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MAR 30 2004

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Region V, SR-6J
77 West Jackson Boulevard
Chicago, Illinois 60604-3590

DOE-0211-04

Mr. Tom Schneider, Project Manager
Ohio Environmental Protection Agency
401 East 5th Street
Dayton, Ohio 45402-2911

Dear Mr. Jablonowski and Mr. Schneider:

COMPLIANCE OF THE SILO 3 EXHAUST STACK SAMPLER WITH NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS SAMPLER LOCATION REQUIREMENTS

References:
1. DOE Letter, DOE-0103-04, J. Reising to G. Jablonowski and T. Schneider, "Silo 3 Remedial Design/Remedial Action Package, Revision 2," dated January 21, 2004
2. Document 40430-RP-0032, A. R. McFarland, PhD, PE, "Compliance of the Fernald Silo 3: 4-ft Stack Sampling Location with ANSI N13.1 Mixing Requirements," dated December 21, 2003

The following information and enclosures document the Fernald Closure Project approach for demonstrating compliance with the sampler location requirements specified by the National Emission Standards for Hazardous Air Pollutants (NESHAPS), Subpart H for the Silo 3 Exhaust Stack.

Background

The Silo 3 Remediation Facility consists of facilities and equipment for retrieval, appropriate treatment, and packaging of the material currently stored in Silo 3 in accordance with the Final Record of Decision Amendment for Operable Unit 4 Silo 3 Remediation approved September 24, 2003. Details of the planned design and operation of the facility were reviewed and approved by the United States Environmental Protection

Agency (USEPA) and the Ohio Environmental Protection Agency (OEPA) in the Silo 3 Remedial Design/Remedial Action (RD/RA) Package (Reference 1). The facilities have been constructed and are currently scheduled to begin operation in May or June 2004.

As documented in the RD/RA Package, the design of the emission control system for the Silo 3 Remediation Facility includes a continuous stack monitor to meet the requirements of the NESHAP Subpart H (40 CFR 61.93). For new installations, stack monitors installed in accordance with NESHAP Subpart H must be installed in accordance with American National Standards Institute (ANSI) Standard ANSI N13.1-1999, "Guide to Sampling Airborne Radioactive Materials in Nuclear Facilities," including requirements for demonstrating that the flow at the sampling location is adequately mixed.

Although the procedure specified by the ANSI N13.1-1999 standard for demonstrating adequate mixing involves testing of the stack during operations using tracer gases, the standard also allows demonstration based upon data from testing of similar stacks, so long as specified criteria are satisfied.

The services of an independent consultant, involved in the actual development of the ANSI N13.1-1999 standard, were obtained to evaluate the most effective means of complying with the ANSI mixing requirements. His recommendation was that a static mixer, demonstrated to provide adequate mixing in similar stacks, be installed in the Silo 3 stack to ensure adequate mixing throughout the stack. The consultant further recommended that the results of actual modeling of a similar stack be used to demonstrate compliance with the ANSI N13.1-1999 mixing requirements for the Silo 3 stack.

Compliance Approach

The recommended compliance approach was discussed in August 2003 with Michael Murphy of the USEPA Region V Air/Radiation Division who indicated that the approach should be acceptable, and requested documentation of the basis for our compliance approach.

In accordance with Design Change Notice (DCN) 40430-JEG-115, the recommended static mixer was installed in the Silo 3 stack prior to erection of the stack. The independent consultant provided a formal evaluation (Reference 2) demonstrating that the Silo 3 stack monitor location meets the mixing requirements of the ANSI N13.1-1999 standard.

The following documentation is enclosed for your review and transmittal to the USEPA Region V Air/Radiation Division:

1. Report 40430-RP-0032, Andrew R. McFarland, PhD, P.E., "Compliance of the Fernald Silo 3: 4-ft Stack Sampling Location with ANSI N13.1 Mixing Requirements," dated December 21, 2003;
2. Design documentation depicting the location of the Silo 3 Remediation Facility, its emission controls, exhaust stack, static mixer, and sampling location;
3. Design details of the shrouded probe sampler, installed in the Silo 3 Exhaust Stack to meet the requirements of NESHAP Subpart H; and
4. Draft Silos Project procedure 11-C-309, "Stack Monitor and Radon Process Equipment Operations," documenting the operation, maintenance and quality control procedures for the Silos Project stack monitoring equipment, including the Silo 3 shrouded probe sampler.

If you have any questions or concerns regarding the enclosed documentation, please contact John Sattler (513) 648-3145.

Sincerely,

William J. Taylor
Director

FCP:Sattler

Enclosures: As stated

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Fernald Closure Project (FCP) Fluor Fernald, Inc. FCP Document Program	Revision No.: 0E Effective Date: mm-dd-yy	
SILOS PROJECT STACK MONITOR AND RADON PROCESS EQUIPMENT OPERATIONS **11-C-309**	Technical - OS Silos Project Procedure	
Authorization _____ _____ Ron Houchins, Operations Manager Date	Supersedes: 602-2099	Page 1 of 24

SUBJECT EXPERT: E. A. Danielson, X4366.

