilation shaft.
 - 2.5.5 FOT, **SECURE** running fan.
 - 2.5.6 FOT, **ISOLATE** the inoperable unit by manually closing applicable U/G filter unit inlet and outlet dampers.
- 3.0 **IF BOTH** local HEPA filter bank readings confirm CMR condition of greater than 3.0 inch water gauge for filter bank 41-B-856 AND filter bank 41-B-857, **THEN PERFORM** the following:
 - 3.1 FOT, **SECURE** running fan.

- 3.2 FSM, **INSTRUCT** CMRO to CLOSE 308 dampers (if remote capability is available from CMR).
- 3.3 FSM, **ENSURE** the Salt Shaft and AIS are covered.
- 3.4 FSM, **ENSURE** the AAIT louvers are in the CLOSED position and inlet grating and damper openings are sealed.
- 3.5 FSM, **INSTRUCT** RadCon to evaluate Station A and Station B filters, **AND PLACE** a CAM at each ventilation shaft.

EXIT CONDITION

- Alarm conditions have cleared.
 - Adjustments have been made to clear the alarm.
 - Repair/Replacement of a Pressure Differential Transmitter.
- 1.0 Upon authorization by the President and Project Manager or Operations Manager, **INSTRUCT** CMRO to make the following announcement:
- May I have your attention please (REPEAT)
The ventilation system issue at the WIPP Site has been resolved.
The precautionary remain indoors measure has been lifted.
All Site personnel resume normal operations.
 - **REPEAT PREVIOUS MESSAGE**

MOD AND/OR HI FILTER UNIT CMS HIGH DP ALARM

LOCAL ALARM PANEL	HIGH SET POINT
PDAH-056-002/006 MOD EFF. FILTER HEPA UNIT 41-B-856/857	3.0 inch wg
PDAH-056-003/007 HIGH EFF. FILTER HEPA UNIT 41-B-856/857	2.5 inch wg
CMS ALARM	HIGH SET POINT
413 UVFS MOD FLTR 856/857	3.0 inch wg
413 UVFS HI FLTR 856/857	2.5 inch wg

AUTOMATIC ACTIONS

- NONE

IMMEDIATE ACTIONS

1.0 CMRO, **PERFORM** the following announcement:

- May I have your attention please (REPEAT)

There is a ventilation system irregularity at the WIPP Site.

All U/G personnel suspend work activities and report to the underground egress hoist stations for a controlled egress.

Suspend all site activities.

All non-essential personnel remain indoors as a precautionary measure.

- **REPEAT PREVIOUS MESSAGE**

2.0 FSM, **SEND FOT** to EFB 413 to verify 41-B-856/857 filter bank local readings.

SUBSEQUENT ACTIONS

- 1.0 **IF** local readings are NORMAL (MOD filter less than 3.0 inch wg AND HI filter less than 2.5 inch wg),
THEN PERFORM the following:
 - 1.1 FOT, **MONITOR** local readings.
 - 1.2 FSM, **CONTACT** COG Engineer and Operations Manager for recommendations on continued actions.

- 2.0 **IF** 41-B-856/857 filter bank local readings confirm CMS indications,
THEN PERFORM the following:
 - 2.1 FOT, visually **CHECK** 41-B-856/857 filter banks for abnormal conditions to include no visual change in configuration or obvious system deterioration.
 - 2.2 FOT, **CHECK** for high fan flow above fan set values (57,000 to 63,000 cfm).
 - 2.3 FOT, with FSM approval, **DECREASE** running fan 41-B-860A (41-B-860B) [41 B-860C] flow by rotating vortex manual handwheel CW (desired flow with both filter banks [41 B 856/41-B-857] I/S is 57,000 to 63,000 cfm, or as directed by COG Engineer).
 - 2.4 FSM, **IF** DPs do NOT stabilize,
THEN CONTACT COG Engineer and Operations Manager for recommendations on continued actions.

EXIT CONDITIONS

- Alarm conditions have cleared.
- Adjustments have been made to clear the alarm.
- Repair/Replacement of a Pressure Differential Transmitter.

1.0 Upon authorization by the President and Project Manager or Operations Manager, **INSTRUCT** CMRO to make the following announcement:

- May I have your attention please (REPEAT)

The ventilation system issue at the WIPP Site has been resolved.

The precautionary remain indoors measure has been lifted.

All Site personnel resume normal operations.

- **REPEAT PREVIOUS MESSAGE**

LOSS OF INDICATIONS FOR FILTER BANK(S) IN 41-B-856/857 UNDERGROUND VENTILATION FILTER SYSTEM (UVFS) UNIT(S)

ENTRY CONDITIONS

ANY of the following conditions is TRUE:

- Loss of Mod indication for either or both 41-B-856/857 filter banks in the CMS
- Loss of High Filter Bank indication for either or both 41-B-856/857 filter banks in the CMS
- Loss of HEPA DP indication for either or both 41-B-856/857 HEPA filter banks in the CMS

AUTOMATIC ACTIONS

- None

IMMEDIATE ACTIONS

- 1.0 FSM, **SEND** Facility Operations Technician (FOT) immediately to check 41-B-856/857 LOCAL filter bank readings in Exhaust Filter Building 413.

SUBSEQUENT ACTIONS

- 1.0 FOT, **NOTIFY** FSM immediately whether 41-B-856/857 LOCAL filter bank readings and HEPA filter bank DP indications in Exhaust Filter Building 413 are operable AND normal.
- 2.0 FSM, **IF** LOCAL filter bank readings are operable AND normal for ALL Mod, High, and HEPA filter bank DP indications, **THEN PERFORM** the following actions:
 - 2.1 **MONITOR** local readings.
 - 2.2 **CONTACT** COG Engineer and Operations Manager for recommendations on continued actions.
 - 2.3 **EXIT** procedure.

- 3.0 FSM, **IF ANY** local filter bank readings are inoperable OR abnormal, **THEN DIRECT** Central Monitoring Room Operator (CMRO) to make the following announcement:
- May I have your attention please (REPEAT)
 - There is a ventilation system irregularity at the WIPP Site.
 - All U/G personnel suspend work activities and report to the underground egress hoist stations for a controlled egress.
 - Suspend all site activities.
 - All non-essential personnel remain indoors as a precautionary measure.
 - **REPEAT PREVIOUS MESSAGE**
- 4.0 **IF ONE OR MORE** 41-B-856/857 HEPA filter bank DP indications are lost or inoperable, **THEN PERFORM** the following actions:
- 4.1 **SECURE** running fan 41-B-860A (41-B-860B) [41-B-860C] (depending upon which is running).
- 4.2 **IF** remote capability to close 308 dampers is available from the CMR, **THEN CLOSE** 308 dampers.
- 4.3 At direction of FSM, **ENSURE** the Salt Shaft and Air Intake Shaft (AIS) are covered.
- 4.4 **VERIFY** bulkhead 313 louvers are closed (if operable).
- 4.5 FSM, **INSTRUCT** RadCon to evaluate Station A and Station B filters, and place a CAM at each ventilation shaft.
- 5.0 **IF** one or more Mod and/or High filter bank indications are lost or inoperable, **THEN FOT, STAY** at local filter bank until directed otherwise by FSM, **AND PERFORM** the following:
- 5.1 **VERIFY** 41-B-856/857 filter bank readings to confirm CMS indications.
- 5.2 **IF LOCAL** readings are available, **THEN MONITOR** DPs for filter banks 41-B-856/857.
- 5.3 Visually **CHECK** 41-B-856/857 filter banks for abnormal conditions to include no visual change in configuration or obvious system deterioration.

- 5.4 **OBSERVE AND REPORT** to FSM any available DPs readings on (High and HEPAs) 41-B-856/857 filter banks.
- 5.5 **CHECK AND REPORT** status to FSM for high fan flow above fan set values (above 57,000 – 63,000 cfm).
- 5.6 **WHEN** directed by FSM, **CONTROL** DPs on other filter banks by decreasing running fan 41-B-860A (41-B-860B) [41-B-860C] flow by rotating vortex manual handwheel CW to no lower than 50,000 cfm, or as directed by COG Engineer with FSM approval.
- 5.7 **CONSULT** FSM regarding further actions.
- 6.0 FSM, **CONSULT** COG Engineer and Operations Manager for recommendations on further actions.

EXIT CONDITIONS

- Where LOCAL Mod, High, and HEPA DP indications are normal and operational and CMS indications are NOT normal or operable:
 - Normal operation of the Central Monitoring System (CMS) is restored and ALL indications (both CMS and LOCAL) are within prescribed limits.
- Successful action has been taken to correct deficiencies.
- HEPA filter bank(s) with ONE 41-B-856/857 Filter Unit Operable at a value as directed by the COG Engineer:
 - Danger tag inoperable 41-B-856/857 Filter Unit inlet and outlet dampers in CLOSED position.
 - Caution tag ALL filtration fans to a value as directed by the COG Engineer.
 - Inoperable 41-B-856/857 Filter Unit isolated and running fan 41-B-860A (41-B-860B) [41-B-860C] flow established at a value as directed by the COG Engineer.

- HEPA Filter Bank(s) with BOTH U/G Filter Units inoperable:
 - Danger tag inoperable U/G Filter Units inlet and outlet dampers in CLOSED position.
 - Danger tag ALL filtration fans – DO NOT RUN.
 - Successful action has been taken to correct deficiencies.
 - Alarms are cleared for BOTH 41-B-856/857 filter units.
- Site operations or limited site operations resumed after a controlled egress only by President & Project Manager or Operations Manager when a fan flow as determined by COG Engineer through one UVFS filter unit is established and maintained.

WASTE HOIST TOWER ALARM 411-PIT-101**ENTRY CONDITIONS**

ALARMS	SET POINTS
411-PIT-201-101 (AP0249)	-0.15 inch wg OR INOPERABLE

AUTOMATIC ACTIONS

- None

IMMEDIATE ACTIONS**NOTE**

Habitability is allowed for those personnel currently in the U/G while actions are being taken to restore negative differential pressure or differential pressure monitoring operability. Maintenance personnel may also enter the U/G to correct the alarm conditions.

- 1.0 **IF** the U/G is manned,
THEN NOTIFY immediately U/G Facility Engineer (UFE) of alarm condition or loss of CMS indication.
- 2.0 **IF** the U/G is manned,
THEN INSTRUCT UFE to verify proper bulkhead alignment
AND REPORT status to CMR.

SUBSEQUENT ACTIONS

- 3.0 FOT, **CHECK AND REPORT** to CMRO condition of AAIT Relief Dampers.
- 4.0 **IF BOTH** the Bulkhead Regulator 308 and WHT differential pressure indication/instrumentation are either in an alarm condition or inoperable,
THEN PERFORM the following actions UNTIL the alarm or inoperable condition is corrected: (ESS-2015-01, PAC 8 (C.1)
 - 4.1 **OPEN** necessary WHT doors to ensure up-casting will exit through either the Waste Handling Building (WHB) CH or RH Confinement Ventilation Systems (HEPA filtered).(ESS-2015-01, PAC 8 (C.2)a)
 - 4.2 **STATION** FOT at Waste Hoist Tower (WHT) differential pressure instrumentation, if operable, to report DP to CRM.

REFERENCE USE

- 4.3 If U/G is manned, **INSTRUCT** U/G Roving Watch to monitor local differential pressure indicator at Bulkhead Regulator 308 and report to CMR.
- 4.4 **INSTRUCT** Radiation Control to install CAMs at the following locations, **AND ENSURE** CAMs are operable and monitored:
- Waste Hoist Collar area
 - Second floor of the WHT
 - CH Conveyance Loading Room
 - RH Facility Cask Loading Room
 - Auxiliary Air Intake (ESS-2015-01, PAC 8 (C.2)b)
- 5.0 FSM, **IF** unable to stabilize DP, **THEN CONTACT** the COG Engineer and Operations Manager for further direction.
- 6.0 FSM, **COVER** AIS and/or Salt Shaft as needed to achieve desired DPs.

EXIT CONDITIONS

- Alarm(s) have cleared.
- Adjustments have been made to clear the alarm.
- Repair/Replacement of a Pressure Differential Transmitter.

LOSS OF UNDERGROUND FILTRATION FAN 860A/B/C**ENTRY CONDITIONS**

ALARMS	SET POINTS
EXH FAN 860A/B/C SHUT DOWN (CMS Point CH5620/5623/5626)	STOP

AUTOMATIC ACTIONS

- None

IMMEDIATE ACTIONS**NOTE**

Immediate Actions 1.0 and 2.0 below may be performed concurrently.

- ESS** 1.0 **(\$)** CMRO, **PERFORM** the following announcement:
- May I have your attention please (REPEAT)
There is a ventilation system irregularity at the WIPP Site.
All U/G personnel suspend work activities and report to the underground egress hoist stations for a controlled egress.
Suspend all site activities.
All non-essential personnel remain indoors as a precautionary measure.
 - **REPEAT** PREVIOUS MESSAGE [ESS-2015-01, 3a] [~~ESS-2015-01, 3a~~]
- 2.0 **START** filtration fan per WP 04-VU1001, *Surface Underground Ventilation and Filtration System Operation*.
- 3.0 **IF** unable to place U/G ventilation in service, **THEN PERFORM** the following:
- **WHEN** directed by FSM, **ENSURE** Salt Shaft and AIS are covered.

- **WHEN** directed by FSM, **ENSURE** the AAIT louvers are in the CLOSED position and inlet grating and damper openings are sealed.
 - CMRO, **IF** remote capability to close 308 dampers is available from CMR, **THEN CLOSE** dampers 308.
- 4.0 **IF** U/G ventilation fan is OPERATING AND both the Bulkhead Regulator 308 and WHT differential pressure indication/instrumentation are either in an alarm condition or inoperable, **THEN GO TO** Waste Hoist Tower Alarm 411-PIT-201-101 in this procedure. (ESS-2015-01, PAC 8 (C.1))

SUBSEQUENT ACTIONS

- 1.0 FSM, **NOTIFY** COG Engineer and Operations Manager of the loss and start of a U/G filtration fan in filtration mode.
- 2.0 CMRO, to limit drafts and airflow from the U/G through a stationary fan, **PERFORM** the following measures promptly when power is interrupted:
- 2.1 Fully **CLOSE** either the inlet or outlet control damper on each 860 fan.
- 2.2 **MAINTAIN** damper in CLOSED state until damper opening is necessary to restart an operating fan.

EXIT CONDITIONS

EXH FAN 41-B-860A (41-B-860B) [41-B-860C] placed in-service.

- 1.0 CMRO, **PERFORM** the following announcement:
- May I have your attention please (REPEAT)
The ventilation system issue at the WIPP Site has been resolved.
The precautionary remain indoors measure has been lifted.
All Site personnel resume normal operations.”
 - **REPEAT PREVIOUS MESSAGE**

LOSS OF S400 DIFFERENTIAL PRESSURE

NOTE

Alarm Response to loss of S400 differential pressure is only applicable during U/G Waste Handling mode.

ENTRY CONDITIONS

ALARMS	SET POINTS
S400 DIFFERENTIAL PRESSURE AIR LOCK (FANS ENABLED) (CMS Point AG6102)	0.20 inch wg

AUTOMATIC ACTIONS

- None

IMMEDIATE ACTIONS

- 1.0 CMRO, **IF** pressure in U/G Bulkhead 74-B-309 is less than 0.20 inch wg, **THEN CONTACT** Underground Facility Engineer (UFE) to start high pressure fan(s) (74-B-007 A/B/C and 74-B-008 A/B/C) to maintain pressure at greater than 0.20 inch wg.
- 2.0 UFE/UGRW, **GO TO** WP 04-VU1611, *Pressurization of U/G Bulkhead 74 B-309*, **AND MAINTAIN** greater than 0.20 inch wg in 74-B-309 (S400) from 53P CP03/309.
- 3.0 CMRO, **WHEN** S400 alarm clears, **THEN NOTIFY** UFE/UGRW.
- 4.0 **IF** alarm condition still does not clear, **THEN UFE, CONTINUE** starting fans at 74-B-309 (S400) per WP 04-VU1611 to maintain pressure with the airlock.
 - 4.1 **SUSPEND** Waste Handling mode in the U/G and shaft access area.

