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**FERNALD ENVIRONMENTAL MANAGEMENT PROJECT - 1995 STACK
TEST RESULTS - LAUNDRY CONTAMINATED CLOTHING DRYERS AND
EAST OLIVER FILETER NASH VACUUM PUMP**

09/13/95

**C:EC:95-0118
FERMCO HAMILTON COUNTY
27
LETTER**



Restoration Management Corporation

P.O. Box 398704 Cincinnati, Ohio 45239-8704 (513) 738-6200

September 13, 1995

Fernald Environmental Management Project
Letter No. C:EC:95-0118

Mr. Peter Sturdevant, Compliance Specialist
Air Quality Management Division
Hamilton County Department of Environmental Services
1632 Central Parkway
Cincinnati, Ohio 45210

Dear Mr. Sturdevant:

**FERNALD ENVIRONMENTAL MANAGEMENT PROJECT - 1995 STACK TEST RESULTS -
LAUNDRY CONTAMINATED CLOTHING DRYERS AND THE EAST OLIVER FILTER NASH
VACUUM PUMP**

Enclosed are the 1995 stack test results for the periodic confirmatory testing of the Laundry Contaminated Clothing Dryers and the East Oliver Filter Nash Vacuum Pump. The stack test results confirm the estimated low levels of emissions as required by 40 CFR 61.93(b)(4)(i), and also verify that the sources are being operated in compliance with their respective permits.

If you have any questions regarding these stack tests, or if you would like complete copies of the final test reports, please call Kip Klee of my staff at (513) 648-5289.

Sincerely,

Terence D. Hagen
Director
Environmental Compliance

TDH:KOK:mhv
Enclosure

- c: S. M. Beckman, FERMCO/MS65-2, w/o enclosure
- K. O. Klee, FERMCO/MS65-2, w/o enclosure
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- File Record Storage Copy 108.6
- RTS Files

**COMPLIANCE EMISSIONS TEST REPORT
DETERMINATION OF PARTICULATE,
RADIONUCLIDES, AND TOTAL URANIUM
EMISSIONS FROM THE EAST OLIVER
FILTER NASH VACUUM PUMP
(EMISSION POINT # EP8-013)
FERNALD ENVIRONMENTAL RESTORATION
MANAGEMENT CORPORATION
CINCINNATI, OHIO**

prepared for

**FERNALD ENVIRONMENTAL RESTORATION MANAGEMENT CORPORATION
P.O. Box 398704
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P.N. A95010
July 13, 1995

Executive Summary

Hayden Environmental Group, Inc. was retained by Fernald Environmental Restoration Management Corporation to determine the particulate, radionuclide, and total uranium emission rates of the East Oliver Filter Nash Vacuum Pump exhaust at their Ross, Ohio facility. The evaluation was performed to demonstrate compliance with Ohio Environmental Protection Agency regulations restricting emissions from stationary sources. Emission samples were collected and analyzed using USEPA Reference Methods for stationary source sampling. The tests were conducted on May 10, 1995. The results of the tests are summarized below:

Summary of East Oliver Filter Nash Vacuum Pump Emissions

Compound	Emission Rate (lb/hr) ^a
Total Particulate	5.00E-03
Total Uranium	4.48E-04

Compound	Emission Rate (pci/hr) ^b
Gross Alpha	570 with 106 std. dev.
Gross Beta	271 with 100 std. dev.

^a pounds per hour

^b picocuries per hour

1.0 Introduction

Hayden Environmental Group, Inc. was retained by Fernald Environmental Restoration Management Corporation (FERMCO) to perform a compliance particulate, radionuclide, and total uranium emissions evaluation on the East Oliver Filter Nash Vacuum Pump exhaust at their Ross, Ohio facility. The evaluation was performed on May 10, 1995. A single test run was conducted using USEPA Reference Methods 1, 2, 3, 4, 5, and 114. Mr. Tim Miller of FERMCO coordinated the test schedule with plant operations. The emission tests were performed by the Hayden test team of Mr. Bruce Sarven and Mr. Bert Forsyth. The emission samples were analyzed by DataChem Laboratories located in Salt Lake City, Utah.