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RECORD OF ISSUE/REVISIONS

EFFECTIVE DATE	REV NO.	DESCRIPTION
mm-dd-yy	0	New procedure issued for operation of the Silos 3 Shrouded Probe, RCS Air Monitor Corporation Stack Monitoring, and Pylon CRM Radon Monitors. Supersedes RadCon procedure 602-2099. Initiated by E. A. Danielson.

INFORMATION ONLY

1.0 PURPOSE

1.1 This procedure establishes the methods to be used for operation of the Silo 3 Shrouded Probe, Air Monitor Corporation Stack Monitor and Pylon CRM Radon Monitors.

2.0 SCOPE

2.1 This procedure provides instructions to personnel for startup, operation and shutdown of the Silos stack monitoring and process instrumentation. These instruments measure airborne radon levels, gamma ray exposure rates, and airborne particulate. This information allows monitoring of the performance of the RCS system and alerts operators to changing conditions.

2.2 The monitoring systems consist of:

2.2.1 **Pylon CRM-1 Radon Monitor** – Monitors radon levels of stack discharge.

2.2.2 **Ludlum Model 375 Digital Wall-Mounted Area Gamma Monitor** – Measures gamma levels at roughing filter.

2.2.3 **AMC Stack Monitor** – system for monitoring levels in RCS or Silo 3 stack discharge air.

2.2.4 **Ludlum Model SM**-177 Beta Monitor – monitors beta particulate collected on sample filter for the stack monitoring system.

3.0 RESPONSIBILITIES

3.1 Performer

4.0 PREREQUISITES

4.1 Equipment and Material

4.1.1 Pylon CRM-1 Radon Monitoring Assembly

4.1.1.1 The Pylon CRM-1 detector is a flow-through alpha scintillation flask with an interior coating of zinc sulfide (ZnS(Ag)). Air is pulled through the flask by an associated pump. It is used in all active radon monitoring applications. The detector assembly, consisting of the detector with electronics, must remain intact with placement and replacement as a complete and integral unit. This is required to retain proper calibration.

4.1.1.2 The scintillation flask used for silos head space monitoring has a reduced area of phosphorescent coating. The radon level in the silos head space will be relatively high. The reduced phosphor allows monitoring of high levels without saturation of the system.

4.1.2 Ludlum Model 375/4 Digital Wall-Mount Area Monitors

4.1.2.1 The Ludlum Model 375/4 has a G-M tube detector mated with a digital read-out panel. This combination is used to monitor the gamma radiation levels of the two roughing filters associated with the dessicant system. The monitor is capable of going from mR/h range to R/h range without changing probes or electronics.

4.1.3 Air Monitor Corporation Stack Monitoring System

4.1.3.1 The AMC Stack Monitoring System (AMC) consists of an air particulate sampler with a glass fiber sample collection filter continuously monitored by a Ludlum 177-62-1 equipped with a thin-window G-M pancake detector.

4.1.3.2 A Pylon CRM-1 monitors radon levels, in the sampling trains, following removal of the airborne particulate.

4.1.3.3 Unless specifically noted for maintenance procedures, the stack monitoring system **MUST** be operating when the exhaust fans are operating per 40710-PL-0018, RCS NHASP (PR-4A).

4.1.4 Monitoring Points for the RCS:

4.1.4.1 **RQIT-DDS-20-001A & RQIT-DDS-20-001B** - These units are gamma radiation monitors used to read the gamma radiation associated with the two roughing filters. Both units are set to alarm at 2 mR/h for the low alarm and the high alarm is also set for 2mR/h. These units only give the control room a light that indicates when the alarm set point has been reached or exceeded. These alarms are 'non-latching' which means that when the radiation levels drop below 2 mR/h the local alarms and the light in the control room reset themselves to the normal condition. These units can also be used to indicate which roughing filter/desiccator system is 'on-line'.

4.1.4.2 **RQIT-TOT-20-001** - This monitor samples the Radon-222 from the silos headspace prior to introduction into the carbon beds for treatment. The radon flows through the chillers and desiccators prior to monitoring. There are no alarm levels associated with this monitor.

INFORMATION ONLY

4.1.4.3 **RQIT-CBD-20-001A/B-2A/B** - This monitor is used to check the effluent radon-222 levels coming from each individual carbon bed. This unit is set up with four each solenoid operated valves (sov's) that are located adjacent to the CRM-1 in the RCS hallway first floor. The high alarm level is set for 50,000 pCi/l and the High-High alarm is set for 60,000 pCi/l.