SUBSEQUENT ACTIONS

- 1.0 **IF** unable to restore S400 DP, **THEN NOTIFY** the COG Engineer and Operations Manager for further direction.

ISSUED

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EXIT CONDITION

- Alarm conditions have cleared.
- Adjustments have been made to clear the alarm.
- Repair/Replacement of a Pressure Differential Transmitter.

REFERENCE USE

LOSS OF BULKHEAD 308 REGULATOR DIFFERENTIAL PRESSURE**ENTRY CONDITIONS**

LOCAL ALARM PANEL	SET POINT
534-PDI-160-528A 534-PDI-160-528B	-0.161 inch wg
LOSS OF INDICATION	INOPERABLE (ESS-2015-01, PAC 8.A)
CMS ALARM	SET POINT
308 Regulator U/G DP4 LOW DP	-0.161 inch wg
LOSS OF INDICATION	INOPERABLE (ESS-2015-01, PAC 8.A)

AUTOMATIC ACTIONS

- None

IMMEDIATE ACTIONS**NOTE**

Habitability is allowed for those personnel currently in the U/G while actions are being taken to restore negative differential pressure or differential pressure monitoring operability. Maintenance personnel may also enter the U/G to correct the alarm conditions.

NOTE

FSM may at any time direct covering the AIS collar when deemed necessary to regulate airflow down the AIS shaft and/or Salt Shaft.

- 1.0 CMRO, **MONITOR** DP indications for the Waste Hoist Tower.(ESS-2015-01, PAC 8.B.1, and PAC 8.C.3)
- 2.0 CMRO, **IF** the U/G is manned,
THEN PERFORM the following actions:
 - 2.1 **NOTIFY UFE AND CONSULT** regarding cause of alarm. (ESS-2015-01, PAC 8.B.2 and PAC 8.C.3)
 - 2.2 **STATION** operator at U/G Bulkhead 308 regulator to **MONITOR AND REPORT** DP readings to CMR. . (ESS-2015-01, PAC 8.B.2 and PAC 8.C.3)

REFERENCE USE

- 3.0 **IF** U/G Bulkhead 308 DP sensor readings are above -0.161 inch wg,
THEN ADJUST 308 Regulator to clear alarm condition. . (ESS-2015-01, PAC 8.B.2 and PAC 8.C.3))
- 4.0 **IF** 308 regulator is completely CLOSED and alarm has not cleared,
THEN PERFORM the following actions: . (ESS-2015-01, PAC 8.B.2 and PAC 8.C.3)
- 4.1 **COVER** AIS collar and/or Salt collar, as necessary.
- 4.2 **ENSURE** an 860 fan is in operation per WP 04-VU1001.
- 4.3 **ADJUST** 308 Regulator per WP 04-VU1004.
- 5.0 **IF** both the Bulkhead Regulator 308 and WHT differential pressure indication/instrumentation are either in an alarm condition or inoperable,
THEN PERFORM AND MAINTAIN the following actions until either condition is corrected:
- 5.1 **OPEN** necessary WHT doors to ensure up-casting will exit through either the Waste Handling Building (WHB) CH or RH Confinement Ventilation Systems (HEPA filtered). (ESS-2015-01, PAC 8 (C.2)a)
- 5.2 **INSTRUCT** Radiation Control to install CAMs at the following locations and ensure CAMs are operable and monitored:
- Waste Hoist Collar area
 - Second floor of the WHT
 - CH Conveyance Loading Room
 - RH Facility Cask Loading Room
 - Auxiliary Air Intake (ESS-2015-01, PAC 8.(C.2)b)

SUBSEQUENT ACTIONS

- 1.0 **IF** unable to restore 308 Louver DP,
THEN CONTACT the COG Engineer and Operations Manager for further direction. . (ESS-2015-01, PAC 8.B.2 and PAC 8.C.3)
- 1.1 FSM, **INSTRUCT** the covering of the AIS collar and/or Salt Shaft collar with staged material. . (ESS-2015-01, PAC 8.B.2 and PAC 8.C.3)
- 1.2 **ADJUST** 74-B-308 Regulator via the CMS as needed to achieve 308 Louver DP with COG Engineer and FSM approval. . (ESS-2015-01, PAC 8.B.2 and PAC 8.C.3)

EXIT CONDITION

- Alarm is cleared.
- Adjustments have been made to clear the alarm.
- Repair/Replacement of a Pressure Differential Transmitter.

WP 12-HP1305

Revision 12

Air Sampling Equipment

Technical Procedure

EFFECTIVE DATE: 01/16/14

Roger Groves
APPROVED FOR USE

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CHANGE HISTORY SUMMARY

REVISION NUMBER	DATE ISSUED	DESCRIPTION OF CHANGES
10	05/31/11	<p>Added 12-HP3500 Att. 4 to list of records generated in Introduction</p> <p>Deleted last precaution bullet regarding Out of Commission tags</p> <p>Added three new precautions: preparing filters in advance, designating a primary skid at Station A, and notifying SEC when back up skid is not available</p> <p>New steps 1.2.9, 1.4.7, and 2.2.3 adding "change filters" as appropriate action</p> <p>Changed order of actions in steps 1.2.11, 1.4.9, and 2.2.5 (switched [A] and [B] in each), added tagging requirements</p> <p>Included tweezers as acceptable tool to use in steps 3.2, 3.9, 4.1, and 4.5</p> <p>Added notes above steps 1.3.6 and 1.4.2 stating the steps are not applicable to Station C</p> <p>Added Attachment 4 – Changing Filter for an External Oversight Group</p> <p>Created new step 3.0 to reference Attachment 4</p>
11	02/19/13	<ul style="list-style-type: none"> • Editorial revision in accordance with MD 1.1.
12	01/16/14	<ul style="list-style-type: none"> • Added "Calibration Due Date" to table entry in attachment 1.

INTRODUCTION 1.2.3.4.5.6.7.8.9

This procedure provides instructions for the operation of air sampling equipment and associated data collection.

Performance of this procedure generates the following record(s), as applicable. Any records generated are handled in accordance with departmental Records Inventory and Disposition Schedules.

- Attachment 1 - Air Sampling Equipment Log Sheet
- Attachment 3 – National Emissions Standards for Hazardous Air Pollutants (NESHAP) Particulate Air Filter Sample Form
- WP 12-HP3500, Attachment 4 – Request for Analysis/Chain-of-Custody Record

REFERENCES			
DOCUMENT NUMBER AND TITLE	BASELINE DOCUMENT	REFERENCED DOCUMENT	KEY STEP
Title 10 <i>Code of Federal Regulations</i> (CFR) Part 835, "Occupational Radiation Protection"	✓		
40 CFR Part 61, Subpart H, "National Emission Standards for Emissions of Radionuclides Other than Radon from Department of Energy Facilities"	✓		8
40 CFR Part 191, Subpart A, "Environmental Standards for Management and Storage"	✓		9
NRC No. M0081, <i>WIPP Radiation Monitoring Systems Manual</i> , Vol. 1, Operation and Maintenance	✓		4
Eberline Model Alpha 6/6A, Alpha Air Monitor Technical Manual	✓		2
ITRI Report, Evaluation of the Eberline Alpha 6 Continuous Air Monitor for use in the Waste Isolation Pilot Plant Report of Phase II	✓		3
<i>Toshiba 1200 UPS Technical Manual</i>	✓		5
<i>Tosnic U 1100 UPS Technical Manual</i>	✓		6
Position Papers 00-05 and 01-09	✓		7
WP 12-5, <i>Waste Isolation Pilot Plant Radiation Safety Manual</i>	✓		1
WP 12-HP3500, <i>Airborne Radioactivity</i>		✓	
EA10-2-1-0, <i>Action Request</i>		✓	

EQUIPMENT

Required equipment is listed in each section, as applicable.

PRECAUTIONS AND LIMITATIONS

- Local flow alarm set points may vary from Central Monitoring Room (CMR) set points.
- Only trained and qualified Radiological Control Technicians (RCTs), and Radiological Engineers who have completed the Job Performance Measure (JPM), are authorized to operate radiological equipment. Trainees may operate radiological equipment with a qualified RCT present.
- When performing JPM CFO-119, "Operate an Air Sampler," all knowledge statements must be successfully completed prior to initiating performance requirements portion of the JPM.
- Cognizant Organization Manager (COM)/manager review of all records generated by this procedure satisfies data validation requirements.
- Air sample filters are to be changed according to the following frequencies:
 - At least once per working day for Station A NESHAP fixed air samplers (FASs). Additional filter changes will be conducted as necessary when RCT is available on-site.
 - At least once per working day for FASs that sample underground air.
 - At least once per week (within seven days) for Stations B and C; and all other FASs.
 - As needed to maintain the air sample flow rate within prescribed settings. The flow rates for Station A are to be maintained within prescribed settings by the RCT on-site.
- Air filters may be prepared in advance when gravimetrics is not required.
- Station A is designed for effluent air monitoring. A primary skid must always be designated.
- **IF** Station A skid has to be secured **AND** no back up is available, **THEN** COM will notify Site Environmental Compliance (SEC) or on-call SEC rep.

PERFORMANCE

1.0 THREE-CHANNEL FAS SKIDS

NOTE

Section 1.0 applies to Three-Channel FAS skids with the following equipment numbers:

- 364-S-101 (Skid A-2)
 - 364-S-103 (Skid A-1)
 - 364-S-104 (Skid A-3)
 - 365-S-100 (Skid B-1)
 - 365-S-102 (Skid B-2)
 - 411-S-105 (Station C)
 - 534-S-114 (Station D)
-

NOTE

All NESHAP and/or designated NESHAP back-up air filter collection data is recorded on attachment 3. All non-NESHAP air filter collection data is recorded on attachment 1.

1.1 Securing Power to Three-Channel FAS Skids at Station A

- 1.1.1 Notify Central Monitoring Room Operator (CMRO) that FAS skid will be secured.
- 1.1.2 Record date, time, and flow reading on applicable attachment.
- 1.1.3 Change air sample filters, as applicable, per section 3.0.
- 1.1.4 Place vacuum pump switch to **OFF** position.
- 1.1.5 Ensure Control Valves are completely closed.
- 1.1.6 Secure uninterruptible power supply (UPS) by performing the following:
 - [A] Press **OFF** buttons (F2 and F3) simultaneously.
 - [B] Turn main power switch located on the back of the UPS to **OFF** position.
- 1.1.7 Open circuit breakers on vacuum pump control panel.

NOTE

Heart interface inverter is located on the base of the skid table under the UPS.

- 1.1.8 Place the heart interface power (inverter) switch to **OFF** position.
- 1.1.9 Complete applicable attachment.
- 1.2 Restoring Power to Three-Channel FAS Skids at Station A
 - 1.2.1 Notify CMRO that FAS skid will be restored.
 - 1.2.2 Place the heart interface power (inverter) switch to **ON** position.
 - 1.2.3 Close circuit breakers on vacuum pump control panel.
 - 1.2.4 Restore UPS by performing the following:
 - [A] Turn main power switch located on the back of the UPS to the **ON** position.
 - [B] If UPS does not start automatically, press **ON** button (F1).
 - 1.2.5 Ensure pump control switch is in PUMP 1 position.
 - 1.2.6 Depress and continue holding low flow reset button, ensuring Control Valve for PUMP 1 has completely opened.
 - 1.2.7 Ensure AUTOMATIC SHUTDOWN SELECTION switch is in:
 - AUTO STOP PRIMARY (for primary skid)
 - OR**
 - AUTO STOP BACK-UP (for secondary skid)

- 1.2.8 **IF** pump does not start,
THEN perform the following:
 - [A] Repeat steps 1.2.5 and 1.2.6 with PUMP 2.
 - [B] Notify CMRO and COM.
 - [C] Use EA10-2-1-0 to initiate an Action Request (AR) to correct deficiency.
- 1.2.9 Change air filters, as applicable, per section 3.0.
- 1.2.10 Ensure flow rates and alarm set points are correct in accordance with attachment 2.
- 1.2.11 **IF** FAS skid does not appear to operate properly,
THEN perform the following:
 - [A] Notify COM.
 - [B] If directed by COM, secure FAS skid per step 1.1 and tag skid as "Out of Commission" (OOC).
 - [C] Initiate an AR to repair FAS skid.
- 1.2.12 Complete applicable attachment.
- 1.2.13 Notify CMRO that the FAS skid has been restored.
- 1.3 Securing Power to Three-Channel FAS Skids at Station B and Station C
 - 1.3.1 Notify CMRO that FAS skid will be secured.
 - 1.3.2 Record date, time, and flow reading on applicable attachment.
 - 1.3.3 Change air filter, as applicable, per section 3.0 or 4.0.
 - 1.3.4 Place pump switch to **OFF** position.
 - 1.3.5 Open circuit breakers on vacuum pump control panel.

NOTE

Step 1.3.6 is not applicable for Station C.

1.3.6 Secure UPS by placing the following switches/breakers to the **OFF** position:

[A] UPS

[B] Inverter breaker

[C] Bypass

1.3.7 Complete applicable attachment.

1.4 Restoring Power to Three-Channel FAS Skids at Station B and Station C

1.4.1 Notify CMRO that FAS skid will be restored.

NOTE

Step 1.4.21.3.6 is not applicable for Station C.

1.4.2 Restore UPS by placing the following switches/breakers to **ON** position:

[A] UPS

[B] Inverter breaker

[C] Bypass

1.4.3 Ensure vacuum pump control switch is in PUMP 1 position.

1.4.4 Close circuit breakers on vacuum pump control panel.

1.4.5 Press and hold PUMP RESET button until flow stabilizes and pump remains on.

1.4.6 **IF** pump does not start,
THEN perform the following:

[A] Place vacuum pump control switch to PUMP 2 position.

[B] Notify CMRO and COM.

[C] Initiate an AR to correct deficiency.

- 1.4.7 Change filters, as applicable, per section 3.0.
- 1.4.8 Ensure flow rates are correct in accordance with attachment 2.
- 1.4.9 **IF** FAS skid does not appear to operate properly,
THEN perform the following:
 - [A] Notify COM.
 - [B] If directed by COM, secure FAS skid per step 1.3 and tag skid as OOC.
 - [C] Initiate an AR to repair FAS skid.
- 1.4.10 Complete applicable attachment.
- 1.4.11 Notify CMRO that FAS skid has been restored.
- 1.5 Securing Power to Three-Channel FAS Skids at Station D
 - 1.5.1 Notify CMRO that FAS skid will be secured.
 - 1.5.2 Record date, time, and flow reading on applicable attachment.
 - 1.5.3 Change air filter, as applicable, per section 3.0.
 - 1.5.4 Press and hold **OFF** button on vacuum pump control panel until pump stops.
 - 1.5.5 Press and hold **OFF** button on the mini-UPS until the UPS is secured.
 - 1.5.6 Complete applicable attachment.
- 1.6 Restoring Power to Three-Channel FAS Skid at Station D
 - 1.6.1 Notify CMRO that FAS skid will be restored.
 - 1.6.2 Press and hold the mini-UPS button until the UPS is restored.
 - 1.6.3 Press and hold **ON** button on vacuum pump control panel until pump starts.
 - 1.6.4 Change filters, as applicable, per section 3.0.
 - 1.6.5 Ensure flow rates are correct in accordance with attachment 2.