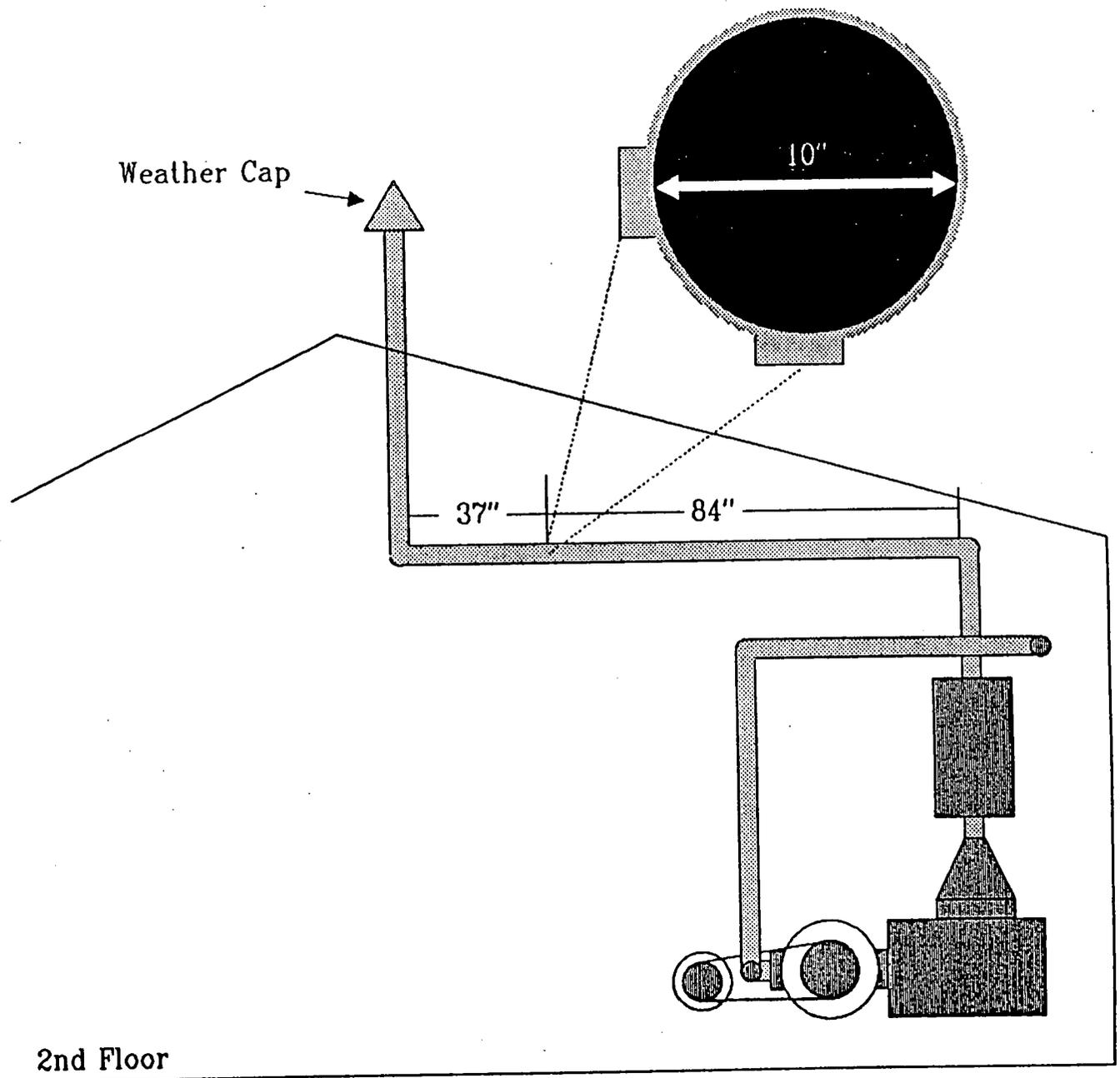
2.0 Process Description

The East Oliver Filter is used to filter sump liquor or sump water. The soap liquor and slop water feeds are neutralized with lime then passed through the Oliver Filter at a rate of 2,000 gallons per hour. The oliver filter is a rotary vacuum filter precoated with dicalite (diatomaceous earth).

The Nash vacuum pump produces the vacuum that moves the feed liquor or water through the Oliver filter. The vacuum pump is equipped with moisture separation systems which reduce the amount of water vapor discharged to the atmosphere. The discharged water vapor can contain radioactive (primarily uranium) compounds, lime, and other miscellaneous solids filtered from the liquor/slurry feed.