4.1.4.4 **RQIT-CBD-20-001/2** - This monitor point is located, just down stream of a common line from all four beds This monitors the total Radon-222 activity regardless of which bed(s) is/are being used. The High alarm is set for 50,000 pCi/l and the High-High alarm is set at 60,000 pCi/l.

4.1.4.5 **RQIT-STK-20-001** - This is the CRM located in the Air Monitor panel inside the CEM building. This unit is used to check the effluent levels of radon-222 that are going out the stack. The High alarm is set for 5000 pCi/l and the High-High alarm is set for 6000 pCi/l per 40710-PL-0018, RCS NHASP (PR-4B).

4.1.4.6 **RQIT-RCS-77-001** - This monitor is used to sample radon-222 in the RCS building HVAC system this includes the building air and any make-up fresh air introduced into the building. The High alarm is set for 100pCi/l. There is no High-High alarm.

4.1.4.7 **RQIT-RCS-20-001 & RQIT-RCS-20-002** - These units are passive radon gas monitors. Ambient radon gas diffuses into the cell through a filter. Number **001** is located in the RCS hallway 1st floor and **002** is located 2nd floor of the RCS building. They both have a High alarm set at 100 pCi/l, there is no High-High alarm associated with these monitors.

4.1.4.8 **LUDLUM SM-177-62-1** - The Ludlum 177-62-1 beta particulate monitor is associated with the Air Monitor Stack panel inside the CEM building. It responds to airborne particulate captured on the glass fiber filter The High alarm is set for 45,000 cpm and there is no associated High-High alarm.

4.2 Requirements

4.2.1 Personnel operating, maintaining, or supervising workers who perform work on the Radon Stack Monitoring equipment, to include turning any instrument in the CEM cabinet on or off, SHALL be trained to this procedure.

4.2.2 Many operations are performed routinely. The training for personnel who perform routine operations include:

- An orientation for Radiological Control Technicians (RCTs) that focuses on radiation detection instrumentation, response to alarms, and sample change-out

- A general system overview orientation for supervisors

4.2.3 The stack sample filter is used to generate official data for submittal to the Environmental Protection Agency. Each time the filter is replaced, it SHALL be submitted to the Laboratory along with a Chain of Custody and sample label. The sample flow total, stack flow total, sample start time and collection time associated with the sample SHALL be provided to the Laboratory and Environmental Compliance with the sample.

4.2.4 Each time the stack probe is cleaned or rinsed, the rinsate must be submitted to the Laboratory, with a Chain of Custody and sample label for analysis. These results are included in the stack effluent determination.

4.2.5 Stack sampling system data must be captured when the system is operating. The primary data capture system is in the Control Room. The backup data capture system is in the CEM Building. Both systems SHOULD be operating, but at least one of the systems SHALL be operating if the stack sampling system is operating.

4.2.6 It is necessary to annotate all actions taken in accordance with this procedure. Information may be recorded in a logbook stored in the CEM Building or the RCT Daily Stack Monitoring Checklist.

4.2.7 Radioactive check sources and various supplies for changing stack filters are stored in a posted, locked location.

4.2.8 The CEM Building door is locked. Contact Control Room Operator for the key.

4.2.9 The Shift Supervisor should be kept informed of ANY conditions outside specifications in this procedure. Also notify the Shift Supervisor when changes and adjustments are completed.

5.0 PRECAUTIONS AND LIMITATIONS

5.1 Precautions

5.1.1 Safety glasses shall be worn in accordance with the Silos Nuclear Health and Safety Plan (N-HASP). Other eye protection may be specified by Industrial Hygiene and Safety or other applicable permits. Hard hats are required in posted areas. Steel-toed shoes are required for access to the CEM Building and surrounding area in accordance with the N-HASP.

INFORMATION ONLY

5.1.2 Hearing protection devices shall be worn at all times while working in posted High Noise Areas.

5.1.3 Latex gloves shall be worn when changing or handling particulate filters. Forceps shall be used to retrieve the filter, when practical.

5.1.4 Maintenance activities on the radon monitoring system may require a Radiation Work Permit (RWP). Contact a RCT before performing maintenance activities.

5.2 Limitations

5.2.1 None

6.0 GENERAL

6.1 The Silos Stack Monitoring System has been designed to sample effluents for particulate on a filter for beta- gamma radiation, and to monitor the carbon bed effluent for radon. The instrumentation for monitoring the effluent is located in the CEM Buildings. The monitors send signals to the Control Room for processing and archiving.

6.2 A representative sample of the stack effluent is collected on a filter above a radiation detector.

6.3 The sample filter is collected and replaced regularly and sent to a laboratory for analysis of uranium isotopes, thorium isotopes, Polonium-220, and, radium. The analytical results are reported to EPA. The site limit equates to a calculated dose rate of 10 mrem per year at the site boundary from all Fernald particulate airborne emissions, including SILOS.