- 1.6.6 **IF** pump does not start,
THEN perform the following:
 - [A] Notify CMRO and COM.
 - [B] Initiate an AR to correct deficiency.
- 1.6.7 Complete applicable attachment.
- 1.6.8 Notify CMRO that the FAS skid has been restored.

2.0 SINGLE FAS UNITS

2.1 Securing Power/Vacuum to Single FAS Units

- 2.1.1 Notify CMRO that FAS will be secured.
- 2.1.2 Record date, time, and flow rate on attachment 1.
- 2.1.3 Change filter, as applicable, per section 4.0.

NOTE

Vacuum is supplied to single FAS units either by a vacuum pump or by supplied plant vacuum.

- 2.1.4 Secure vacuum supply.
- 2.1.5 Complete attachment 1.
- 2.2 Restoring Power/Vacuum to Single FAS Units
 - 2.2.1 Notify CMRO that power/vacuum will be restored to FAS.
 - 2.2.2 Restore vacuum supply.
 - 2.2.3 Change filter, as applicable, per section 4.0.
 - 2.2.4 Set flow rate in accordance with attachment 2.

2.2.5 **IF** FAS skid does not appear to operate properly,
THEN perform the following:

- [A] Notify COM.
- [B] If directed by COM, secure FAS skid per step 2.1 and tag skid as OOC.
- [C] Initiate an AR to repair FAS skid.

2.2.6 Complete attachment 1.

3.0 CHANGING THREE-CHANNEL FIXED AIR SAMPLE FILTERS

NOTE

Representatives from external oversight groups such as the Carlsbad Environmental Monitoring and Research Center (CEMRC) may request that air samples be obtained from Stations A and/or B. After this request is made, COM will coordinate with the external oversight groups to change these filters. The external groups will provide kits containing air sample filters and chain-of-custody forms in a locked box on-site. If a representative from the external group is not available for a filter change, an RCT shall change the filters using these kits. In the event of a low flow during normal operations, all legs on a skid will be changed.

NOTE

All NESHAP and/or designated NESHAP backup air filter collection data is recorded on attachment 3. The RCT will document the transfer of filter samples to the WIPP Laboratories using the attachment in WP 12-HP3500, Request for Analysis/Chain-of-Custody Record.

3.1 **IF** changing a filter for an external oversight group,
THEN perform filter change in accordance with attachment 4.

3.2 Obtain the following equipment:

- Versopore filter
- Filter container
- Forceps/tweezers

NOTE

In the following step, if a filter is collected more than once a day, the time of collection should be added to the sample identification number.

- 3.3 Assign a unique sample identification number to the filter by putting the FAS number and the current date on the back of the filter.
- 3.4 **IF** a filter requires gravimetrics analysis,
THEN GO TO WP 12-HP3500, and perform the Gravimetrics section.
- 3.5 Notify CMRO prior to changing filters.
- 3.6 If filter samples are non-NESHAP, record information on attachment 1.
- 3.7 If filter samples are NESHAP, record information on attachment 3.
- 3.8 Turn ball valve to **OFF** position, if applicable.

CAUTION

Effluent FAS filters are not to be changed if there is no vacuum supply, unless a ball valve is installed for that purpose.

- 3.9 Using forceps or tweezers, remove loaded filter, place it in a container, taking care not to disturb particle collection area, and keep the loaded side facing up until final disposition.
- 3.10 Install a clean filter.
- 3.11 Turn ball valve to **ON** position, if applicable.
- 3.12 Ensure flow rate is within specified limits of attachment 2.
- 3.13 **IF** flow cannot be corrected,
THEN perform the following:
 - Notify COM.
 - Notify CMRO, if applicable.
 - Secure FAS skid.

- Tag equipment OOC.
 - Initiate an AR.
- 3.14 Complete applicable attachments.
- 3.15 Submit completed Attachments to COM for review and approval.
- 3.16 COM, review, approve, and submit completed attachment 1 to Records Coordinator for filing and disposition.
- 3.17 COM, review, approve, and submit completed attachment 3 to SEC.
- 3.18 RCT, **IF** NESHAP and non-NESHAP filter samples require gross alpha/beta analysis,
THEN complete a Request for Analysis/Chain-of-Custody record and submit with the filter(s) in labeled container(s) to the WIPP Laboratories in accordance with WP 12-HP3500.

4.0 CHANGING FIXED AND PORTABLE AIR SAMPLE FILTERS

NOTE

Portable air samplers (PASs) used in place of fixed air samplers will use the same flow rate and filter change method as the fixed air samplers they are replacing.

- 4.1 Obtain the following equipment:
- Versapore filter
 - Labeled filter container
 - Forceps/tweezers
-

NOTE

In the following step, if a filter is collected more than once a day, the time of collection should be added to the sample identification number.

- 4.2 Assign a unique sample identification number to the filter by putting the FAS number and the current date on the back of the filter.
- 4.3 **IF** a filter requires gravimetrics analysis,
THEN GO TO WP 12-HP3500, and perform the Gravimetrics section.

- 4.4 Prior to changing the filter at FAS 157 (Station C), perform the following:
- Notify the CMRO
 - Record date, time, and flow on attachment 1
- 4.5 Using forceps or tweezers, remove loaded filter, place it in a container, taking care not to disturb particle collection area, and keep the loaded side facing up until final disposition.
- 4.6 Install a clean filter.
- 4.7 Ensure the flow rate is within specified limits of attachment 2.
- 4.8 **IF** the flow rate cannot be corrected, **THEN** perform the following:
- Notify CMRO, if applicable.
 - Notify COM.
 - Secure FAS/PAS.
 - Tag equipment OOC.
 - Initiate an AR.
- 4.9 Complete attachment 1.
- 4.10 Submit completed attachment(s) to COM for review and approval.
- 4.11 COM, review and approve completed attachment and submit to Records Coordinator for filing and disposition.
- 4.12 RCT, **IF** FAS filter(s) requires analysis, **THEN** complete a Request for Analysis/Chain-of-Custody record and submit with the filter(s) in labeled container(s) to the WIPP Laboratories in accordance with WP 12-HP3500.

Attachment 2 – FAS Flow Rates and Alarm Set Points

FAS Type	Low Air Flow Alarm Set Point	Acceptable Air Flow Rate	High Flow Alarm Set Point
Single FAS Units	0.9 cfm	0.9 - 1.1 cfm	1.1 cfm
FASs on the following skids: 364-S-101 (Skid A-2) 364-S-103 (Skid A-1) 364-S-104 (Skid A-3) 365-S-100 (Skid B-1) 365-S-102 (Skid B-2) 534-S-114 (Skid D-1)	1.8 cfm	1.8 - 2.2 cfm	2.2 cfm
411-S-105 (FAS 157)	0.2 cfm	0.2 to 1.8 cfm	1.8 cfm

Attachment 3 – NESHAP Particulate Air Filter Sample Form

LOCATION: _____
 START DATE: _____
 AIR SAMPLE FILTER NUMBER: _____

FILTER CHANGE DATA					
START			STOP		
DATE	TIME	FLOW	DATE	TIME	FLOW
Interruptions In Flow? No ___ Yes ___			Run Time (Min):		
Filter Status at Station "A" Only: Primary / Secondary			Volume: ft³		
RCT: _____ / _____			RCT: _____ / _____		
Printed Name		Signature	Printed Name		Signature

DESICCATION/GRAVIMETRICS							
CLEAN FILTER DESICCATION				CLEAN FILTER WEIGHT			
DATE	TIME	WEIGHT	mg/m ³	DATE	TIME	WEIGHT	mg/m ³
RCT: _____ / _____				RCT: _____ / _____			
Printed Name		Signature		Printed Name		Signature	
Loaded Filter Weight (ASAP after filter change)				Loaded Filter Weight (After 24 hr desiccation)			
Net Filter Weight: _____				Net Filter Weight: _____			
RCT: _____ / _____				RCT: _____ / _____			
Printed Name		Signature		Printed Name		Signature	

COMMENTS:

Attachment 4 – Changing Filter for an External Oversight Group

NOTE

Latex, plastic, or rubber gloves should be worn when exchanging and handling filters.

Removing a Loaded Filter from the Sampler

1. Verify that an empty petri dish with a pre-assigned Sample Identification (SID) is present in the plastic pouch of the CEMRC/New Mexico Environmental Department (NMED) FAS sampling kit if a sample is currently running.
2. Verify that the 'SID,' 'Initial Weight,' and 'Sample Collection Start Data' sections have been completed on the *FAS Sample Collection and Chain of Custody Form* for the sample that is currently running.
3. Verify that the SID on the form from step 2 above matches the one on the empty petri dish from step 1 above.
4. Complete the 'Sample Collection Stop Data' section of the *FAS Sample Collection and Chain of Custody Form* including:
 - Recording the stop date and local time the filter is removed from the sampler.
 - Recording the stop flow-rate.
 - Printing and signing your name.
 - Recording your organization.
 - Recording any site, equipment, or environmental irregularities, conditions adverse to quality, or other non-routine events (e.g. low flow, securing of skid, power outages) in the "comments" section of the *FAS Sample Collection and Chain of Custody Form*.
5. Close the sampler ball valve approximately 80%.
 - This will allow a small amount of flow to keep the filter on the coupling and not allow the filter to fall off when the coupling is opened.
 - If the skid is secured (off), ensure the ball valve is closed 100% to prevent the filter from being sucked up the exhaust stack.
6. Unscrew the coupling containing the filter.
7. Using plastic forceps, remove the loaded filter from the coupling and place it in the appropriate empty petri dish.
8. Place the lid on the petri dish and pack it for transport.

Attachment 4 – Changing Filter for an External Oversight Group

Placing an Unloaded Filter onto the Sampler

1. Locate the next available unloaded filter and its associated *FAS Sample Collection and Chain of Custody Form* in the CEMRC/NMED FAS sampling kit.
 - The *FAS Sample Collection and Chain of Custody Forms* are placed in numerical order by SID number in a three-ring binder.
2. Using plastic forceps, place the unloaded filter onto the sampler support-screen.
 - Make sure the filter is centered on the support screen of the coupling using the forceps to move the filter, if necessary.
3. Reassemble the sampler coupling and open the ball valve completely.
4. Complete the 'Sample Collection Start Data' section of the *FAS Sample Collection and Chain of Custody Form* from step 1 above including:
 - Recording the start date and time the filter was placed on the sampler.
 - Recording the start flow rate.
 - Circling the appropriate sampling skid and its status (primary or backup).
 - Recording any site, equipment, and environmental irregularities, conditions adverse to quality, or other non-routine events in the "comments" section of the *FAS Sample Collection and Chain of Custody Form*.
 - Printing and signing your name.
 - Recording your organization.
5. Return the completed *FAS Sample Collection and Chain of Custody Form* and empty petri dish to the CEMRC FAS sampling kit.
6. Repeat all steps in this attachment for the backup skid.

ISSUED

WP 12-HP1325

Revision 5

Station B Canberra iCAM Alpha Continuous Air Monitor

Technical Procedure

EFFECTIVE DATE: 02/15/16

Walter MacMillan
APPROVED FOR USE

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CONTINUOUS USE

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CHANGE HISTORY SUMMARY

REVISION NUMBER	DATE ISSUED	DESCRIPTION OF CHANGES
0	04/22/14	<ul style="list-style-type: none"> This is a new document.
1	04/29/14	<ul style="list-style-type: none"> Added note above Performance heading declaring that sections can be performed in any order as necessary. Clarified in Introduction and substeps 4.11.3 and 6.25.2 that section 8.0 is to be implemented within one hour when CAM is declared out-of-service/fails operability or functional tests. Added substeps 4.12.6, 6.27.2 [F], and 6.30.6 directing RCT to secure CAM as directed by RCE/RCM. Added step 6.9 directing RCM to section 7.0 if alarm set points are UNSAT. Added in Introduction and steps 4.17 and 6.29 instruction for RCE/RCM to provide a copy of applicable attachment to FSM upon completion. Added step 8.2 directing RCT to fill in instrument information on attachment 4. Added in steps 8.3, 8.12, and 8.13 “/reference reading” to “background.”
2	05/01/14	<ul style="list-style-type: none"> Added in step 4.9 and attachment 1 LPM equivalents to CFM readings. Added substep 5.8.2 [F] directing RCT to secure CAM as directed by RCE/RCM. Deleted in attachment 1 note regarding change from multi-CAM to single Station B CAM data sheet. Changed alpha alarm Level 2 and Level 3 set points from 40 DAC-h to 50,000 DAC-h in all instances in document.
3	05/02/14	<ul style="list-style-type: none"> Revised 1.8 to 1.73 and 51 to 49 in step 4.9, bullet 3 and attachment 1. Add new step 8.2 to have RCT record initials, date and time on attachment 4.

REVISION NUMBER	DATE ISSUED	DESCRIPTION OF CHANGES
4	07/08/15	<ul style="list-style-type: none"> • Removed reference to 12-ER4903, Radiological Event Response. • Added reference to 12-ER4925, Incident Recognition and Initial Response. • Added a note above step 4.9 regarding time allowance for spectrum stabilization.
5	02/15/16	<p>Complete rewrite to include:</p> <ul style="list-style-type: none"> • Formatted the procedure to meet the requirements of WP 15-PS.2. • Converted the procedure from "Reference Use" to "Continuous Use" • Developed separate attachments for each section of the procedure, to document step "sign-offs". • Document ESS requirement denotations. • Added step to address low flow at Serra Control valve • Added Hearing Protection as a requirement for accessing the Station B Filter Housing Building, as a Precaution and Limitation. • Deleted NS-SBS-2014-02, <i>Station B Continuous Air Monitor (CAM) Installation and Use</i> as a reference, per Nuclear Safety. • Revised Section 8.0 to reflect the action level of 1500 DPM. • Revised attachment 4 to reflect the changes made in Section 8.0.

INTRODUCTION

This procedure implements the Safety Basis Supplement, ESS-2015-01 "*Post Panel/Room Closure*", which allows a real time prompt notification of abnormal radiological conditions, enabling timely execution of personnel protective measures.

This procedure provides instruction for the Operation, Operability Check, Filter Change, Functional Check, and compensatory actions to be taken when the iCAM is out of service.

Performance of this procedure generates the following record(s), as applicable. Any records generated are handled in accordance with departmental Records Inventory and Disposition Schedules.

Attachment 1, Station B Canberra iCAM Alpha Continuous Air Monitor Operability Check Sheet

Attachment 2, Station B Canberra iCAM Alpha Continuous Air Monitor Functional Check Sheet

Attachment 4, Direct Frisk of Station B Filter Data Sheet

Attachment 5, Securing Power to the CAM

Attachment 6, Restoring Power to the CAM

Attachment 7, Filter Change

Attachment 8, Changing Alpha Alarm Setpoints

A copy of attachments 1 and 2 shall be provided to the FSM upon completion.