3.0 Sampling Site Description

The emissions from the East Oliver Filter are vented through a 10 inch diameter circular stack. Two sampling ports were located at 90° angles from each other. The sampling ports were located 84 inches or 8.4 stack diameters downstream from the last flow disturbance (elbow) and 37 inches or 3.7 stack diameters upstream from the next flow disturbance (elbow). A drawing of the sampling site is provided in Figure 3.1.



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Figure 3.1 Sample Site Detail

4.0 Sampling and Analytical Procedures

The sampling and analytical procedures conformed to the most recent revisions of USEPA Reference Methods for stationary sources. Specifically, USEPA Reference Methods 1, 2, 3, 4, 5, and 114 were used. A brief description of each procedure is included below:

4.1 Measurement Sites (USEPA Method 1A)

The location of measurement sites and the number of traverse points were determined using USEPA Reference Method 1A, "Sample and Velocity Traverses for Stationary Sources with Small Stacks or Ducts."

4.2 Velocities and Volumetric Flow Rates (USEPA Method 2C)

The stack gas velocity and volumetric flow rates were determined using USEPA Reference Method 2, "Determination of Stack Gas Velocity and Volumetric Flow Rate in Small Stack or Ducts (Standard Pitot Tube)." The stack gas velocity was measured on a Dwyer oil filled manometer using a calibrated S-type pitot tube. The stack gas temperature was measured with a calibrated type "K" thermocouple and Omega digital temperature readout.

4.3 Dry Molecular Weight (USEPA Method 3)

The stack gas dry molecular weight was determined using USEPA Reference Method 3, "Gas Analysis for Carbon Dioxide, Oxygen, Excess Air, and Dry Molecular Weight." Several grab samples were collected and analyzed during each test with Fyrite combustion gas analyzers which directly measure concentrations of O₂ and CO₂.

4.4 Moisture (USEPA Method 4)

The stack gas moisture content was determined using USEPA Reference Method 4, "Determination of Moisture Content in Stack Gases." The samples were collected in a series of chilled impingers. The moisture collected within the impingers was analyzed by gravimetric analysis.

4.5 Particulate Matter (USEPA Method 5C)

The particulate emissions were determined using USEPA Reference Method 5C, "Determination of Particulate Emissions from Stationary Sources with Small Stacks or Ducts." The samples were collected isokinetically from a single representative point through a heated glass lined probe, a heated (248° +/- 25°) tared glass fiber filter, and a series of cooled impingers (to condense the moisture). The nozzle, probe, and glassware before the filter was rinsed and brushed with acetone. The acetone rinse was placed in a tare-weighted beaker. The contents of the impingers were collected and all of the glassware behind the filter was rinsed with deionized water. The DI rinse was collected in a separate tare-weighted beaker. The acetone and DI water were both evaporated at temperatures below their boiling points. The filter and acetone residue were analyzed by gravimetric analysis to determine the filterable particulate mass collected. The DI water residue was analyzed by gravimetric analysis to determine the condensible particulate mass collected. The total particulate was obtained by adding the filterable and condensible particulate emission rates. A drawing of the particulate sampling train is provided in Figure 4.1.

4.6 **Radionuclide and Total Uranium (USEPA M-114)**

The Radionuclide and total uranium emissions were determined using USEPA Reference Method 114, "Test Methods for Measuring Radionuclide Emissions from Stationary Sources." The radionuclide analysis was performed on the total particulate. The uranium was dissolved, oxidized to the hexavalent state, and extracted using a suitable solvent. The samples were analyzed for total uranium by colorimetry (Method A-5) and laser phosphoremetry. The total gross alpha activity was determined using an alpha counter (Method A-4). The total gross beta activity was determined using a beta counter (Method B-4). The total gamma isotopic activity was determined using a high resolution gamma detector (Method G-1).

The Hayden Environmental Group Inc. Air Sampling Quality Assurance Program includes procedures for equipment calibration that follow USEPA and manufacturers guidelines, use of and strict adherence to standard published procedures, and traceability protocols for the recording and calculation of data.

5.0 Test Results

Table 5.1 summarizes the East Oliver Filter Nash Vacuum Pump exhaust stack gas conditions. The stack gas velocity averaged 12.8 feet per second (fps). The volumetric flow rate averaged 418 actual cubic feet per minute (acfm) or 351 dry standard cubic feet per minute (dscfm) at 124°F. The stack gas concentration of oxygen and carbon dioxide were 21.0% and 0.0%, respectively.