6.4 A portion of the sample stream is drawn through a Pylon CRM-1 radon-222 gas monitoring unit. The range of this unit is 1 pCi/L to approximately 100,000 pCi/L.

INFORMATION ONLY

7.0 PROCEDURE

7.1 Routine Operations and Maintenance

Note: **For short periods of time it is permissible to shut down the sample pump while the stack exhaust fan is operating; e.g., during sample filter changes.**

WARNING
Lines inside CEM cabinet may be thermally hot.

Control Room Operator

7.1.1 Take the following actions to ensure continued proper operation of the stack sampling system:

7.1.1.1 Monitor stack sampling system. If there is a low flow or non-isokinetic alarm contact the Shift Supervisor.

7.1.1.2 Monitor radon and beta radiation levels during operation. If high alarm sounds contact the Shift Supervisor, and Silos Radiological Control as appropriate for resolution.

7.1.2 Monitor CEM alarms during operation.

7.1.3 Maintain a general awareness of radon and beta concentrations during operation.

Silos Instrumentation

7.1.4 Collect particulate air filter samples and submit to Laboratory in accordance with Section 7.7 of this procedure.

7.1.5 Perform source checks on the radon monitor as necessary.

7.1.6 Perform a source check on the beta monitor each time the sample filter is changed.

RCT

7.1.7 Provide radiological support as needed, when the air monitoring system is breached for maintenance, upgrades, or other activities.

INFORMATION ONLY

7.2 Stack Monitor Shutdown

Note: If a CEM Building power outage is to occur the following procedure should be performed.

Silos Instrumentation

7.2.1 Notify Shift Supervisor of CEM Shutdown.

7.2.2 Place beta and radon monitors in OFF position.

7.2.3 Verify low sample flow alarm during shutdown.

7.2.4 Notify Shift Supervisor when the pump is to be restarted.

7.2.5 Annotate in the logbook in the CEM Building, the time stack sampling system is shut down and re-started.

7.2.6 Establish communication with the Control Room Operator and verify that the stack exhaust fan(s) has/have been shut down and that it is permissible to perform CEM system shutdown.

7.2.7 Shutdown the sampling pump at PB-1 by activating the start/stop push button on the front of the panel.

7.2.8 If the stack monitoring system must be de-energized, shutdown the main power to the Radon Monitor Main Instrument panel (SW-1) located inside the CEM cabinet.

7.2.9 Document activities in the logbook maintained inside the CEM building.

7.2.10 If the sample filter is collected, be sure to replace the sample with a new filter, even if the system is not expected to run for an extended period.

7.3 Quarterly Beta Detector Source Check

Silos Instrumentation

7.3.1 Place blank filter on filter support. Close sample filter holder and tighten the wingnut.

7.3.2 Collect background for approximately 60 seconds. Note reading on the SM-177 source check sheet.

7.3.3 When the background count is complete, open the sample filter holder and place the check source on the filter support, source face down.

7.3.4 Count the source for approximately 60 seconds. The source should read between +/- 20% of a known source value minus the background counted in step 7.3.3. Note reading on the SM-177 source check sheet.

7.3.5 Remove the check source and return the check source to the controlled storage area.

7.4 CRM Efficiency Source Check

Silos Instrumentation

7.4.1 Notify Silos control room operator **PRIOR** to performing efficiency source checks on field units.

CAUTION

Failure to ensure power is OFF when removing/attaching accessories may result in damage to photomultiplier tube.

7.4.2 Ensure the Pylon CRM ON/OFF switch is OFF before removing/attaching accessories.

7.4.3 Remove the Lucas cell from Pylon CRM. Shelter from direct light as much as possible.

7.4.4 Attach the Pylon 3150A check source to CRM PMT.

NOTE: Unit will display "SYSTEM INITIALIZING" for several seconds followed by Main Menu.

7.4.5 [4] Press [ON/OFF] to activate CRM.

7.4.6 Ensure display appears as follows and cursor appears beside **"Collect..."**:

```
Collect...
Display/Print...
Communications...
Setup...
```

7.4.7 Press [>] **UNTIL** display appears as follows:

```
Start
Start At
Setup
```

7.4.8 Press [∨] **UNTIL** cursor appears beside **"Setup"**.

7.4.9 Press [>] **UNTIL** display appears as follows:

```
Interval
Printer
```

7.4.10 Press [>] **UNTIL** display appears as follows:

```
Enter Interval Len.

Minutes:    -----
```

NOTE **Dash represents position where numbers can be input (i.e., five dashes represents number up to 99999).**

7.4.11 Use [>] and both [^] [v] to adjust interval to 2 minutes.

7.4.12 Press [<] **UNTIL** display appears as follows:

```
Interval
Printer
```

7.4.13 Press [<] **UNTIL** display appears as follows:

```
Start
Start At
Setup
```

7.4.14 Use [^] and [v] to move cursor beside **"Start" AND** press [>] **UNTIL** display appears as follows:

```
Enter Run ID:

    -------------
```

7.4.15 Press [>] UNTIL cursor moves one space.

7.4.16 Press [^] UNTIL display appears as follows:

```
Enter Run ID:

    -0------------
```

INFORMATION ONLY

7.4.17 Press [<] **UNTIL** display appears as follows:

```
yy/mm/dd        hh:mm:ss
Measuring Int.        1
Counts        -------------
Act:          0.0 pCi/l
```

NOTE: CRM is now counting Pylon 3150A check source.