REFERENCES			
DOCUMENT NUMBER AND TITLE	BASELINE DOCUMENT	REFERENCED DOCUMENT	KEY STEP
Title 10 <i>Code of Federal Regulations</i> (CFR) Part 835, "Occupational Radiation Protection"	✓		
Canberra iCAM Alpha Continuous Air Monitor User Guide	✓		
Position Paper 2002-06, <i>Alarm Set Points for the Radiation Monitoring Instrumentation in the Remote-Handled Facility at WIPP</i>	✓		
Position Paper 2007-002, <i>Underground Continuous Air Monitor Alarm Set Points</i>	✓		
WP 12-HP2001, <i>Abnormal Radiological Conditions</i>		✓	
WP 12-HP1305, <i>Air Sampling Equipment</i>		✓	

CONTINUOUS USE

REFERENCES			
DOCUMENT NUMBER AND TITLE	BASELINE DOCUMENT	REFERENCED DOCUMENT	KEY STEP
WP 12-HP1307, <i>Portable Instrument Operability Checks</i>		✓	
WP 12-HP4000, <i>Emergency Radiological Control Responses</i>		✓	
WP 04-EM4200, <i>Radiological Monitoring System Alarm Response</i>	✓		
WP 12-ER4925, <i>Incident Recognition and Initial Response</i>	✓		
JHA PROD-817, <i>Radiation Safety</i>	✓		
ESS-2015-01 <i>Post Panel/Room Closure</i>		✓	\$

EQUIPMENT LIST

Model 2360/4393 Probe Dual Alpha/Beta contamination survey instrument

PRECAUTIONS AND LIMITATIONS

Only Technicians who completed the applicable Job Performance Measures (JPM's) are qualified to perform this procedure.

Hearing Protection is required when stay-time in the Station B Filter Building exceeds 15 minutes, or two hours per day.

Calibration and operability check (radioactive) sources must be registered with the iCAM instrument.

Operability checks are to be performed daily, and are valid for 24 hours.
[ESS-2015-01, 4 SR 1]

The monitor is to be calibrated annually, and again after required maintenance/repair, followed by a functional test.

Functional checks are to be performed monthly. In the event a functional check is not performed as scheduled: **[ESS-2015-01, 4 SR 2]**

Documentation of the cause (e.g., power outage, not in service) shall be recorded in the Radiological Control (RC) Logbook, along with approval by the RCM/designee and FSM.

The functional check is then to be performed as soon as possible.

The iCAM monitor has a 30-minute backup battery for power interruptions.

The Station B iCAM "beta and gamma" alarm setpoints are not used.
The iCAM filter change frequency will be defined in the facility routine program.

CONTINUOUS USE

PRE-REQUISITE ACTIONS

None

PERFORMANCE

NOTE

1. Sections of this procedure may be performed in any order.
2. Sections of this procedure are performed in conjunction with procedure WP 12-HP1305.
3. Reference Attachment 3, *iCAM Alpha Continuous Air Monitor*, for a graphic display of the unit.
4. The instrument functions are displayed along the bottom of the display screen, and are activated by depressing soft keys directly below the display.
5. A flashing green beacon, accompanied by an intermittent single-tone sound, indicates an instrument fault condition.
6. A flashing red beacon, accompanied by a two-tone sound, indicates a high radioactivity measurement alarm by the instrument.

1.0 OPERATION CONTROLS**1.1 Local Controls****1.1.1 PRESS** the RESET key to:

- CLEAR an alarm condition. The alarm will reactivate if the initial alarm condition is not corrected.
- RESTART a counting measurement.
- Install a new filter.

1.1.2 PRESS BACKLIGHT key to:

- ADJUST screen brightness.
- RETURN to the main display.

2.0 SECURING POWER

NOTE

Completion of steps 2.1 through 2.9 are to be recorded on attachment 5.

ESS

2.1 **(\$)** NOTIFY the Central Monitoring Room Operator (CMRO) prior to securing power to the CAM. [ESS-2015-01, 4]

2.2 **UNLOCK AND OPEN** the cabinet door using the attached key.

2.3 **SET** the battery toggle switch to the OFF position.

2.4 **CLOSE AND LOCK** the cabinet door.

2.5 **SET** the monitor power switch to the OFF position.

2.6 **ENSURE** monitor screen is OFF.

2.7 **ENSURE** the AC power indicator is not illuminated.

2.8 **GO TO** procedure WP 12-HP1305 **AND**:

2.8.1 **PERFORM** steps 1.3.1 through 1.3.7 and SECURE power to Skid B-2.

2.8.2 **RETURN TO** step 2.9.

2.9 **ENSURE** the following isolation valves are CLOSED:

- EM-365-V-040
- EM-365-V-041
- EM-365-V-042

3.0 RESTORING POWER

NOTE

Completion of steps 3.1 through 3.8 are to be recorded on Attachment 6.

ESS

3.1 **(\$)** NOTIFY CMRO prior to restoring power to CAM. [ESS-2015-01, 4]

3.2 **ENSURE** the following isolation valves are **OPEN**:

- EM-365-V-040
- EM-365-V-041
- EM-365-V-042

CONTINUOUS USE

- 3.3 **GO TO** procedure WP 12-HP1305 **AND**:
- 3.3.1 **PERFORM** steps 1.4.1 through 1.4.11 and RESTORE power to Skid B-2.
- 3.3.2 **RETURN** to step 3.4.
- 3.4 **UNLOCK AND OPEN** the cabinet door using the attached key.
- 3.5 **SET** the battery toggle switch to the ON position.
- 3.6 **CLOSE AND LOCK** the cabinet door.
- 3.7 **SET** the monitor power switch to the ON position.
- 3.8 **ENSURE** the green AC power light is illuminated.

ESS

- 3.9 **(\$)** IF the CAM fails to energize, **[ESS-2015-01, 4 SAC 1.B]** THEN:
- 3.9.1 **NOTIFY** the CMR.
- 3.9.2 **PERFORM** SECTION 8.0. DOCUMENT results on Attachment 4, *Direct Frisk of Station B Filter Data Sheet*, with initial frisk within 1 hour. [ESS-2015-01, 4 SAC 1.B.1)
- 3.9.3 **INITIATE** an Action Request.
- 3.9.4 **RECORD** the instrument inoperability and corrective actions taken in the RC Logbook.

4.0 OPERABILITY CHECK

NOTE

It takes at least 20 to 30 minutes for a spectrum to develop and the count to stabilize.

Completion of steps 4.1 through 4.26 are to be recorded on Attachment 1.

ESS

- 4.1 **(\$)** **NOTIFY** the CMRO of the operability check. **[ESS-2015-01, 4 SR 1]**
- 4.2 **USING** Attachment 1, *Station B Canberra iCAM Alpha Continuous Air Monitor Operability Check Sheet*, RECORD the following:
- Name of the CMRO notified, along with Date and Time of notification.

- Name of the RCT performing the notification.
- Date and Start Time of the Operability Check.
- The iCAM number.
- The iCAM calibration due date.

4.3 **IF** the CAM has been monitoring while out of calibration,
THEN:

4.3.1 **CONTACT** the CMRO and Radiological Control Engineer (RCE)/RCM or designee,

4.3.2 **GO TO** WP 12-HP2001 and **PERFORM** steps 1.1 through 1.9.

4.3.3 **RETURN TO** section 8.0 and **PERFORM** steps 8.1 through 8.16. **DOCUMENT** results on attachment 4.

4.3.4 **RECORD** the instrument inoperability and corrective actions taken in the RC Logbook.

4.4 **PERFORM** a visual inspection for damage.

4.5 **IF** damage to the CAM is discovered,
THEN:

4.5.1 **NOTIFY** the CMRO and RCE/RCM or designee.

4.5.2 **RECORD** the damage in the comments section of Attachment 1.

4.5.3 **VERIFY** the instrument is OPERABLE.

ESS 4.6 **(\$)** **IF** the damage has rendered the instrument INOPERABLE,
THEN: [ESS-2015-01, 4 SR 1]

ESS 4.6.1 **(\$)** **NOTIFY** CMRO and RCE/RCM or designee.
[ESS-2015-01, 4 SR 1]

4.6.2 **SECURE** the CAM as directed by the RCE/RCM.

4.6.3 **USING** Attachment 1, **RECORD** the following:

- OOC in the "Status Block"
- Cause of the operability failure, and corrective action(s) taken in the "Comments Section"

4.6.4 **TAG** the instruments as "Out of Commission".

- ESS 4.6.5 **(\$)** **PERFORM** Section 8.0. DOCUMENT results on Attachment 4, *Direct Frisk of Station B Filter Data Sheet*, with initial frisk within 1 hour. **[ESS-2015-01, 4 SAC 1.B.1]**
- 4.6.6 **RECORD** the instrument inoperability and corrective actions taken in the RC Logbook.
- 4.6.7 **INITIATE** an Action Request.
- 4.6.8 **EXIT** the procedure.
- 4.7 **VERIFY** the Monitoring Indicator light is illuminated.
- ESS 4.8 **(\$)** **IF** the Monitoring Indicator light is NOT illuminated, **THEN:** **[ESS-2015-01, 4 SR 1]**
- ESS 4.8.1 **(\$)** **NOTIFY** CMRO and RCE/RCM or designee. **[ESS-2015-01, 4 SR 1]**
- 4.8.2 **SECURE** the CAM as directed by the RCE/RCM.
- 4.8.3 **USING** Attachment 1, **RECORD** the following:
- OOC in the “Status Block”
 - Cause of the operability failure, and corrective action(s) taken in the “Comments Section”
- 4.8.4 **TAG** the instruments as “Out of Commission”.
- ESS 4.8.5 **(\$)** **PERFORM** Section 8.0. DOCUMENT results on Attachment 4, *Direct Frisk of Station B Filter Data Sheet*, with initial frisk within 1 hour. **[ESS-2015-01, 4 SAC 1.B.1]**
- 4.8.6 **RECORD** the instrument inoperability and corrective actions taken in the RC Logbook.
- 4.8.7 **INITIATE** an Action Request.
- 4.8.8 **EXIT** the procedure.
- 4.9 **OBSERVE** the Main Display Screen. **USING** Attachment 1, **VERIFY** and **RECORD** the following:
- Current Main Display Screen time and date
 - Instrument status reads “NORMAL”
 - Air flow is within 1.73 and 2.20 cfm (49 and 60 lpm), with a nominal flow of 1.9 cfm (53.8 lpm)

- 4.10 **IF** the instrument status DOES NOT indicate “NORMAL”,
THEN PERFORM the following:
- ESS 4.10.1 **(\$)** NOTIFY CMRO and RCE/RCM or designee.
[ESS-2015-01, 4 SR 1]
- 4.10.2 **SECURE** the CAM as directed by the RCE/RCM.
- 4.10.3 **USING** Attachment 1, RECORD the following:
- OOC in the “Status Block”
 - Cause of the operability failure, and corrective action(s) taken in the “Comments Section”
- 4.10.4 **TAG** the instruments as “Out of Commission”.
- ESS 4.10.5 **(\$)** PERFORM Section 8.0. DOCUMENT results on Attachment 4, *Direct Frisk of Station B Filter Data Sheet*, with initial frisk within 1 hour. [ESS-2015-01, 4 SAC 1.B.1]
- 4.10.6 **RECORD** the instrument inoperability and corrective actions taken in the RC Logbook.
- 4.10.7 **INITIATE** an Action Request.
- 4.10.8 **EXIT** the procedure.
- 4.11 **IF** flow rate cannot be established and/or maintained within the range of 1.73 – 2.20 cfm (49 and 60 lpm),
THEN:
- 4.11.1 **TAG** the instruments as “Out of Commission”.
- ESS 4.11.2 **(\$)** PERFORM Section 8.0. DOCUMENT results on Attachment 4, *Direct Frisk of Station B Filter Data Sheet*, with initial frisk within 1 hour. [ESS-2015-01, 4 SAC 1.B.1]
- 4.11.3 **RECORD** the instrument inoperability and corrective actions taken in the RC Logbook.
- 4.11.4 **INITIATE** an Action Request.
- 4.11.5 **EXIT** the procedure.

NOTE

Occasional negative alpha DAC-hour readings are normal. Continuous negative readings however are indicative of an operating problem (dusty conditions, wrong configuration settings) that shall be investigated, resolved, and documented in the RC Logbook.

4.12 **RECORD** the current alpha DAC-hour (DAC-h) reading.

NOTE

1. PRESS F1 twice to access the alarm set points.
2. PRESS F4 twice to return to normal screen.

4.13 **VERIFY** and **RECORD** the following Alpha alarm set points on Attachment 1.

Alpha alarm	Level 1	40 DAC-h
	Level 2	50,000 DAC-h
	Level 3	50,000 DAC-h

4.14 **IF** the alarm setpoints are incorrect,
THEN PERFORM steps 7.1 through 7.12 to adjust the setpoints.

4.15 **PRESS** F2 then F3 to access the Radium C' (RaC') peak on the monitor screen.

4.15.1 **USE** the left or right arrows (<<< >>>) to move the cursor to locate the peak channel. Peak channel will be displayed in the upper right corner of the display.

4.15.2 **VERIFY** Radium C' peak is between channels 178 to 188.

4.15.3 **RECORD** Radium C' peak on Attachment 1.

4.15.4 **PRESS** F4 twice to return to normal screen.

ESS 4.16 **(\$)** **IF** the Radium C' peak is NOT within channels 178 to 188,
THEN: [ESS-2015-01, 4 SR 1]

ESS 4.16.1 **(\$)** **NOTIFY** CMRO and RCE/RCM or designee.
[ESS-2015-01, 4 SR 1]

4.16.2 **SECURE** the CAM as directed by the RCE/RCM.

4.16.3 **USING** Attachment 1, RECORD the following:

- OOC in the "Status Block"
- Cause of the operability failure, and corrective action(s) taken in the "Comments Section"

4.16.4 **TAG** the instruments as "Out of Commission".

ESS

4.16.5 **(\$)** **PERFORM** Section 8.0. DOCUMENT results on Attachment 4, *Direct Frisk of Station B Filter Data Sheet*, with initial frisk within 1 hour. [**ESS-2015-01, 4 SAC 1.B.1**]

4.16.6 **RECORD** the instrument inoperability and corrective actions taken in the RC Logbook.

4.16.7 **INITIATE** an Action Request.

4.16.8 **EXIT** the procedure.

4.17 **VERIFY** the following local indications:

- Instrument status reads "Normal"
- "Alarm" light is off
- "Fault" light is off
- "Muted" light is off
- "A/C power" light is on
- "Monitoring" light is on

4.18 **CONTACT** the CMRO and **VERIFY**:

- CAM is being monitored in the CMR.
- There is no CAM "Malfunction Indication" in the CMR.

4.19 **IF** all the local and CMR CAM indications are satisfactory, **THEN RECORD** "OK" in the status box on Attachment 1.

ESS

4.20 **(\$)** **IF** the operability check is unsatisfactory, **THEN PERFORM** the following: [**ESS-2015-01, 4 SR 1**]

ESS

4.20.1 **(\$)** **NOTIFY** CMRO and RCE/RCM or designee. [**ESS-2015-01, 4 SR 1**]

4.20.2 **SECURE** the CAM as directed by the RCE/RCM.

ESS

- 4.20.3 **USING** Attachment 1, RECORD the following:
- OOC in the "Status Block"
 - Cause of the operability failure, and corrective action(s) taken in the "Comments Section"
- 4.20.4 **TAG** the instruments as "Out of Commission".
- 4.20.5 **(\$)** **PERFORM** Section 8.0. DOCUMENT results on Attachment 4, *Direct Frisk of Station B Filter Data Sheet*, with initial frisk within 1 hour. **[ESS-2015-01, 4 SAC 1.B.1]**
- 4.20.6 **RECORD** the instrument inoperability and corrective actions taken in the RC Logbook.
- 4.20.7 **INITIATE** an Action Request.
- 4.20.8 **EXIT** the procedure.
- 4.21 **RECORD** the stop time on Attachment 1 when all operability checks are complete.
- 4.22 **NOTIFY** the CMRO that the operability check is complete, and "Operable".
- 4.23 **RECORD** the following on Attachment 1:
- Name of the CMRO notified, along with Date and Time of notification.
 - Name of the RCT performing the notification.
- 4.24 **GO TO** Section 5.0 and REPLACE the sample filter. **RETURN TO** step 4.25.
- 4.25 **COMPLETE** Attachment 1 and SUBMIT to RCE/RCM or designee for review and approval.
- 4.26 RCE/RCM/RCT or designee, **PERFORM** the following:
- 4.26.1 **SUBMIT** a copy of the reviewed and approved Attachment 1 to the Facility Shift Manager.
- 4.26.2 **SUBMIT** the reviewed and approved Attachment 1 to the Records Coordinator.