Table 5.2 summarizes the East Oliver Filter Nash Vacuum Pump exhaust particulate emissions. The average stack gas filterable particulate concentration was $7.87\text{E-}04$ grains per dry standard cubic feet (gr/dscf) or $1.12\text{E-}07$ pounds per dry standard cubic foot (lb/dscf). The filterable particulate emission rate averaged $2.37\text{E-}03$ pounds per hour (lb/hr). The average stack gas condensible particulate concentration was $8.72\text{E-}04$ gr/dscf or $1.25\text{E-}07$ lb/dscf. The condensible particulate emission rate averaged $2.63\text{E-}03$ lb/hr. The average total particulate emission rate was $5.00\text{E-}03$ lb/hr.

Table 5.3 summarizes the East Oliver Filter Nash Vacuum Pump exhaust total uranium emissions. The average stack gas uranium concentration was $3.40\text{E-}01$ milligrams per cubic meter (mg/m^3) or $2.12\text{E-}08$ lb/dscf. The uranium emission rate averaged $4.48\text{E-}04$ lb/hr.

Table 5.4 summarizes the East Oliver Filter Nash Vacuum Pump exhaust gross alpha radionuclide emissions. The average stack gas gross alpha concentration was $2.70\text{E-}02$ picocuries per dry standard cubic foot ($\rho\text{ci/dscf}$) with a standard deviation of $5.02\text{E-}03$ $\rho\text{ci/dscf}$. The gross alpha emission rate averaged 570 picocuries per hour ($\rho\text{ci/hr}$) with a standard deviation of 106 $\rho\text{ci/hr}$.

Table 5.5 summarizes the East Oliver Filter Nash Vacuum Pump exhaust gross beta radionuclide emissions. The average stack gas gross beta concentration was $1.29\text{E-}02$ $\rho\text{ci/dscf}$ with a standard deviation of $4.76\text{E-}03$ $\rho\text{ci/dscf}$. The gross beta emission rate averaged 271 $\rho\text{ci/hr}$ with a standard deviation of 100 $\rho\text{ci/hr}$.



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Table 5.1 Summary of East Oliver Filter Nash Vacuum Pump Exhaust Stack Gas Conditions

Run No.	Date Time	Velocity (fps) ^a	Air Flow		Temp. (°F) ^d	Moisture (%)	Oxygen (%)	Carbon Dioxide (%)
			(acfm) ^b	(dscfm) ^c				
EO-1	5/10/95 0924-1433	12.8	418	351	124	5.0 ^e	21.0	0.0

^a feet per second

^b actual cubic feet per minute

^c dry standard cubic feet per minute

^d degrees Fahrenheit

^e The moisture was estimated to be 5.0%. An explanation is provided in Section 6.0 "Discussion and Interpretation."

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Table 5.2 Summary of East Oliver Filter Nash Vacuum Pump Exhaust Particulate Emissions

Run No.	Date	Filterable Particulate			Condensible Particulate		Total Particulate Emission Rate (lb/hr) ^c	
		Concentration		Emission Rate (lb/hr) ^c	Concentration			Emission Rate (lb/hr) ^c
	(gr/dscf) ^a	(lb/dscf) ^b	(gr/dscf) ^a		(lb/dscf) ^b			
	Time							
EO-1	5/10/95 0924-1433	7.87E-04	1.12E-07	2.37E-03	8.72E-04	1.25E-07	2.63E-03	5.00E-03

- ^a grains per dry standard cubic foot
- ^b pounds per dry standard cubic foot
- ^c pounds per hour

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Table 5.3 Summary of East Oliver Filter Nash Vacuum Pump Exhaust Total Uranium Emissions

Run No.	Date Time	Concentration		Emission Rate (lb/hr) ^c
		(mg/m ³) ^a	(lb/dscf) ^b	
EO-1	5/10/95 0924-1433	3.40E-01	2.12E-08	4.48E-04

^a milligrams per cubic meter

^b pounds per dry standard cubic foot

^c pounds per hour

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Table 5.4 Summary of East Oliver Filter Nash Vacuum Pump Exhaust Gross Alpha Emissions

Run No.	Date Time	Concentration			Emission Rate		
		Measured Concentration (pci/dscf) ^a	Standard Deviation (pci/dscf) ^a	Concentration Range (pci/dscf) ^a	Measured Emission Rate (pci/hr) ^b	Standard Deviation (pci/hr) ^b	Emission Rate Range (pci/hr) ^b
EO-1	5/10/95 0924-1433	1.29E-02	5.02E-03	7.88E-03 to 1.79E-02	570	106	464 to 676