7.4.18 Allow at least five (5) 2 minute counts to be completed. Record the concentration data (pCi/L) for each of the 5 counts.

CAUTION

Failure to turn the Pylon CRM OFF when connecting or disconnecting accessories may result in damage to equipment.

7.4.19 Remove the Pylon 3150A check source AND replace the Lucas cell WHILE power is OFF. Discard the first 2-minute reading and average the final four 2-minute readings. Compare this value to the acceptable pre-determined source efficiency value and ensure that this value is within +/- 5% of the determined value.

7.4.20 IF the Pylon CRM efficiency source check result is NOT within specified limits on 3150A Pylon CRM source check data sheet, THEN perform the following:

7.4.20.1 Record the problem on "Rejection" sticker **AND** attach "Rejection" sticker to Pylon CRM.

7.4.20.2 Send the Pylon CRM (i.e. control module and probe) to manufacturer.

7.4.20.3 Obtain another Pylon CRM and Lucas cell **AND** repeat preceeding steps for each CRM requiring an efficiency check.

7.4.21 **IF** the CRM efficiency source check result is within limits **AND** Pylon CRM is in field, **THEN** begin continuous radon gas monitoring.

7.4.22 Enter the monitor location, number, date, and source check status in field logbook.

7.4.23 Return the Pylon 3150A check source to sealed source storage location.

INFORMATION ONLY

7.5 Changing Out a CRM Electronics Module

NOTE: The following are guidelines to replacing the module. When a CRM Electronics Module is changed out the following items should be verified:

- **Date**
- **Time**
- **Sensitivity**
- **Interval**

Silos Instrumentation

7.5.1 Turn off the instrument's power by pressing the power switch.

7.5.2 Unplug the electrical power from the wall outlet.

7.5.3 Disconnect power and communications connectors from the bottom of the electronic module.

7.5.4 Unscrew the four nuts that hold the electronics module to the NEMA enclosure.

7.5.5 Remove the electronics module.

7.5.6 Remove the connector from the top of the PMT.

7.5.7 Remove the hose inserts from the quick disconnect connection at the bottom of the Lucas cell.

7.5.8 Replace the connector at the top of the REPLACEMENT Lucas cell.

7.5.9 Replace the hose inserts from the quick disconnects connection at the bottom of the Lucas Cell.

7.5.10 Insert the REPLACEMENT electronics module.

7.5.11 Screw in the four nuts that hold the electronics module to the NEMA enclosure.

7.5.12 Reconnect the power and communications connectors from the bottom of the electronic module.

7.5.13 Plug in the electrical power from the wall outlet.

7.5.14 Turn on the instrument's electrical power by pressing the power switch (System Initialization).

INFORMATION ONLY

7.5.15 Check the Date as follows:

7.5.15.1 Press the down cursor until it appears besides "**Setup**"

7.5.15.2 Press the right cursor until it displays the following:

Alarm...
Date/Time...
Calibrate...

7.5.16 Press the down cursor until it appears besides **"Date/Time..." AND** press the right cursor to select

7.5.17 Edit the date using the right and left hand cursors to position the cursor and the up and down cursors to change the displayed values.

7.5.18 Press the left cursor to exit the date option.

7.5.19 Edit time using the right and left cursors to position the cursor and the up and down cursors to change the displayed values.

7.5.20 Press the left cursor to exit the time option.

7.6 Masstron II Replacement

NOTE: Perform Section 7.8 after replacement of a Masstron unit

Silos Instrumentation

7.6.1 Obtain an in-calibration Masstron II flow sensor. Note: Select the replacement Masstron II with the appropriate flow detection range. There is one range flow sensor for detecting the sample flow and one range flow sensor for detecting the exhaust stack flow.