5.0 FILTER CHANGE

NOTE

1. The filter paper will tear if the vacuum pump on Skid B2 (41-G-102A for Pump 1 or 41-G-102B for pump 2) is not secured prior to the filter change.
2. Pressing the filter release lever has the following effects:
 - Normal operation is halted.
 - The red beacon flashes to indicate abnormal operating mode.
 - Alarms are disabled.
 - A display will appear with information.

Completion of steps 5.1 through 5.11 are to be recorded on Attachment 7.

- ESS
- 5.1 **(\$)** NOTIFY the CMRO prior to initiating filter change. **[ESS-2015-01, 4]**
 - 5.2 **PLACE** the vacuum pump control switch in the OFF position.
 - 5.3 **CLOSE** isolation valve EM-365-V-041.
 - 5.4 **LABEL** the new filter card with the current Date and Time.
 - 5.5 **PRESS** the filter release lever.
 - 5.6 **PERFORM** the following:
 - 5.6.1 **REMOVE** the spent filter card.
 - 5.6.2 **ENSURE** the beveled edge of the new filter card is on the left.
 - 5.6.3 **LOAD** the new filter card.
 - 5.7 **OPEN** isolation valve EM-365-V-041.
 - 5.8 **PLACE** the vacuum pump control switch to the "Pump 1" position.
 - 5.9 **IF** "Pump 1" does not start,
THEN PLACE the vacuum pump control switch to the "Pump 2" position.

5.10 **IF** "Pump 2" does not start,
THEN PERFORM the following:

5.10.1 **RECORD** the following on Attachment 1:

- OOC in the status block.
- Cause of the operability failure, and corrective action(s) taken in the "Comments" section.

ESS

5.10.2 **(\$)** **NOTIFY** the CMRO and RCE/RCM or designee.
[ESS-2015-01, 4]

5.10.3 **SECURE** the CAM as directed by RCE/RCM.

5.10.4 **TAG** the instrument as "Out of Commission".

ESS

5.10.5 **(\$)** **PERFORM** Section 8.0. **DOCUMENT** results on Attachment 4, *Direct Frisk of Station B Filter Data Sheet*, with initial frisk within 1 hour. **[ESS-2015-01, 4 SAC 1.B.1]**

5.10.6 **INITIATE** an Action Request.

5.10.7 **RECORD** the instrument inoperability and corrective actions take in the RC Logbook.

5.11 **PRESS** the RESET button.

6.0 STATION B iCAM FUNCTIONAL CHECK [Background and Efficiency]

NOTE

1. The MUTE & BACKLIGHT button may be pressed to silence any alarms.
2. The following steps require a card-mounted Americium-241 (Am-²⁴¹) source.
3. "CHAMPS" is the Computerized History and Maintenance Planning System.

Completion of steps 6.1 through 6.48 are to be recorded on Attachment 2.

- 6.1 IF** the functional check is being performed as part of a CHAMPS work order,
THEN PERFORM the following:

6.1.1 **RECORD** the Preventative Maintenance or Action Request Number on Attachment 2, *Station B Canberra iCAM Alpha Continuous Air Monitor Functional Check Sheet*.

6.1.2 **ENSURE** the following signatures are OBTAINED and RECORDED on the CHAMPS cover sheet prior to beginning work:

- Cognizant Organization Manager (COM) Release
- Zone Maintenance Manager (ZMM) Release
- FSM Work Authorization

ESS **6.2 (\$)** NOTIFY the CMRO of the functional check. **[ESS-2015-01, 4 SR 2]**

6.3 Using Attachment 2, **RECORD** the following:

- Name of the CMRO notified, along with Date and Time of notification.
- Name of the RCT performing the notification.
- Date and Start Time of the Functional Check.
- The CAM number.
- The CAM calibration due date.

ESS 6.4 **(\$)** **PERFORM** Section 8.0 DOCUMENT results on Attachment 4, *Direct Frisk of Station B Filter Data Sheet*, with initial frisk within 1 hour.
[ESS-2015-01, 4 SAC 1.B.1]

6.5 **USING** the normal display screen, **PRESS** the "F1" key twice.

6.6 **VERIFY** the following alarm set points.

Alpha alarm	Level 1 Level 2 and 3	40 DAC-h 50,000 DAC-h
-------------	--------------------------	--------------------------

6.7 **IF** the alarm setpoints are SAT,
THEN:

6.7.1 **RECORD** "SAT" on Attachment 2.

6.7.2 **GO TO** step 6.9.

6.8 **IF** the alarm setpoints are UNSAT,
THEN:

6.8.1 **RECORD** "UNSAT" on Attachment 2.

6.8.2 **GO TO** section 7.0 and **PERFORM** steps 7.1 through 7.12.

6.8.3 **RECORD** the change in alarm setpoints in the "Comments" section of Attachment 2.

6.8.4 **RETURN TO** step 6.9.

NOTE

1. Secured Skid B-2 will result in a low flow alarm every time the iCAM is reset.
 2. The sources used for this test should be placed facing up with the beveled edge to the left.
 3. Down-time for Skid B-2 air sample filters should be documented on attachment 1 of WP 12-HP1305.
-

6.9 **PLACE** the vacuum pump control switch in the OFF position.

6.10 **ENSURE** valve EM-365-V-041 is closed.

6.11 **PRESS** the filter release lever.

6.12 **REMOVE** the filter card AND INSERT the Am²⁴¹ source card, with the beveled edge to the left.

6.13 **PRESS** the RESET button.

NOTE

A "low flow" and quick (acute) alarm will occur at first. Acknowledge the alarm and then wait for the instrument to alarm at the normal set point.

6.14 **VERIFY** the following:

- local strobe light activates
- audio alarm activates
- CMR "High" alarm activates

6.15 **IF** the alarm functions are SAT,
THEN:

6.15.1 **RECORD** "SAT" on Attachment 2.

6.15.2 **CONTINUE TO** step 6.17.

6.16 **IF** the alarm functions are UNSAT,
THEN:

ESS

6.16.1 **(\$)** NOTIFY CMRO and RCE/RCM or designee.
[ESS-2015-01, 4 SR 2]

6.16.2 **SECURE** the CAM as directed by the RCE/RCM.

6.16.3 **USING** Attachment 2, RECORD the following:

- UNSAT on the "Functional Check Results" block
- Cause of the functional failure, and corrective action(s) taken in the "Comments Section"

6.16.4 **TAG** the instrument as "Out of Commission".

ESS

6.16.5 **(\$)** PERFORM Section 8.0 DOCUMENT results on Attachment 4, *Direct Frisk of Station B Filter Data Sheet*, with initial frisk within 1 hour. [ESS-2015-01, 4 SAC 1.B.1].

6.16.6 **RECORD** the instrument inoperability and corrective actions take in the RC Logbook.

6.16.7 **INITIATE** an Action Request.

6.16.8 **EXIT** the procedure.

CONTINUOUS USE

- 6.17 **PRESS** the filter release lever.
- 6.18 **REMOVE** the Am²⁴¹ source AND INSERT a new filter card, with the beveled edge to the left.
- 6.19 **PRESS** the RESET key.
- 6.20 **USING** the Normal Display screen:
- 6.20.1 **PRESS** F4 "CHECK".
- 6.20.2 **PRESS** CODE.
- 6.21 **ENTER** password 5555.
- 6.22 **PRESS** the arrow keys (<<< >>>) AND SELECT "Counting/source/gamma balance".
- 6.23 **SELECT** the "Fixed Check" (10 minutes).
- 6.24 **RECORD** the alpha background on Attachment 2. PRESS EXIT twice.
- 6.25 **PRESS** the filter release lever.
- 6.26 **REMOVE** the filter card AND INSERT the Am²⁴¹ source card, with the beveled edge to the left.
- 6.27 **PRESS** the arrow keys (<<< >>>), LOCATE "Alpha Calibration" AND PRESS SELECT.
- 6.28 **PRESS** the arrow keys (<<< >>>), LOCATE "Alpha Source", SELECT "Am²⁴¹ Number 1" AND PRESS SELECT.

NOTE

1. The 120 second count time will have to be monitored manually by the user, for the instrument will only display at 15 second intervals.
2. The display will show "Calibration Not Verified" because the "Quick Check" does not update the efficiency.

-
- 6.29 **SELECT** "Quick Check" (15 seconds) AND STOP the source count after approximately 120 seconds has elapsed.
- 6.30 **RECORD** the alpha efficiency on Attachment 2, AND COMPARE it with the specified tolerance of > 25%.

- 6.31 **IF** the alpha efficiency is SAT,
THEN:
- 6.31.1 **RECORD** "SAT" on Attachment 2.
- 6.31.2 **CONTINUE** with step 6.31.
- 6.32 **IF** the efficiency check is UNSAT,
THEN:
- ESS 6.32.1 **(\$)** **NOTIFY** CMRO and RCE/RCM or designee.
[ESS-2015-01, 4 SR 2]
- 6.32.2 **SECURE** the CAM as directed by the RCE/RCM.
- 6.32.3 **USING** Attachment 2, **RECORD** the following:
- UNSAT on the "Functional Check Results" block
 - Cause of the functional failure, and corrective action(s) taken in the "Comments Section"
- 6.32.4 **TAG** the instrument as "Out of Commission".
- ESS 6.32.5 **(\$)** **PERFORM** Section 8.0. **DOCUMENT** results on Attachment 4, *Direct Frisk of Station B Filter Data Sheet*, with initial frisk within 1 hour. [ESS-2015-01, 4 SAC 1.B.1]
- 6.32.6 **RECORD** the instrument inoperability and corrective actions take in the RC Logbook.
- 6.32.7 **INITIATE** an Action Request.
- 6.32.8 **EXIT** the procedure.
- 6.33 **PRESS** EXIT.
- 6.34 **PRESS** the filter release lever AND REMOVE the Am²⁴¹ source.
- 6.35 **LABEL** a new filter card with the current Date and Time.
- 6.36 **INSERT** the new filter card, with the beveled edge to the left side.
- 6.37 **OPEN** isolation valve EM-365-V-041.
- 6.38 **PLACE** the vacuum pump control switch to the "Pump 1" position.
- 6.39 **IF** Pump 1 does not start,
THEN PLACE vacuum pump control switch to "Pump 2" position.

6.40 **IF** Pump 2 does not start,
THEN PERFORM the following:

ESS

6.40.1 **(\$)** **NOTIFY** CMRO and RCE/RCM or designee.
[ESS-2015-01, 4 SR 2]

6.40.2 **SECURE** the CAM as directed by the RCE/RCM.

6.40.3 **USING** Attachment 2, **RECORD** the following:

- UNSAT on the "Functional Check Results" block
- Cause of the functional failure, and corrective action(s) taken in the "Comments Section"

6.40.4 **TAG** the instrument as "Out of Commission".

ESS

6.40.5 **(\$)** **PERFORM** Section 8.0. **DOCUMENT** results on Attachment 4, *Direct Frisk of Station B Filter Data Sheet*, with initial frisk within 1 hour. **[ESS-2015-01, 4 SAC 1.B.1]**

6.40.6 **RECORD** the instrument inoperability and corrective actions take in the RC Logbook.

6.40.7 **INITIATE** an Action Request.

6.40.8 **EXIT** the procedure.

6.41 **PRESS** the EXIT and RESET keys.

6.42 **VERIFY** the instrument status on the main screen indicates "NORMAL" and **RECORD** "SAT" in the status block on Attachment 2.

6.43 **IF** the instrument status **DOES NOT** indicate "NORMAL",
THEN PERFORM the following:

ESS

6.43.1 **(\$)** **NOTIFY** CMRO and RCE/RCM or designee.
[ESS-2015-01, 4 SR 2]

6.43.2 **SECURE** the CAM as directed by the RCE/RCM.

6.43.3 **USING** Attachment 2, **RECORD** the following:

- UNSAT on the "Main Screen Indicates Normal" block
- UNSAT on the "Functional Check Results" block
- Cause of the functional failure, and corrective action(s) taken in the "Comments Section"

6.43.4 **TAG** the instrument as "Out of Commission".

CONTINUOUS USE

- ESS 6.43.5 **(\$)** **PERFORM** Section 8.0. DOCUMENT results on Attachment 4, *Direct Frisk of Station B Filter Data Sheet*, with initial frisk within 1 hour. [**ESS-2015-01, 4 SAC 1.B.1**]
- 6.43.6 **RECORD** the instrument inoperability and corrective actions taken in the RC Logbook.
- 6.43.7 **INITIATE** an Action Request.
- 6.43.8 **EXIT** the procedure.
- 6.44 **IF** all functional checks are satisfactory,
 THEN record functional check results as "SAT".
- 6.45 **RECORD** the "Stop Time" on Attachment 2.
- 6.46 **IF** unit passes functional check, **NOTIFY** CMRO that "Station "B" CAM functional check completed, unit is operational."
- 6.47 **RECORD** the following on Attachment 2:
- Name of the CMRO notified, along with Date and Time of notification.
 - Name of the RCT performing the notification.
- 6.48 **COMPLETE** Attachment 2 AND SUBMIT to RCE/RCM/designee for review.
- 6.49 RCE/RCM/designee, **PERFORM** the following:
- 6.49.1 **SUBMIT** a copy of the reviewed and approved Attachment 2 to the FSM.
- 6.49.2 **SUBMIT** the original reviewed approved Attachment 2 to Records Coordinator

7.0 CHANGING ALPHA ALARM SETPOINTS

NOTE

The Alpha Alarm Setpoints are as follows:

- Level 1: 40 DAC-h
- Level 2 and 3: 50,000 DAC-h

Completion of steps 7.1 through 7.12 are to be recorded on Attachment 8.

7.1 **ENSURE** the ""Normal" screen is displayed.

7.2 **PRESS** F3 (SETUP).

7.3 **PRESS** "CODE".

7.4 **ENTER** the password 5555 as follows:

7.4.1 **ENSURE** the pointer appears under the question (?) mark.

7.4.2 **IF** the pointer is not under the (?),
THEN:

- **PRESS** the arrow keys (<<< >>>) AND
- **MOVE** the pointer to the question mark to be replaced.

7.4.3 **PRESS** EDIT to move the pointer to the number line.

7.4.4 **IF** the pointer is not under the (5),
THEN:

- **PRESS** the arrow keys (<<< >>>) AND
- **MOVE** the pointer to 5.

7.4.5 **PRESS** "DONE" and an "x" will replace the question mark.

7.4.6 **REPEAT** steps 7.4.1 through 7.4.6 until the password indicates "xxxx".

7.4.7 **PRESS** "DONE".

7.5 **SELECT** Alarm Levels AND **PRESS** "EDIT".

7.6 **PRESS** the arrow keys <<< or >>> AND **SELECT** the desired alarm setpoint (LEVEL 1, 2, OR 3).