^a picocuries per dry standard cubic foot

^b picocuries per hour

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Table 5.5 Summary of East Oliver Filter Nash Vacuum Pump Exhaust Gross Beta Emissions

Run No.	Date Time	Concentration			Emission Rate		
		Measured Concentration (pci/dscf) ^a	Standard Deviation (pci/dscf) ^a	Concentration Range (pci/dscf) ^a	Measured Emission Rate (pci/hr) ^b	Standard Deviation (pci/hr) ^b	Emission Rate Range (pci/hr) ^b
EO-1	5/10/95 0924-1433	1.29E-02	4.76E-03	8.14E-03 to 1.77E-02	271	100	171 to 371

^a picocuries per dry standard cubic foot

^b picocuries per hour

6.0 Discussion and Interpretation

One of the sampling ports was not accessible during the test. The sampling port was sealed shut and could not be opened. Therefore the air flow measurements were performed on only one sampling port.

The filtration system shut down before a post-test air flow measurement could be performed. Both a pre-test and a post-test air flow are required to be performed and averaged together for USEPA Reference Method 5C calculations. Since the process is considered to be steady state and the post-test air flows were not representative, the pre-test air flow was used to calculate the air flows and emission rates.

The silica gel impinger was broken sometime between the end of the sample run and the beginning of the sample recoveries. The broken impinger had no effect on the integrity of the sample, However, it made calculating a stack gas moisture impossible. Therefore an estimate of the stack gas moisture was used to calculate the air flows.

The negative weight was recorded for the filter catch. It is not uncommon for the net weight change of the particulate filter to be negative on sources with very low particulate loadings. The filter edge is typically partially damaged by normal use in a Method 5 sampling train. When the filter is recovered, the loose filter material from the edge of the filter holder and frit are also recovered with the filter to the extent possible. Following recovery of the filter, the filter holder and frit are brushed and rinsed with acetone to recover any particulate and filter residue that could not be recovered by physical means. This portion of the particulate is included in the acetone rinse fraction. The portion of filter material not recovered with the filter fraction is reflected in the weight gain of the acetone rinse. The sample from this test run showed a positive total particulate weight gain.

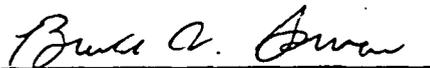
**COMPLIANCE EMISSIONS TEST REPORT
DETERMINATION OF PARTICULATE,
RADIONUCLIDES, AND TOTAL URANIUM
EMISSIONS FROM LAUNDRY
CONTAMINATED CLOTHING DRYERS
(EMISSION POINT # EP11-002)
FERNALD ENVIRONMENTAL RESTORATION
MANAGEMENT CORPORATION
CINCINNATI, OHIO**

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P.N. A95010
July 13, 1995

Executive Summary

Hayden Environmental Group, Inc. was retained by Fernald Environmental Restoration Management Corporation to determine the particulate, radionuclide, and total uranium emission rates of the laundry contaminated clothing dryers at their Ross, Ohio facility. The evaluation was performed to demonstrate compliance with Ohio Environmental Protection Agency regulations restricting emissions from stationary sources. Emission samples were collected and analyzed using USEPA Reference Methods for stationary source sampling. The tests were conducted on May 9, 1995. The results of the tests are summarized below:

Summary of Laundry Dryer Emissions

Compound	Emission Rate (lb/hr) ^a
Total Particulate	0.026 lb/hr
Total Uranium (average)	BDL

Compound	Emission Rate (pci/hr) ^b
Gross Alpha	11,445 with 1,479 std. dev.
Gross Beta	5,106 with 1,461 std. dev.

BDL = Below Analytical Detection Limits

^a pounds per hour

^b picocuries per hour

1.0 Introduction

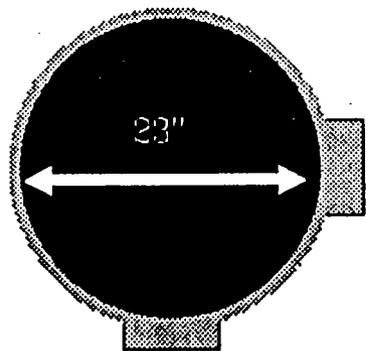
Hayden Environmental Group, Inc. was retained by Fernald Environmental Restoration Management Corporation (FERMCO) to perform a compliance particulate, radionuclide, and total uranium emissions evaluation on the laundry contaminated clothing dryers at their Ross, Ohio facility. The evaluation was performed on May 9, 1995. A single test run was conducted using USEPA Reference Methods 1, 2, 3, 4, 5, and 114. Mr. Tim Miller of FERMCO coordinated the test schedule with plant operations. The emission tests were performed by the Hayden test team of Mr. Bruce Sarven and Mr. Bert Forsyth. The emission samples were analyzed by DataChem Laboratories located in Salt Lake City, Utah.