7.6.2 Contact an RCT (X - 3940) for radiological coverage.

7.6.3 Notify the RCS Control Room of the subsequent tasks you are going to undertake.

7.6.4 Sign in on the appropriate RCS Silos Breach RWP.

7.6.5 Turn off the sample collection pump. Note: the RCS Control Room will receive a Low Pump Flow alarm.

7.6.6 Turn off the power to the Masstron II flow sensor.

7.6.7 Isolate (close) the high flow and low flow isolation valves to the Masstron II units.

INFORMATION ONLY

7.6.8 Disconnect the wire block from the left side of the Masstron II flow sensor unit.

7.6.9 Disconnect the high flow and low flow exhaust stack sample lines.

7.6.10 Disconnect the low and high side sample flow lines at the bottom of the flow sensor unit.

7.6.11 Remove the retaining screws connecting the unit to the panel.

7.6.12 Remove the flow sensor unit from the cabinet.

7.6.13 Remove each of the swage lock "T" fittings from the bottom of the flow sensor unit.

7.6.14 Install the swage lock "T" fittings just removed into the new flow sensor unit.

7.6.15 Mount the flow sensor unit to the cabinet panel with the retaining screws.

7.6.16 Reattach the high flow and low flow exhaust stack sample lines.

7.6.17 Reattach the low and high side sample lines at the bottom of the flow sensor unit.

7.6.18 Reattach the power feed wire block from the left side of the flow sensor unit.

7.6.19 Open the high flow and low flow isolation valves.

7.6.20 Turn on the power to the Masstron II flow sensor.

7.6.21 Set the K factor to the number that was used in the previous Masstron.

7.6.22 Ensure that the unit is powered.

7.6.23 Turn the sample pump on.

▲**Note:** **There is a 30 second lag time before the pump starts.**

7.6.24 Ensure that the stack exhaust flows return to their normal pre-replacement flow levels.

7.6.25 IF stack exhaust flow does not return to normal levels, THEN shut down the system and troubleshoot and repair.

7.6.26 Check to see that the sample flow approximates the pre-replacement sample flows.

INFORMATION ONLY

7.6.27 IF sample flow does not return to normal levels, THEN shut down the system and troubleshoot and repair.

7.6.28 Check the sample flow trends on the DAQ computer.

7.6.29 Send off the replaced flow meters for calibration by the vendor.

7.7 Particulate Sample Filter Changeout

Silos Instrumentation

7.7.1 Obtain new numbered sample filter and blank filter from the analytical lab.

7.7.2 Obtain Chain of Custody paper work.

7.7.3 Contact an RCT (X - 3940) for radiological coverage, as required.

7.7.4 Notify the Control Room of the subsequent tasks you are going to undertake.

7.7.5 Sign in on the appropriate RCS Silos Breach RWP.

▼**NOTE: The control room will receive a low flow sample alarm.**

7.7.6 Turn off the Data Acquisition program. Note the flow values in the notebook.

7.7.7 Turn off the sample pump by pushing the *start/stop button*.

7.7.8 Isolate (close) the 1.5" sample line Ball Valve by pushing the handle upwards to the 90 degree position.

7.7.9 Disconnect the ¾" quick disconnect vacuum line from the bottom of the particulate filter sample head.

7.7.10 Disconnect the 1.5" brass quick disconnect to remove the particulate filter sample head.

7.7.11 Disconnect the BNC connector on the bottom of the particulate filter sample head.

7.7.12 While wearing latex gloves, open the retaining ring on the particulate filter sample head and carefully remove the filter with forceps, as practical.

7.7.13 Place the filter in a large Ziploc bag and label with label supplied with the Chain of Custody paperwork and annotate the following on the Ziploc bag:

- Filter number
- Start Date
- Start Time
- Air Particulate Sample type – e.g. Blank, Sample
- End Date
- End Time

INFORMATION ONLY

▼NOTE: If radon concentration data is not available for the Data Acquisition computer (DAQ), information can be collected from the RCS daily reports.

7.7.14 Gather pertinent flow and radon concentration data from the Data Acquisition (DAQ) computer in the CEM building.

7.7.15 Collect the previously stored Blank filter (# noted in log book) from the box in the CEM cabinet.

7.7.16 Place the Blank filter in a large Ziploc bag and label bag with:

- Filter number
- Start Date
- Start Time
- Blank Sample type – e.g. Blank, Sample
- End Date
- End Time

▼NOTE: Collection side should be face up.

7.7.17 Place a new sample filter on the mesh screen of the sample head with forceps, as practical. Note the filter serial number.

7.7.18 Replace the retaining ring on particulate filter sample head.

7.7.19 Reconnect the GM tube connector on the bottom of the particulate filter sample head.

7.7.20 Remove Latex gloves and properly discard.

7.7.21 Record both the old and new sample and blank filter number and flow data, etc., in the Lab book.

7.7.22 Place a new blank filter in the filter box and place back in the CEM cabinet.

7.7.23 Reconnect the 1.5″ brass quick disconnect containing the particulate sample head with the new filter.

7.7.24 Reconnect the ¾″ quick disconnect vacuum line.

7.7.25 Open the 1.5″ sample line Ball Valve by pulling the handle downwards to the 180 degree position.

7.7.26 Save the files on the Data Acquisition program.

7.7.27 Restart/Reset the flow values on the Data Acquisition program to zero.

7.7.28 Restart the sample pump.

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7.7.29 Ensure that flow meters are reading values that are similar to the filter pre-replacement conditions. Ensure stack and sample totals have zeroed and begun to accumulate new data.