ESS 7.7 **(\$)** **SET** the alarm level as follows: **[ESS-2015-01, 4 SR 2]**
CONTINUOUS USE

- 7.7.1 **PRESS** DIGIT.
- 7.7.2 **USE** the EDIT and arrow (<<< >>>) keys to select the digit to be changed.
- 7.7.3 **PRESS** EDIT.
- 7.7.4 **USE** the DIGIT and arrow (<<< >>>) keys to raise or lower the selected digit.
- 7.8 **PRESS** DIGIT, and then press EXIT.
- 7.9 **REPEAT** steps 7.6 through 7.8 to change additional alarm setpoints.
- 7.10 **PRESS** "F1" twice to VERIFY the alarm settings.
- 7.11 **IF** Alarm set points are correct,
THEN PRESS "F4" (EXIT) twice to return to the "Normal" display.
- 7.12 **IF** alarm the setpoints are incorrect,
THEN:
 - 7.12.1 **REPEAT** steps 7.6 through 7.8.
 - 7.12.2 **PRESS** "F1" twice to VERIFY the alarm settings.
 - 7.12.3 **PRESS** "F4" (EXIT) twice to return to the "Normal" display screen

8.0 STATION B - PERFORMANCE OF INITIAL FRISK (within 1 hour) and
SUBSEQUENT TWO-HOUR DIRECT FRISK

NOTE

ESS (\$) The Station B CAM is monitored by, and will alarm in, the Central Monitoring Room (CMR). Any time the Station B CAM is in an alarm condition, the Radiological Control Technician (RCT) will perform Section 8.0 of this procedure within one hour of notification of the alarm if the alarm is not immediately cleared and continue to perform the actions specified in Section 8.0 until the CAM alarm condition has been "cleared", the instrument is returned to service and released for normal operation by the Facility Shift Manager (FSM) and Radiological Control Manager (RCM). **[ESS-2015-01, 4]**

Completion of steps 8.1 through 8.18 are to be recorded on attachment 4.

8.1 **ENSURE** that an operability check of the Model 2360 Portable Alpha/Beta Contamination Instrument that will be used for the following steps has been performed using WP 12-HP1307.

8.2 **USING** Attachment 4, *Direct Frisk of Station B Filter Data Sheet*, **RECORD** the following:

- Current Date and Time
- RCT Printed Name and Signature
- Model 2360 instrument number and calibration due data
- Model 2360 efficiencies for Alpha(α) and Beta (β)

NOTE

If the UVS is inoperable and Station B is inoperable than the initial frisk is not to be performed per ESS-2015-01, 4 SAC 1.B.2.

ESS 8.3 **(\$)** **VERIFY** with the CMRO that the UVS is operating prior to performing the following steps related to the FAS filter, and **RECORD** the time on Attachment 4, **AND IF** the UVS is NOT operational the initial frisk (within 1 hour) **SHALL NOT** be performed **AND EXIT** this procedure. **[ESS-2015-01, 4 SAC 1.B.2]**

8.4 On the designated skid leg, **TURN** the ball valve FULLY to the **OFF** position.

8.5 **REMOVE** the FAS collar.

ESS 8.6 **(\$)** **PERFORM** a direct frisk of the FAS filter, with Initial Frisk within 1 hour of Station B CAM becoming inoperable. **[ESS-2015-01, 4 SAC 1.B.1]**

- 8.7 **ENSURE** O-ring is in place.
- 8.8 **REPLACE** FAS collar.
- 8.9 **RECORD** the net counts CPM (alpha and beta) on Attachment 4.
- 8.10 **TURN** ball valve FULLY to **ON** position.
- 8.11 **VERIFY** that the flow for the designated skid leg is between 1.8 cfm and 2.2 cfm.
- 8.12 **IF** the flow is NOT within tolerance,
THEN:
- 8.12.1 **CONTACT** the RCE/RCM/designee
- 8.12.2 **CHANGE** the filter as directed by the RCE/RCM/designee.
- 8.13 **CALCULATE** the disintegrations per minute (DPM), by dividing the NET counts per minute (CPM), by the corresponding 2360 instrument efficiency for each count (alpha and beta).
- 8.14 **RECORD** the corresponding DPM values on Attachment 4.
- 8.15 **IF** calculated results are LESS THAN OR EQUAL TO "1500 DPM/probe Alpha",
THEN:
- 8.15.1 **NOTIFY** CMRO of Station B direct frisk results.
- 8.15.2 **SUBMIT** completed Attachment 4 to RCE/RCM/designee.
- 8.15.3 **EXIT** this section of the procedure.
- 8.16 **IF** calculated results ARE GREATER THAN "1500 DPM/probe Alpha",
THEN:
- 8.16.1 **(\$)** **NOTIFY** RCE and FSM of potential radiological event.
[ESS-2015-01, 4 SAC 1.C.1]
- 8.17 RCE, with FSM concurrence, **PERFORM** the following:
- 8.17.1 **GO TO** emergency response procedure WP 12-HP4000.

ISSUED

WP 12-HP1325

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Attachment 1 – (\$) Station B Canberra iCAM Alpha Continuous Air Monitor Operability Check Sheet
 [ESS-2015-01, 4 SR 1]

Steps 4.1 & 4.2	CMRO Notified of the Operability Check [Name]					Date:	Time:	By (RCT):	
OOC: () Out-of-Commission OK: () Operating properly					Flow rate – 1.73-2.2 CFM (49-60 LPM) with nominal reading of 1.9 CFM (53.8 LPM) RaC' peak channel - 178 to 188				
Steps 4.2 & 4.21	Date:				Start Time:				
					Stop Time:				
	ID Number Step 4.2	Calibration Due Step 4.2	Time/Date Step 4.9	Normal Condition Step 4.9	Air Flow Step 4.9	Current DAC-h Step 4.12	Alarm set points in DAC-h <u>L1 / L2, L3</u> Step 4.13	RaC' Peak Step 4.15	Status of Step Performed or N/A Step 4.19 Step 4.6.3 Step 4.8.3 Step 4.10.3 Step 4.16.3 Step 4.20.3
						α	α /		
Step 4.22 & 4.23	CMRO Notified of the Equipment Status (Name)				Date:	Time:	By (RCT):		

CONTINUOUS USE

ISSUED

WP 12-HP1325

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Attachment 1 – (\$) Station B Canberra iCAM Alpha Continuous Air Monitor Operability Check Sheet
[ESS-2015-01, 4 SR 1]

	Comments:		
Step 4.25 Step 4.26	Performed by (Printed Name):	Signature:	Date/Time:
	Approved by (Printed Name):	Signature:	Date/Time:

CONTINUOUS USE

Attachment 2 – (\$) Station B Canberra iCAM Alpha Continuous Air Monitor Functional Check Sheet [ESS-2015-01, 4 SR 2]

Step 6.1 PM or Action Request #:					
Steps 6.2 and 6.3 CMRO Notified of the Functional Check [Name]		Date:	Time:	By (RCT):	
Step 6.3	Date:	Start Time:		Step 6.45 Stop Time:	
	CAM #:	Calibration Date:			
RADIOACTIVE SOURCE INFORMATION					
			Am-241 Source Serial #: OB315		
Step	Parameter	Specification		SAT	UNSAT
6.6, 6.7, 6.8	Alpha Alarm Set Point	Level 1 Level 2, 3	40 DAC-h 50,000 DAC-h		
6.14, 6.15, 6.16	Local Strobe Light and Audio alarm activates				
6.14, 6.15, 6.16	CMR "High" Alarm Activates				
6.24	Background	α			
6.30	Alpha Efficiency		>25%		
Step 6.44 Functional Check Results (Check One):			SAT:	UNSAT:	
Step 6.42 Verify the instrument status on the main screen indicates NORMAL			SAT:	UNSAT:	
Step 6.47 CMRO Notified of the Equipment Status [Name]		Date:	Time:	By (RCT):	

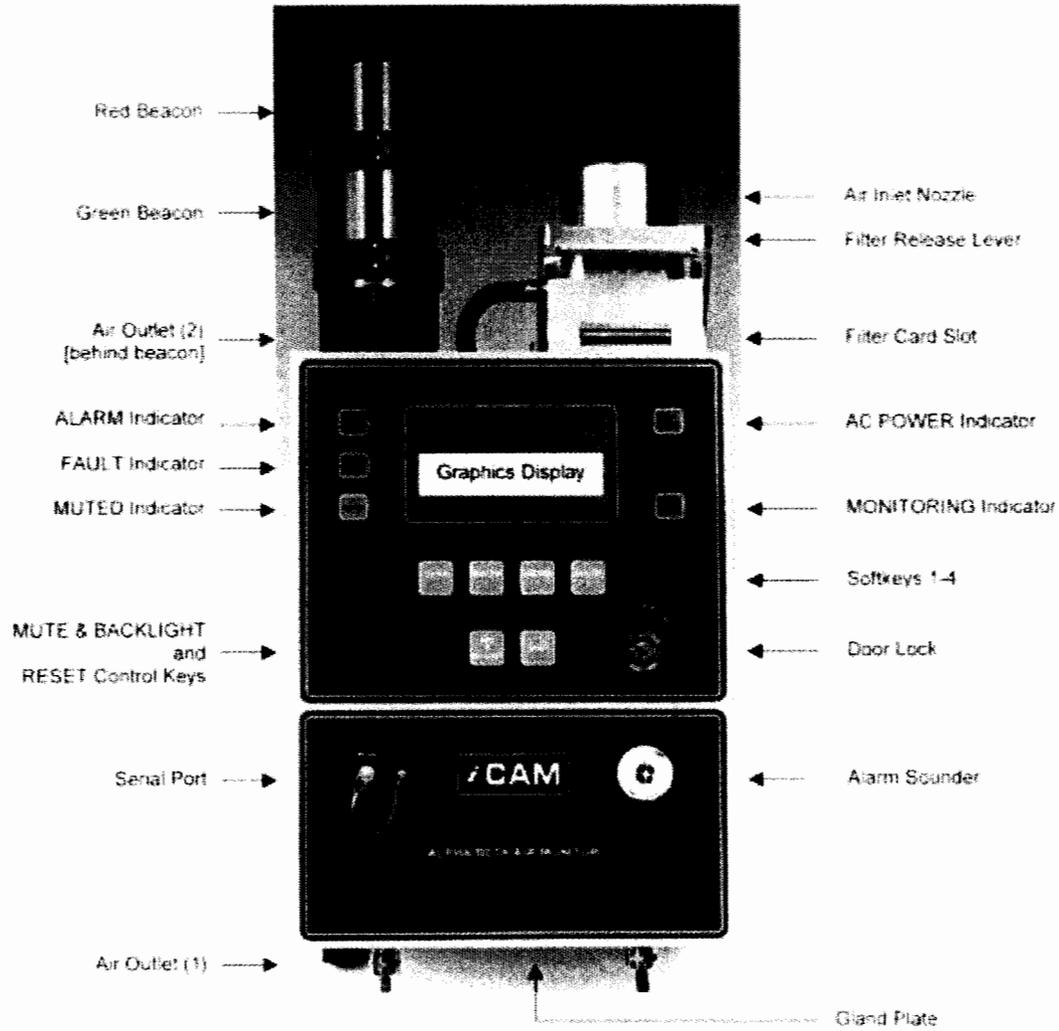
Comments:

Performed by (Printed Name): _____ Signature: _____ Date/Time: _____

Approved by (Printed Name): _____ Signature: _____ Date/Time: _____

CONTINUOUS USE

Attachment 3 – iCAM Alpha Continuous Air Monitor



Introduction

CONTINUOUS USE

ISSUED

WP 12-HP3500

Revision 21

Airborne Radioactivity

Technical Procedure

EFFECTIVE DATE: 11/24/15

Walter MacMillan
APPROVED FOR USE

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REFERENCE USE

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CHANGE HISTORY SUMMARY

REVISION NUMBER	ISSUED DATE	DESCRIPTION OF CHANGES
19	01/24/12	<ul style="list-style-type: none"> • Editorial changes made throughout the document. • Step 1.1.9 made as a Note before section 1.0. • Steps 3.3, 3.3.1, and 3.3.2 added information for turning in air monitoring filters to WIPP Labs and completing Attachment 4 for NESHAP and Non-NESHAP filters.
20	08/17/15	<ul style="list-style-type: none"> • Complete rewrite to align with current practices.
21	11/24/15	<ul style="list-style-type: none"> • Replaced NESHAPS filters with lapel air sample filters throughout document. • Added to bullet under step 3.1, the count rate for both Tennelec and portable counters. • Deleted in bullet four, beneath Precautions and Limitations, material regarding background for portable counters. • Deleted bullet beneath step 3.3, regarding attachment of a map. • Changed five (5) minutes to one (1) hour in step 3.4 and substep 3.4.1. • Changed five (5) and ten (10) minutes to thirty (30) minutes in step 3.5. • Replaced in substep 3.11.1, "each of these" with "exposed." • Added to Note above step 1.3, information regarding surgeon gloves. • Deleted steps 1.13 and 1.15 regarding check weight serial number. • Changed in step 1.17, "calibration test" to "operability check." • Added to end of step 1.20, "and attachment 3 of 12-HP1305." • Added to end of step 3.3, "or other format approved by the RC & DM." • Added to bullet beneath step 3.3, information regarding counting the filter. • Added bullets beneath step 3.3 regarding sample count and Airborne Concentration. • Deleted bullet beneath step 3.3 regarding map.

INTRODUCTION

This procedure provides instructions for analyzing and reporting results of particulate air samples for airborne radioactivity. Radiological Assessment Filter (RAF) processing is NOT covered in this procedure.

Performance of this procedure generates the following record(s), as applicable. Any records generated are handled in accordance with departmental Records Inventory and Disposition Schedules (RIDS).

- Attachment 1, *Gravimetrics, Volume, and Activity Statistics*
- Attachment 2, *Airborne Sample Results*
- Attachment 3, *DAC-hour Tracking*
- Attachment 4, *Mettler Balance Operability Check*
- Attachment 5, *Request for Analysis/Chain-of-Custody Record*

REFERENCES			
DOCUMENT NUMBER AND TITLE	BASELINE DOCUMENT	REFERENCED DOCUMENT	KEY STEP
Title 10 <i>Code of Federal Regulations</i> (CFR) Part 835, " <i>Occupational Radiation Protection</i> "	✓		
40 CFR Part 61, Subpart H, " <i>National Emission Standards for Emissions of Radionuclides Other Than Radon from Department of Energy Facilities</i> "	✓		
40 CFR Part 191, Subpart A, " <i>Environmental Standards for Management and Storage</i> "	✓		
Agreement for Consultation and Cooperation Between the Department of Energy and the State of New Mexico on the Waste Isolation Pilot Plant	✓		
DOE-EH-0173T, <i>Environmental Regulatory Guide for Radiological Effluent Monitoring and Environmental Surveillance</i>	✓		
Health Physics 64: 434-435, <i>Standardizing Minimum Detectable Amount Formulations</i> , Brodsky, A., 1993	✓		
METTLER AE240 <i>Dual Range Balance Operating Instructions</i>	✓		
PSD No. 17, <i>The Minimum Detectable Activity Concept</i> , EG&G Ortec Systems Application Studies, Lochamy, J. C., September 1981	✓		

REFERENCES			
DOCUMENT NUMBER AND TITLE	BASELINE DOCUMENT	REFERENCED DOCUMENT	KEY STEP
Radiation Protection Management Vol. 13, No. 4, Detection and Quantification Limits of Field Survey Instrumentation (Part 1), Jamieson, M., 1996	✓		
Radiation Protection Management Vol. 13, No. 5, Detection and Quantification Limits of Field Survey Instrumentation (Part 2), Jamieson, M., 1996	✓		
DOE/WIPP 97-2238, <i>Periodic Confirmatory Measurement Protocol for the Waste Isolation Pilot Plant</i>	✓		
WP 10-WC3002, <i>Corrective Maintenance</i>	✓		
WP 12-5, <i>Waste Isolation Pilot Plant Radiation Safety Manual</i>	✓		
WP 12-HP1100, <i>Radiological Surveys</i>	✓		
WP 12-HP1245, <i>Tennelec Series 5 XLB Low Background Alpha/Beta Counting System Operation</i>		✓	
WP 12-HP1305, <i>Air Sampling Equipment</i>		✓	
WP 12-HP1307, <i>Portable Instrument and Portal Monitor Operability Checks</i>		✓	
WP 12-HP1500, <i>Radiological Posting and Access Control</i>	✓		
WP 12-HP2001, <i>Abnormal Radiological Conditions</i>	✓		
WP 12-HP4000, <i>Emergency Radiological Control Responses</i>	✓		
WP 13.1, <i>Nuclear Waste Partnership Quality Assurance Program</i>	✓		