2.0 Process Description

Three Cissell clothes dryers are used in drying washed (potentially) contaminated clothing. Each clothing dryer has a maximum operating capacity of 150 pounds per cycle. Each drying cycle is 60 minutes in duration. Therefore the maximum capacity of the combined dryers is 450 pounds per hour. Each dryer typically operates at an average of 104 pounds per hour. The emissions from the dryers are vented through a lint filter, a pre-filter, and a HEPA filter.

3.0 Sampling Site Description

The emissions from the hepa filter are vented through a 22 inch diameter circular stack. Two sampling ports were located at 90° angles from each other. The sampling ports were located 94 inches or 1.7 stack diameters downstream from the last flow disturbance (fan) and 39 inches or 1.7 stack diameters upstream from the next flow disturbance (top of stack). A drawing of the sampling site is provided in Figure 3.1.



Hepa Filter

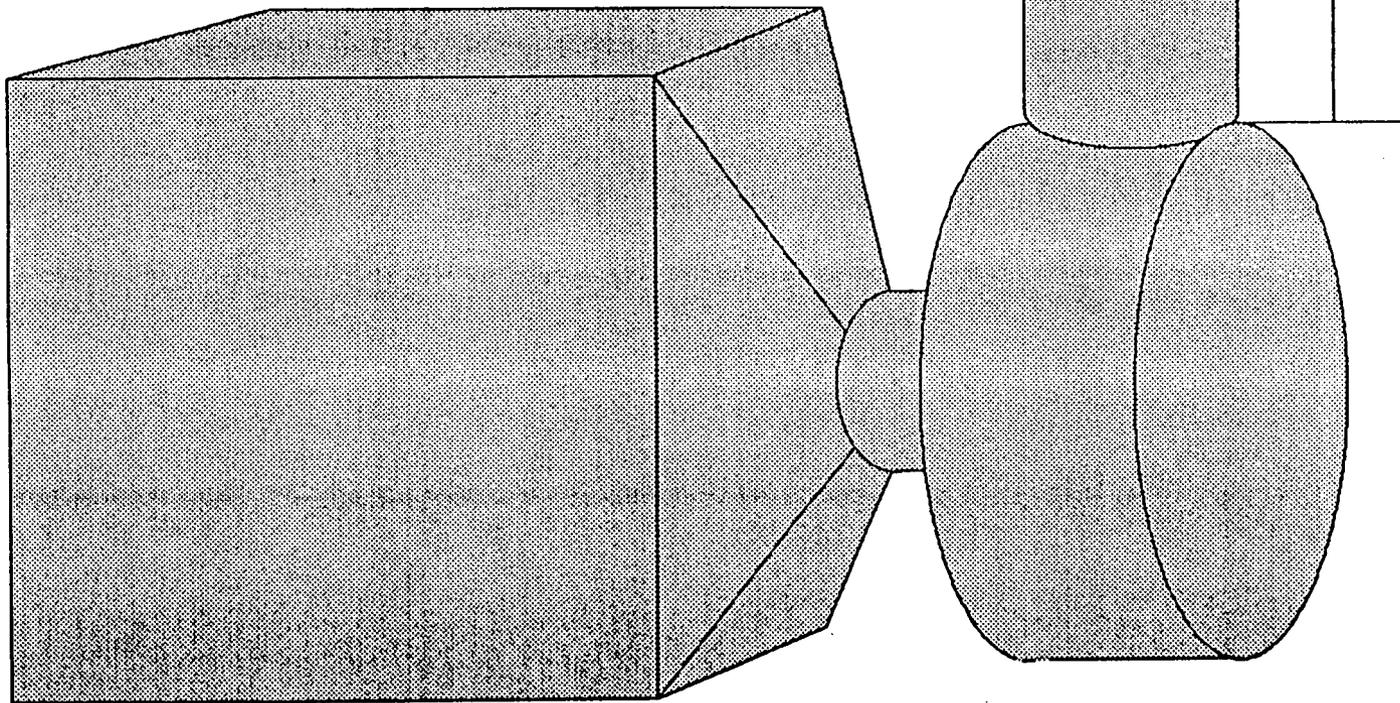


Figure 3.1 Sample Site Detail

4.0 Sampling and Analytical Procedures

The sampling and analytical procedures conformed to the most recent revisions of USEPA Reference Methods for stationary sources. Specifically, USEPA Reference Methods 1, 2, 3, 4, 5, and 114 were used. A brief description of each procedure is included below:

4.1 Measurement Sites (USEPA Method 1)

The location of measurement sites and the number of traverse points were determined using USEPA Reference Method 1, "Sample and Velocity Traverses for Stationary Sources."