7.7.30 Lock the CEM building, exit the area, and sign off of the RWP.

7.7.31 Complete filling out the Chain of Custody form.

7.7.32 Take the Chain of Custody form and samples to the Sample Lab.

7.7.33 Sign over the Chain of Custody form and samples to lab personnel.

7.7.34 Keep the pink copy of Chain of Custody form.

7.8 Quarterly Mass Flow Check

Silos Instrumentation

▼**NOTE: Per ANSI Standard N13.1, mass flow meters should be checked quarterly with a secondary or transfer standard. The transfer standard is typically a calibrated mass flowmeter or digital manometer placed in series with the unit to be tested.**

7.8.1 Obtain a calibrated digital manometer. Ensure that you have the correct fittings.

7.8.2 Notify the RCS control room of the testing on the mass flow meters. The control room may experience alarms and erratic readings.

7.8.3 Obtain key to the CEM building from the control room.

7.8.4 Open the cabinet door and locate the mass flow meter to be tested.

7.8.5 Turn on the digital manometer and allow it to warm up for at least 1 minute. Perform a "Zero" of the scale if necessary.

7.8.6 Place the digital manometer in the inches of water column mode.

7.8.7 The flow of the stack must be within 25% of the nominal design flow while performing this check.

7.8.8 Connect the digital manometer to the SwageLok® "T" connectors on the bottom of the mass flow meter. Ensure that the high side and low side of the manometer are connected to the respective high side and low side of the mass flow meter.

7.8.9 Damping of the readings on the digital manometer may be required to facilitate easier data acquisition.

7.8.10 Allow 2 minutes for the test set-up to stabilize.

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7.8.11 While noting the reading on the bottom line of the mass flow meter in inches of water column, note readings on the manometer.

7.8.12 Readings from the mass flow meter shall agree within 10% of the readings on the manometer.

7.8.13 If manometer readings are at or within 10% of the mass flow readings, then the mass flow meter is still functioning properly. Notate that the quarterly check has been accomplished in the CEM logbook.

7.8.14 If the manometer readings are outside 10% of the accepted mass flow readings then the mass flow meter shall be removed from service and replaced with a new unit. The new unit shall satisfactorily pass the quarterly check per this procedure prior to the system being returned to service.

7.8.15 Disconnect the digital manometer from the SwageLok® "T" connectors and replace the blank caps. Ensure that the readings on the mass flow meter stabilize, both for inches of water column and flow in SCFM.

7.8.16 Close the cabinet door. Lock the CEM building and return key back to the control room. Inform control room that testing is complete and the system is back in service.

7.9 Resetting I/O Cards

NOTE: An electrician/instrument mechanic must be present to reset the cards.

Silos Instrumentation

7.9.1 From the RUN position on each individual card, toggle the switch back to the STOP position.

7.9.2 From the STOP position, toggle the switch to the BOTTOM position until it blinks *Yellow* and then let go (the switch returns to the STOP position).

7.9.3 Return the switch to the BOTTOM position and hold until you see a green blinking light.

7.9.4 Release the switch and push the toggle switch back up to the RUN position.

7.9.5 Call the RCS Control Room Operator and ask them to reset the start bit value for the I/O card.

7.9.6 Repeat this sequence of activities for each of the remaining I/O cards, as necessary.

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7.10 Annual Stack Sample Line Inspection/Rinse

NOTE: Per ANSI N13.1 pitot tube type flow devices should be inspected on an annual basis for contaminant deposits, system leaks, and sharp edged nozzle damage. The sample system should be rinsed on an annual basis to account for sample loss from deposition onto/into the sample probe/rake. This sample is considered part of the yearly discharge of the system and shall be included in the annual stack discharge report. These inspections shall be completed on an annual basis by qualified site personnel. The annual stack rinse shall be accomplished under a FCP Work Permit.

Silos Instrumentation

7.10.1 Ensure work permits are reviewed and approved prior to inspection/rinse of the sample lines. Ensure that a crane/man-lift is available for this evolution.

7.10.2 Notify the control room, prior to testing, that the sample lines are going to be tested. Ensure that the system fans/blowers are turned off.

7.10.3 Close the stack sample valve.

7.10.4 Disconnect the stack sample line from the sample probe. Temporarily cover the end of the sample line with a plastic bag.

7.10.5 Remove the retaining bolts from the sample probe flange.

7.10.6 Carefully remove the sample probe from the stack. Cover the sample nozzles as the probe is being removed.

7.10.7 Have a Radiological Control Technician perform a Beta-Gamma direct frisk of the sample probe.

7.10.8 Do a visual inspection of the probe looking for any obvious physical damage paying particular attention to the sample nozzle knife edges.