EQUIPMENT LIST

None

PRECAUTIONS AND LIMITATIONS

- When requested by Stakeholders and Engineering, and/or as directed by the Radiological Control Supervisor (RCS)/Radiological Control Engineer (RCE)/Radiological Control Manager (RCM), Gravimetrics (the weighing of air sample filters) is performed on specific Continuous Air Monitors (CAMs) and Fixed Air Samplers (FASs) to evaluate the effect of salt, diesel, water, or any other substances that could interfere with the collection and analysis of radioactive particulate.
- National Emission Standards for Hazardous Air Pollutants (NESHAP) filters (Station B and Station C [FAS-157] samples), and designated NESHAP backup filter samples may be retained by Site Environmental Compliance (SEC) for analysis and determination as periodic confirmatory samples.
- WIPP Radiological Controls organization is responsible for the review, and trend analysis, if needed, of the analyzed FAS filter samples. SEC will determine if the actual filters are to be maintained for NESHAPs back up and, if required, retain the filters, Chain-of-Custody records, and associated analysis data package(s) of non-NESHAP FAS filter samples.
- Routine air monitoring filter samples, and NESHAP filter samples, will NOT be analyzed for record purposes prior to 72 hours after filter collection to allow naturally occurring isotopes to decay.
- Only RCTs who have completed the appropriate Job Performance Measures (JPMs) may perform the steps directed to RCTs in this procedure.
- The required Derived Air Concentration (DAC) sensitivity is 0.1 DAC for radiological areas and 0.02 DAC for Controlled Areas (or as designated by the Radiological Controls and Dosimetry Manager [RC&DM]/DEPUTY/DESIGNEE).
- Air samples will be a minimum of 300 cubic feet (unless otherwise designated by the RCS/RCE/RCM) for the measurement of air concentrations in Radiological Areas to achieve an Minimum Detectable Concentration (MDC) that is less than or equal to (\leq) the required DAC sensitivity. When these samples are collected for the coverage of specific jobs, the time period of air sample collection should extend throughout the duration of the job for that shift (unless otherwise designated by the RCS/RCE/RCM). As long as the minimum volume per sample is collected, this may also be achieved by collecting several air samples in succession or even with the use of overlapping time periods that cover the entire duration of the job for that shift.
- ONLY VERSAPOR®3000 Membrane filters with 3.0 μ m pore size will be used in fixed and portable air samplers utilized in connection with monitoring individual radiological job activities. This restriction does NOT apply to CAMs or lapel air sample filters.

- For measurement of air concentrations in Controlled Areas, air sample volume will be a minimum of 1000 cubic feet (unless otherwise designated by the RCS/RCE/RCM) and will be counted on a TENNELEC or an instrument of equal or greater sensitivity.
- NESHAP filter samples will be kept in a locked cabinet or locked room, OR in the possession of a qualified Radiological Control Technician (RCT), Radiological Engineer, SEC, or Waste Isolation Pilot Plant (WIPP) Laboratories personnel.
- Filter samples submitted to WIPP Laboratories will be submitted with the completed Request for Analysis/Chain-of-Custody record, and this must occur within three of the Laboratories' normal working days after the filter is collected unless otherwise directed by the RCS/RCE/RCM.
- Radioactivity analysis of air monitoring filter samples may be performed one (1) of two (2) ways, as directed by RCS/RCE/RCM: (1) RCT may perform the air filter sample analysis, or (2) Per RCS/RCE/RCM, RCT may send air monitoring filter samples to WIPP Laboratories for analysis.
- Sample identification numbers (SID#s) are assigned utilizing the following logic: FAS, PAS, or CAM number, followed by the date the filter was placed on the FAS or CAM. For example, a filter placed on CAM 146A on August 8th, 2004, would be assigned a SID# of 146A080804. If a filter is changed more than once a day, the time of installation (24 hour format) should be added to the SID# (e.g., for the example given, if installation took place at 8:30 p.m., the SID# would be 146A0808042030).
- Use good Radiological Work practices when handling used filters (i.e.: wear surgeon gloves, ensure frisk is performed prior to touching face or other clean surface).

PREREQUISITE ACTIONS

NONE

REFERENCE USE

PERFORMANCE

NOTE

Section 1.0, *Gravimetrics*, is performed when requested by the RCS/RCE/RCM.

1.0 GRAVIMETRICS

- 1.1 RCT, **VERIFY** current calibration stickers exist for balance and calibration weights **AND RECORD** calibration information on attachment 4.
 - 1.2 RCT, **IF** balance calibration is due within one month of due date, **THEN NOTIFY** RCS/RCE/RCM.
-

NOTE

Check weights are calibrated annually. Surgeon gloves (or equivalent) should be worn when handling the weights in order to avoid skin contamination, oil, dirt, etc. that could affect the calibration.

- 1.3 RCT, **ENSURE** balance is level by determining if bubble is in center of circle (located just in front of weighing pan) **AND RECORD** information on attachment 4.
- 1.4 RCT, **IF** bubble is NOT located in center of circle, **THEN LEVEL** balance by adjusting leveling screws located underneath rear section of balance.
- 1.5 RCT, **ENSURE** balance is powered on AND indicates a lighted display of "0.0000."
- 1.6 RCT, **IF** display is not "0.0000," **THEN PRESS** the control bar briefly **AND ENSURE** display is "8.8.8.8.8.8.8.8," followed by "0.0000."
- 1.7 RCT, **PRESS AND HOLD** control bar UNTIL "r n g" appears **AND ENSURE** balance is in 200 range as indicated by display showing "200."
- 1.8 RCT, **IF** balance is NOT in the 200 range, **THEN PUSH** (tap) control bar UNTIL it reads 200.
- 1.9 RCT, **PLACE** a tare container on weighing pan (if one is not already present) **AND CLOSE** sliding glass doors.

- 1.10 RCT, **PRESS** control bar briefly with tare container in place, TO ZERO balance.
- 1.11 RCT, **DON** gloves **AND PLACE** a 2 gram calibrated weight in the tare container **AND CLOSE** the sliding glass door.
- 1.12 RCT, **RECORD** the mass measurement indicated by the scale AND the calibrated weight of the standard on attachment 4.
- 1.13 RCT, **REPLACE** the 2 gram calibrated standard with a calibrated standard of 10 grams in the tare container **AND CLOSE** the sliding glass door.
- 1.14 RCT, **RECORD** the mass measurement indicated by the scale AND the calibrated weight of the standard on attachment 4.
- 1.15 RCT, **IF** standards are within 0.02 milligrams (mg) of the calibrated weight AND the balance is operating correctly, **THEN RECORD** "Sat" for Sat/Unsat and sign attachment 4.
- 1.16 RCT, **IF** the balance fails the calibration test, **THEN TAG** balance out of service (OOC), **RECORD** "Unsat", **AND SIGN** attachment 4.
- 1.17 RCT, **IF** the balance fails the operability check, **THEN NOTIFY** RCS/RCE/RCM.

NOTES

1. Periodic Gravimetrics data performed on NESHAP and designated NESHAP backup filter samples are recorded on attachment 3, NESHAP Particulate Air Filter Sample Form, of WP 12-HP1305, *Air Sampling Equipment*.
2. Calculations necessary to determine volume and mg/m³ are found on attachment 1.

-
- 1.18 RCT, **ENSURE** a clean filter has desiccated for a minimum of 24 hours.
 - 1.19 RCT, **ASSIGN** a unique SID# to the filter.
 - 1.20 RCT, **RECORD** the SID# on the filter, the container, and attachment 3 of 12-HP1305.
 - 1.21 RCT, **RECORD** the desiccation date, time, AND RCT printed name AND signature on attachment 3 of WP 12-HP1305.

- 1.22 RCT, **ENSURE** balance is “zeroed” **AND PLACE** filter in tare container on the scale.
- 1.23 RCT, **RECORD** the SID#, weight, date, time, AND RCT printed name AND signature on attachment 3 of WP 12-HP1305.
- 1.24 RCT, **PLACE** weighed filter in the assigned container.
- 1.25 RCT, **REFER TO** WP 12-HP1305 (for changing air monitoring filter samples) **AND WEIGH** the loaded filter sample as soon as possible after collection.
- 1.26 RCT, **RECORD** date, time, gross and net weights, volume (mg/m^3), AND RCT printed name AND signature on attachment 3 of WP 12-HP1305.
- 1.27 RCT, **PLACE** the filter in the desiccator, **THEN REMOVE** the lid from the container **AND PLACE** it under the container.
- 1.28 RCT, **DESICCATE** the filter sample for a minimum of twenty four (24) hours, **THEN WEIGH** the filter sample.
- 1.29 RCT, **RECORD** date, time, gross and net weights, volume (mg/m^3), AND RCT printed name AND signature on attachment 3 of WP 12-HP1305.
- 1.30 RCS/RCE/RCM, **CONTACT** SEC by voice to determine which filters (if any) will be retained. In the comments section of attachment 4, **PROVIDE** the name of the person contacted and the time and date AND the ANSWER to which filters will be retained. **RETAIN** filters until SEC provides the answer via written documentation.
- 1.31 SEC, **PROVIDE** written documentation to RCS/RCE/RCM with copy to RC&DM AND Deputy regarding which filters will be retained AND which filters will be released for disposal.

NOTE

Section 2.0, *Desiccator Maintenance*, is performed when requested by the RCS/RCE/RCM.

2.0 DESICCATOR MAINTENANCE

2.1 RCT, **IF** it is known to the RCT that the desiccant was used more than (>) twice after drying,

OR

IF the desiccant is pink in color,

OR

IF the humidity gauge reads 50% or greater,

THEN REPLACE desiccant as follows:

2.1.1 **REMOVE** desiccant pan from desiccator.

2.1.2 **POUR** desiccant into a glass jar container.

2.1.3 **FILL** the pan with blue desiccant.

2.1.4 **PLACE** desiccant pan in desiccator.

3.0 RADIOACTIVITY ANALYSIS OF AIR MONITORING FILTERS

NOTES

1. Air sample activity determination may include, but is not limited to recount of air filter sample to determine natural/transuranic, half-life indication AND/OR Analysis of air sample filter with spectral analysis instrumentation.
 2. Background and sample counting times may be altered in accordance with attachment 1 when directed by the RCS/RCE/RCM.
 3. The required DAC sensitivity is 0.1 DAC for radiological areas and 0.02 DAC for Controlled Areas (or as designated by the RC&DM/DEPUTY/DESIGNEE).
 4. If available, use data from sample counter report(s) to complete the applicable blocks on attachment 2. Attachment 2 and the numerical entry required may be designated and replaced or supplemented by appropriate approved computer programs designated by the RC&DM or Deputy.
 5. Some numerical values required on attachment 2 may not automatically be reported and must (in that case) be calculated.
 6. Record the real numbers calculated, even if they are negative values, unless otherwise directed by the procedure.
 7. Do NOT indicate less than (" $<$ ") values.
-

3.1 RCT, **ENSURE** the following:

- Counting system operability checks were performed in accordance with WP 12-HP1245, *Tennelec Series 5 XLB Low Background Alpha/Beta Counting System Operation*, OR WP 12-HP1307, *Portable Instrument and Portal Monitor Operability Checks*,
- Background counting time is more than or equal to (\geq) thirty (30) minutes (unless a different background counting time is specified by the RCS/RCE/RCM),
- The alpha background count rate is less than ($<$) 0.5 counts per minute (cpm) for Tennelec's and $<$ 1.0 cpm for portable counters (or as otherwise specified by the RCS/RCE/RCM) and
- The beta background count rate is less than 10 cpm for Tennelec's and 100 cpm for portable counters (or as otherwise specified by the RCS/RCE/RCM).

3.2 RCT, **COUNT** filter for a minimum of ten (10) minutes.

3.3 RCT, **RECORD** the following information on attachment 2 or other format approved by the RC & DM:

- Building/Location where air sample was collected
- Air Sample ID
- RWP Number (if any)
- Job Description
- Sampler ID
- Sampler Type
- Filter Type (such as “Versapor 3000”). For ALL fixed and portable air samplers other than CAMs or lapel air samples, use Versapor®3000 Membrane filters with 3 µm pore size.
- Date/Time ON (MM/DD/YYYY, HH:MM)
- Date/Time OFF (MM/DD/YYYY, HH:MM)
- Initial Flow Rate (cubic feet per minute (CFM)/liters per minute (LPM))
- Final Flow Rate (CFM/LPM)
- Filter Correction Factor (alpha), use 0.80 (unless otherwise designated by the RCS/RCE/RCM)
- Filter Correction Factor (beta), use 0.95 (unless otherwise designated by the RCS/RCE/RCM)
- Filter Sample Fraction “Y”. If you are counting the entire filter, record Y as 1. If you are counting a portion of the filter, seek guidance from the RE/RCS/RCM.
- Sample Collection Time (min)

- Average Flow Rate (CFM/LPM):

$$\begin{aligned} & \text{Average Flow Rate (CFM)} \\ &= \frac{\text{Initial Flow Rate} + \text{Final Flow Rate}}{2} \frac{\text{LPM}}{28.32} \\ &= \text{CFM} \end{aligned}$$

- Total Volume (ft³)
- Counter ID (240-RI-000-####)
- Counter Type (such as TENNELEC or 3030)
- Date/Time Count Initiated (MM/DD/YY, HH:MM), using 24 hour time
- Background Counting Time (min)
- Sample Counting Time (min)
- Counter Efficiency fraction (alpha)
- Counter Efficiency fraction (beta)
- **IF** sample report(s) from the sample counter **are available**,

AND

IF the data for all four items directly below is listed,
THEN ENTER the data for the following four items from the sample report(s):

- Alpha Background Count Rate (cpm)
- Beta Background Count Rate (cpm)
- Alpha Minimum Detectable Activity (MDA) in disintegrations per minute (dpm)
- Beta MDA (dpm)

Otherwise, **ENTER** the following:

- Alpha Background Count Rate (cpm)
- Beta Background Count Rate (cpm)
- Alpha Gross Count Rate (cpm)
- Alpha Net Count Rate (cpm)
- Beta Gross Count Rate (cpm)
- Beta Net Count Rate (cpm)

REFERENCE USE

- Alpha MDA (dpm)
- Beta MDA (dpm)
- **CHECK** one of the following:
 - Initial Sample Count
 - Or
 - Decayed Sample Count
- Air Sample Activity (dpm), for both alpha and beta
- **CALCULATE** the Decision Level (dpm), for both alpha and beta

$$DL (dpm) = \frac{1.645}{(\epsilon) (C)} \sqrt{\frac{R_b}{t_s} + \frac{R_b}{t_b}}$$

- Either “Y” for “Yes” or “N” for “No” for the answer to the query “Sample Activity > Decision Level (Y/N)”, (for both alpha and beta)
- Beta activity to alpha activity ratio:

$$\text{Beta Activity to Alpha Activity Ratio} = \frac{\text{Beta Sample Activity in dpm}}{\text{Alpha Sample Activity in dpm}}$$

- MDC ($\mu\text{Ci/ml}$), for both alpha and beta
- MDC Total DAC Fraction, for the sum of the alpha and beta contributions:

$$\text{MDC Total DAC fraction} = \frac{\text{MDC for alpha}}{\text{Alpha DAC Value}} + \frac{\text{MDC for beta}}{\text{Beta DAC Value}}$$

DAC value = 5 E-12 $\mu\text{Ci/ml}$ for alpha and 7 E-9 $\mu\text{Ci/ml}$ for beta (beta-gamma), unless otherwise directed by the RC&DM/DEPUTY/DESIGNEE.