4.2 Velocities and Volumetric Flow Rates (USEPA Method 2)

The stack gas velocity and volumetric flow rates were determined using USEPA Reference Method 2, "Determination of Stack Gas Velocity and Volumetric Flow Rate." The stack gas velocity was measured on a Dwyer oil filled manometer using a calibrated S-type pitot tube. The stack gas temperature was measured with a calibrated type "K" thermocouple and Omega digital temperature readout.

4.3 Dry Molecular Weight (USEPA Method 3)

The stack gas dry molecular weight was determined using USEPA Reference Method 3, "Gas Analysis for Carbon Dioxide, Oxygen, Excess Air, and Dry Molecular Weight." Several grab samples were collected and analyzed during each test with Fyrite combustion gas analyzers which directly measure concentrations of O₂ and CO₂.

4.4 Moisture (USEPA Method 4)

The stack gas moisture content was determined using USEPA Reference Method 4, "Determination of Moisture Content in Stack Gases." The samples were collected in a series of chilled impingers. The moisture collected within the impingers was analyzed by gravimetric analysis.

4.5 Particulate Matter (USEPA Method 5)

The particulate emissions were determined using USEPA Reference Method 5, "Determination of Particulate Emissions from Stationary Sources." The samples were collected isokinetically through a heated glass lined probe, a heated (248° +/- 25°) tared glass fiber filter, and a series of cooled impingers (to condense the moisture). The nozzle, probe, and glassware before the filter was rinsed and brushed with acetone. The acetone rinse was placed in a tare-weighed beaker. The contents of the impingers were collected all of the glassware behind the filter were rinsed with deionized water. The DI rinse was collected in a separate tare-weighed beaker. The acetone and DI water were both evaporated at temperatures below their boiling points. The filter and acetone residue were analyzed by gravimetric analysis to determine the filterable particulate mass collected. The DI water residue was analyzed by gravimetric analysis to determine the condensible particulate mass collected. The total particulate was obtained by adding the filterable and condensible particulate emission rates. A drawing of the particulate sampling train is provided in Figure 4.1.

4.6 Radionuclide and Total Uranium (USEPA M-114)

The Radionuclide and total uranium emissions were determined using USEPA Reference Method 114, "Test Methods for Measuring Radionuclide Emissions from Stationary Sources." The radionuclide analysis was performed on the total particulate. The uranium was dissolved, oxidized to the hexavalent state, and extracted using a suitable solvent. The samples were analyzed for total uranium by colorimetry (Method A-5) and laser phosphoremetry. The total gross alpha activity was determined using an alpha counter (Method A-4). The total gross beta activity was determined using a beta counter (Method B-4). The total gamma isotopic activity was determined using a high resolution gamma detector (Method G-1).

The Hayden Environmental Group Inc. Air Sampling Quality Assurance Program includes procedures for equipment calibration that follow USEPA and manufacturers guidelines, use of and strict adherence to standard published procedures, and traceability protocols for the recording and calculation of data.

5.0 Test Results

Table 5.1 summarizes the laundry dryer HEPA filter exhaust stack gas conditions. The stack gas velocity averaged 35.1 feet per second (fps). The volumetric flow rate averaged 6,068 actual cubic feet per minute (acfm) or 5,181 dry standard cubic feet per minute (dscfm) at 132°F and 2.5% moisture. The stack gas concentration of oxygen and carbon dioxide were 21.0% and 0.0%, respectively.

Table 5.2 summarizes the laundry dryer HEPA filter exhaust particulate emissions. The average stack gas filterable particulate concentration was 5.76E-04 grains per dry standard cubic foot (gr/dscf) or 8.23E-08 pounds per dry standard cubic foot (lb/dscf). The filterable particulate emission rate averaged 0.026 pounds per hour (lb/hr). The condensible particulate was below the analytical detection limits. Therefore the total particulate emission rate averaged 0.026 lb/hr.