7.10.9 Wrap the sample probe in a plastic sleeve.

7.10.10 Put the probe in the man-basket for movement to the ground and subsequent transportation to the area designated for the probe rinse.

7.10.11 Follow all steps/precautions required by Industrial Health outlined in the job specific work permit.

7.10.12 Use procedure EQT-38 to complete the probe rinse.

7.10.13 Re-install the original rinsed probe into the stack or install the spare sample probe into the stack. Properly store the unused probe for future use.

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7.11 Sample System Leak Test

Silos Instrumentation

NOTE 1: A system leak test is required per ANSI 13.1-1999.

NOTE 2: The system leak test can be accomplished using a pressure pump and a blank flange or cap for the sample line.

7.11.1 Acquire a pump and a calibrated pressure gauge as well as the necessary Swagelok® fittings to connect the pump to the sample lines.

NOTE: The sample pump will be turned off during this test and may cause a "Low Flow" alarm in the control room.

7.11.2 Notify the operations control room.

7.11.3 Turn the sample pump "off" by pushing the "on/off" pushbutton on the front of the CEM panel.

7.11.4 Disconnect the 1.5" sample line from the CEM panel.

7.11.5 Connect the 1.5 " sample line to the pressure gauge using the appropriate fittings.

7.11.6 Disconnect the 1.5" sample line from the nozzle up on the stack. Blank flange or cap the 1.5" sample line at this end..

7.11.7 Pump up the pressure in the sample line to be tested to approximately 15 psi. Note the reading.

7.11.8 Observe pressure gauge reading for 10 minutes.

7.11.9 The reading shall remain within ±1 psi of the reading noted in step 7.11.7.

7.11.10 **IF** the readings observed on the pressure gauge drop below14 psi, **THEN** secure the leak test and repair the leak. After the leak is repaired, repeat the leak test as described above.

7.11.11 **IF** the leak test passes, **THEN** note that the test has been accomplished in the CEM building system logbook.

7.11.12 Re-install the 1.5" sample line to its pre-test configuration.

7.11.13 Ensure all sample valves inside the CEM cabinet are in the "open" position. Ensure that all stack valves are in the "open" position.

7.11.14 Press the "on/off" pump pushbutton on the CEM panel. The sample pump should start after approximately 30 seconds.

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7.11.15 Ensure that the sample flow numbers are reading the appropriate numbers. These numbers are project specific.

7.11.16 Notify the control room that the test is complete.

7.12 Quarterly Response Check of Stack Flow

Silos Instrumentation

▼NOTE 1: Per ANSI N13.1 on a quarterly basis, response checks should be made of the flowrate readings from in-stack equipment using a reference Pradtl-type pitot-static tube (Traverse stack sampler). This section shall also be performed upon initial commissioning and after masstron change-outs.

▼NOTE 2: Under normal circumstances, this section shall be performed by a qualified vendor with assistance from qualified site personnel.

7.12.1 Notify the operations control room that the response check is being initiated.

7.12.2 Remove the cover to the "Stack" Masstron II by removing the four retaining screws on the front cover.

▼NOTE: See section 5.15 of the "Installation, Operation, and Maintenance Manual" for the Masstron II flowmeter, which is the AMC "Operations and Maintenance Manual" for each indivdual stack.

7.12.3 Set the "K" factor to "1".

7.12.4 Ensure the local system computer is collecting and recording the stack flow data.

7.12.5 Have the vendor perform the traverse of the stack in the vicinity of the instack device.

7.12.6 Determine if the velocity readings recorded on the local computer agree within 10% of the velocity readings determined by the vendor's traverse.

7.12.7 IF the velocity readings deviate by more than 10%, THEN:

7.12.7.1 Determine and correct the cause prior to putting the unit back in operation.

7.12.7.2 If necessary, adjust the "K" factor on the stack Masstron to bring the Masstron value within 10% of the vendor's traverse reading.

7.12.8 Notify the operations control room that the response check is completed.

INFORMATION ONLY

8.0 APPLICABLE DOCUMENTS

8.1 Drivers

8.1.1 10 CFR 835, Occupational Radiation Protection

8.2 References

8.2.1 ANSI N323-1978, Radiation Protection Instrumentation Test and Calibration

8.2.2 ANSI N13.1-1999, Guide to Sampling Airborne Radioactive Materials in Nuclear Facilities.

8.2.3 EQT-38, Stack Insert Inspection and Annual Rinse

8.3 Information Sources

8.3.1 Maintenance Manual, Pylon Model CRM-1 Continuous Radiation Monitor, A900092

8.3.2 Instruction Manual, Ludlum Model 177-62-1 Alarm Ratemeter

8.4 Forms

None

8.5 Records

None

9.0 DEFINITIONS

None

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