- Airborne Conc. ($\mu\text{Ci/ml}$), (airborne concentration) for both alpha and beta, AND for this data entry, **RECORD all negative values as zero.**
- Airborne Concentration ($\mu\text{Ci/ml}$) = $\frac{\text{Air Sample Activity in dpm}}{(V) (Y) (6.286 \text{ E}10)}$
- Airborne Total DAC Fraction, for the sum of the alpha and beta contributions [utilizing the “Airborne Conc. ($\mu\text{Ci/ml}$)”]:

Airborne Total DAC Fraction

$$= \frac{\text{Airborne Concentration for alpha}}{\text{Alpha DAC Value}} + \frac{\text{Airborne Concentration for beta}}{\text{Beta DAC Value}}$$

DAC value = 5 E-12 $\mu\text{Ci/ml}$ for alpha and 7 E-9 $\mu\text{Ci/ml}$ for beta (beta-gamma), unless otherwise directed by the RC&DM/DEPUTY/DESIGNEE.

- Resp. PF (respirator protection factor). When no respirator is used, the respirator protection factor = 1.
- Effective Airborne Total DAC Fraction

$$\text{Effective Airborne Total DAC Fraction} = \frac{\text{Airborne Total DAC Fraction}}{\text{Respirator Protection Factor}}$$

- **ATTACH** the printed out report(s) of the sample counter for the analysis of the sample (when available).
- Signature and Date from RCT, AND any added COMMENTS
- Printed name, signature, AND date of review from the RCS/RCE/RCM

NOTE

Steps 3.4, 3.5, and 3.6 are performed concurrently.

3.4 RCT, **IF ALL** of the following are true:

- The Airborne Total DAC Fraction is more than or equal to (\geq) the required DAC sensitivity, as listed on attachment 1, in an active working area,
- The Airborne Total DAC Fraction is more than or equal to (\geq) the MDC Total DAC Fraction,
- The air sample is counted within 1 hour of the ending time of the air sample collection (or other time period designated by the RC&DM/DEPUTY/DESIGNEE), and
- The Sample Activity beta to alpha ratio for the initial count of the air sample is outside the range of 1.5 to 3 (or other ratio range designated by the RC&DM/DEPUTY/DESIGNEE),

THEN PERFORM the following:

- RCT, **NOTIFY** the RCS/RCE/RCM by voice within one (1) hour,
- **PERFORM** spectral analysis of air sample radioactivity,
- **RECORD** analysis results in the Remarks section of attachment 2.

3.4.1 RCT, **IF** spectral analysis is performed **AND** the sample results indicate transuranic activity, **THEN NOTIFY** the RCS/RCE/RCM by voice within one (1) hour.

3.5 RCT, **IF** analyzing a filter due to **ANY** of the following:

- U/G CAM alarm,
- Loss of remote indication from U/G CAM (when remote indication exists),
- Requested by FSM,

THEN NOTIFY the RCS/RCE/RCM by voice within thirty (30) minutes, **AND THEN** RCS/RCE/RCM, **NOTIFY** FSM/CMRO (Central Monitoring Room Operator) of analysis results after they are available by voice within thirty (30) minutes.

NOTE

If there are questions regarding how to accomplish this sample recount from the guidance on attachment 1 and 2 or other questions, contact a Radiological Engineer (RE) or RCS/RCE/RCM for guidance. The RCS/RCE/RCM may instruct the RCT to skip the sample recount required within step 3.6.

- 3.6 RCT, **IF** the MDC Total DAC Fraction is more than ($>$) the required DAC sensitivity,
THEN RECOUNT the air sample in accordance with attachment 1 TO REDUCE the MDC Total DAC Fraction.
- 3.7 RCT, **SUBMIT** completed air sample data sheets to RCS/RCE/RCM for review.
- 3.8 RCS/RCE/RCM, **IF** the MDC Total DAC Fraction is more than ($>$) the required DAC sensitivity,
THEN CONSIDER RECOUNTING the air sample in accordance with attachment 1 TO REDUCE the MDC Total DAC Fraction.
- 3.9 RCS/RCE/RCM, **IF** the sample was recounted, AND the MDC Total DAC Fraction continues to be more than ($>$) the required DAC sensitivity,
THEN CONSIDER CONTACTING a Radiological Engineer for guidance.
- 3.10 RCS/RCE/RCM, **IF** MDC Total DAC Fraction is less than or equal to (\leq) the required DAC sensitivity

AND

the Sample Activity is less than ($<$) the Decision Level (for BOTH alpha and beta),

THEN the air sample results are NOT considered to be indicative of airborne program activity.

NOTE

It is preferred that TENNELEC counters with an alpha background of 0.1 cpm (or less), or other counters of equal or greater sensitivity, be utilized for the final count.

3.10.1 RCT, **IF** decayed counts of the air samples have not been performed, **THEN PERFORM** the following:

[A] **PERFORM** decayed counts of the air samples (as many as needed per the RCS/RCE/RCM) using a TENNELEC or other counter with equal or greater sensitivity, with the final count being more than or equal to (\geq) 72 hours after the ending time of the sample collection, for each sample, respectively.

[B] **GO TO** step 3.7.

NOTE

Only those sample results for which the Sample Activity (for either alpha or beta) is more than or equal to (\geq) the Decision Level need be considered for DAC-hour tracking **UNLESS** otherwise requested by an RE.

3.11 Upon request of the RC&DM or Deputy (and only for the periods of time requested), **PERFORM** DAC-hour calculations and tracking, **IF** the final decayed sample activity results (for either alpha or beta) are more than or equal to (\geq) the Decision Level

AND

the Effective Airborne Total DAC Fraction \geq 0.02,

THEN PERFORM the following sub-steps:

3.11.1 RCS/RCE/RCM, **PERFORM** DAC-hour calculations for exposed individuals.

3.11.2 RCS/RCE/RCM, **SUBMIT** the original DAC-hour calculation records (using the form illustrated on Attachment 3) to a RE for review (after DAC-hour calculations have been completed for a given day).

- 3.11.3 RE, **TRACK** Total Effective DAC-hours (the running total for each of these individuals) for the current calendar year (within the time constraints designated by the RC&DM or Deputy) **AND ENSURE** the original records are submitted to the Dosimetry Team Leader/designee.
- 3.11.4 RE, **IF** the running total for the current calendar year is more than or equal to (\geq) any positive integer multiple of four (4) Effective DAC-hrs for any individuals, **THEN PERFORM** the following for each positive integer multiple of four (4) Effective DAC-hrs:
- [A] **NOTIFY** the Dosimetry Team Leader/designee that the individuals who have initially accrued ≥ 4 Effective DAC-hours (or who have currently accrued ≥ 4 additional Effective DAC-hours) should be considered for inclusion in a bioassay program to quantify any internal dose received.
 - [B] **IF** the Total Effective DAC-hours (running total) for any individual is more than or equal to (\geq) twenty (20) for the current calendar year (within the time constraints designated by the RC&DM or Deputy), **THEN NOTIFY** the RC&DM AND Deputy **AND RECOMMEND** to them that they **CONSIDER** reassignment of that individual to other activities during the current calendar year, **TO PREVENT** the individual receiving more internal dose.
- 3.11.5 Dosimetry Team Leader (DTL), **SUBMIT** originals received of DAC-hour tracking records to Dosimetry Records Coordinator (DRC).

NOTE

1. Section 4.0, *NESHAP Filters and Filters submitted to WIPP Laboratory*, is performed when requested by the RCS/RCE/RCM.
2. NESHAP and Non-NESHAP filters must be on separate Attachment 5s.
3. One blank air monitoring filter must be included for every ten air monitoring filters turned in to WIPP Laboratories.

4.0 NESHAP FILTERS AND FILTERS SUBMITTED TO WIPP LABORATORY

- 4.1 RCT, **COMPLETE** Attachment 5 for air monitoring filter samples to be analyzed (using separate Attachment 5s for NESHAP and Non-NESHAP filters), with NESHAP filter samples identified as those from Station B AND/OR Station C (FAS-157).
- 4.2 RCT, **SUBMIT** filters to WIPP Laboratories as follows:
 - 4.2.1 **IF** WIPP Laboratories are available, **THEN SUBMIT** filters with attachment 5 **AND OBTAIN AND FILE** a copy of the attachment in the Chain-of-Custody binder **WHEN** WIPP Laboratories personnel have signed attachment 5 (as having received the filters).
 - 4.2.2 **IF** WIPP Laboratories are unavailable, **THEN PERFORM** the following:
 - [A] **ENSURE** that desiccator has been prepared according to section 2.0.
 - [B] **ENSURE** attachment 5 is completed.
 - [C] **STORE** filters in desiccator **UNTIL** WIPP Laboratories are available, **THEN SUBMIT** filters according to step 4.2.1.

Attachment 1 – Gravimetrics, Volume, and Activity Statistics

1. Gravimetric Data (mg/m^3) is Calculated as follows:

$$\text{mg}/\text{m}^3 = 1000 \text{ mg } (35.3 \text{ ft}^3/\text{m}^3)(W_{\text{net}})/V$$

where: W_{net} = Net filter weighting

V = Volume in ft^3

2. Air Sample Volume is Calculated as follows:

$$\begin{aligned} & \text{Air Sample Volume (ft}^3\text{)} \\ &= \left(\frac{\text{Initial Flow Rate} + \text{Final Flow Rate}}{2} \right) (\text{Sample Collection Time}) \end{aligned}$$

3. Activity Statistics

$$\text{Air Sample Activity (dpm)} = \frac{\text{Net cpm}}{(\epsilon) (C)}$$

$$\text{Airborne Concentration } (\mu\text{Ci}/\text{ml}) = \frac{\text{Air Sample Activity in dpm}}{(V) (Y) (6.286 \text{ E}10)}$$

$$\text{Airborne DAC fraction} = \frac{\text{Airborne Concentration } (\mu\text{Ci}/\text{ml})}{\text{DAC value}}$$

$$\text{MDA (dpm)} = \frac{3 + 3.29 \sqrt{R_b t_s \left(1 + \frac{t_s}{t_b}\right)}}{(\epsilon) (C) (t_s)}$$

$$\text{DL (dpm)} = \frac{1.645}{(\epsilon) (C)} \sqrt{\frac{R_b}{t_s} + \frac{R_b}{t_b}}$$

$$\text{MDC } (\mu\text{Ci}/\text{ml}) = \frac{\text{MDA}}{(V) (Y) (6.286 \text{ E}10)}$$

$$\text{MDC DAC fraction} = \frac{\text{MDC}}{\text{DAC value}}$$

REFERENCE USE

Attachment 1 – Gravimetrics, Volume, and Activity Statistics

where:

R_b	=	Background Count Rate in counts per minute (cpm)
t_s	=	Sample Counting Time in minutes
t_b	=	Background Counting Time in minutes
ϵ	=	Counter efficiency <i>fraction</i> (4π).
C	=	Filter Correction Factor for the filter media (such as for collection efficiency) and radiation to be detected (such as for self-absorption). Use 0.80 for alpha and 0.95 for beta, unless otherwise designated by the RC&DM/DEPUTY/DESIGNEE.
V	=	Air sample volume in ft^3
Y	=	Filter/sample fraction (d^2/D^2), where d = the diameter of the filter counted and D = diameter of the filter used for air sample collection; ($Y = 1$ if the whole filter is counted, $Y = 0.25$ if a 2 inch diameter circle is punched out of the <i>central area</i> of a 4-inch diameter filter)

DAC value = $5 \text{ E-}12 \text{ } \mu\text{Ci/ml}$ for alpha and $7 \text{ E-}9 \text{ } \mu\text{Ci/ml}$ for beta (beta-gamma), unless otherwise directed by the RC&DM/DEPUTY/DESIGNEE.

The required DAC sensitivity is 0.1 DAC for radiological areas and 0.02 DAC for Controlled Areas (or as designated by the RC&DM/DEPUTY/DESIGNEE).

NOTE

If the calculated **sample activity** is $< \text{DL}$, then there is a 95 percent (or greater) confidence that the actual (real) sample **airborne activity** is $< \text{MDC}$, **AND IN THAT CASE** if the MDC is also less than the required DAC sensitivity, **THEN** the results (alpha or beta, as applicable) from the particular air sample are normally NOT considered to be indicative of program activity. The MDA, DL, MDC, and MDC DAC fraction may all be reduced (improved) by increasing background counting time, increasing sample counting time, decreasing background, and/or increasing counter efficiency. The MDC and MDC DAC fraction may also be reduced (improved) by increasing air sample volume.

Attachment 2 – Airborne Sample Results

Building/Location		Air Sample ID	
RWP Number (if any)		Job Description	
Sampler ID		Sampler Type	Filter Type
Date/Time ON (MM/DD/YYYY, HH:MM)		Date/Time OFF (MM/DD/YYYY, HH:MM)	
Initial Flow Rate (CFM)		Final Flow Rate (CFM)	
Filter Correction Factor (alpha)	Filter Correction Factor (beta)	Filter Sample Fraction "Y"	
Sample Collection Time (min)	X Average Flow Rate (CFM)	= Total Volume (ft ³)	
Counter ID (240-RI-000-####)	Counter Type:	Date/Time Count Initiated (MM/DD/YY, HH:MM)	
Background Counting Time (min)		Sample Counting Time (min)	
Counter Efficiency <i>fraction</i> (alpha)		Counter Efficiency <i>fraction</i> (beta)	

Sample Report(s) from sample counter is attached that contains each of the following: **Yes** **OR** **No**

- 1) Alpha background count rate
- 2) Beta background count rate
- 3) Alpha MDA
- 4) Beta MDA

If the answer to the query above (in this box) is "YES," then provide the information in the bolded print below. Otherwise, provide ALL the additional information requested below in this box.

Alpha Background Count Rate (cpm)	Beta Background Count Rate (cpm)
Alpha Gross Count Rate (cpm)	Alpha Net Count Rate (cpm)
Beta Gross Count Rate (cpm)	Beta Net Count Rate (cpm)
Alpha MDA (dpm)	Beta MDA (dpm)

Check one of the following: **Initial Sample Count** **Decayed Sample Count**

Air Sample Activity (dpm)	Decision Level (dpm)	Sample Activity ≥ Decision Level (Y/N)	Beta to Alpha (β/α) Activity Ratio	MDC (μCi/ml)	MDC Total DAC Fraction	Airborne Conc. (μCi/ml)	Airborne Total DAC Fraction	Resp. PF	Effective Airborne Total DAC Fraction
α	α	α	β/α	α	α + β	α	α + β		α + β
β	β	β		β		β			

Attach the printed out report(s) of the sample counter for the analysis of this sample (when available).
 If this filter is from a portable air sampler (including portable CAMs), attach a map indicating the location.
 Printed Name, Signature, and Date from RCT, plus any added REMARKS:

Reviewed by:

RCS/RCE/RCM (Printed Name)	Signature	Date (MM/DD/YY)
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Attachment 4 – Mettler Balance/Weight Operability Check

Balance Serial Number:				Calibration Due Date:			
Weight Serial Number:				Calibration Due Date:			
Date	Level (Y or N)	2 gram Calibrated Mass	2 gram Scale Indication	10 gram Calibrated Mass	10 grams Scale Indication	Sat/Unsat (±0.02 mg)	RCT Signature
Comments:							
Reviewed by: _____							
Printed Name			Signature			Date	