Table 5.3 summarizes the laundry dryer HEPA filter exhaust total uranium emissions. The total uranium catch was below the analytical detection limit.

Table 5.4 summarizes the laundry dryer HEPA filter exhaust gross alpha radionuclide emissions. The average stack gas gross alpha concentration was 3.68E-02 picocuries per dry standard cubic foot (pci/dscf) with a standard deviation of 4.76E-03 pci/dscf. The gross alpha emission rate averaged 11,445 picocuries per hour (pci/hr) with a standard deviation of 1,479 pci/hr.

Table 5.5 summarizes the laundry dryer HEPA filter exhaust gross beta radionuclide emissions. The average stack gas gross beta concentration was 1.64E-02 pci/dscf with a standard deviation of 4.70E-03 pci/dscf. The gross beta emission rate averaged 5,106 pci/hr with a standard deviation of 1,461 pci/hr.

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Table 5.1 Summary of Laundry Dryer HEPA Filter Exhaust Stack Gas Conditions

Run No.	Date Time	Velocity (fps) ^a	Air Flow		Temp. (°F) ^d	Moisture (%)	Oxygen (%)	Carbon Dioxide (%)
			(acfm) ^b	(dscfm) ^c				
LD-1	5/9/95 0927-1435	35.1	6,068	5,181	132	2.5	21.0	0.0

^a feet per second

^b actual cubic feet per minute

^c dry standard cubic feet per minute

^d degrees Fahrenheit

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Table 5.2 Summary of Laundry Dryer HEPA Filter Exhaust Particulate Emissions

Run No.	Date Time	Filterable Particulate			Condensable Particulate			Total Particulate Emission Rate (lb/hr) ^c
		Concentration		Emission Rate (lb/hr) ^c	Concentration		Emission Rate (lb/hr) ^c	
		(gr/dscf) ^a	(lb/dscf) ^b		(gr/dscf) ^a	(lb/dscf) ^b		
LD-1	5/9/95 0927-1435	5.76E-04	8.23E-08	0.026	0.00E-00	0.00E-00	0.000	0.026

- ^a grains per dry standard cubic foot
- ^b pounds per dry standard cubic foot
- ^c pounds per hour

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Table 5.3 Summary of Laundry Dryer HEPA Filter Exhaust Total Uranium Emissions

Run No.	Date Time	Concentration		Emission Rate (lb/hr) ^c
		(mg/l) ^a	(lb/dscf) ^b	
LD-1	5/9/95 0927-1435	BDL	BDL	BDL

^a grains per dry standard cubic foot

^b pounds per dry standard cubic foot

^c pounds per hour

BDL = The sample collected was below the analytical detection limits

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Table 5.4 Summary of Laundry Dryer HEPA Filter Exhaust Gross Alpha Emissions

Run No.	Date Time	Concentration			Emission Rate		
		Measured Concentration (pci/dscf) ^a	Standard Deviation (pci/dscf) ^a	Concentration Range (pci/dscf) ^a	Measured Emission Rate (pci/hr) ^b	Standard Deviation (pci/hr) ^b	Emission Rate Range (pci/hr) ^b
LD-1	5/9/95 0927-1435	3.68E-02	4.76E-03	3.20E-02 to 4.16E-02	11,445	1,479	9,966 to 12,924

^a picocuries per dry standard cubic foot

^b picocuries per hour

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Table 5.5 Summary of Laundry Dryer HEPA Filter Exhaust Gross Beta Emissions

Run No.	Date Time	Concentration			Emission Rate		
		Measured Concentration (pci/dscf) ^a	Standard Deviation (pci/dscf) ^a	Concentration Range (pci/dscf) ^a	Measured Emission Rate (pci/hr) ^b	Standard Deviation (pci/hr) ^b	Emission Rate Range (pci/hr) ^b
LD-1	5/9/95 0927-1435	1.64E-02	4.70E-03	1.17E-02 to 2.11E-02	5,106	1,461	3,645 to 6,567

^a picocuries per dry standard cubic foot

^b picocuries per hour

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6.0 Discussion and Interpretation

The negative weight was recorded for the filter catch. It is not uncommon for the net weight change of the particulate filter to be negative on sources with very low particulate loadings. The filter edge is typically partially damaged by normal use in a Method 5 sampling train. When the filter is recovered, the loose filter material from the edge of the filter holder and frit are also recovered with the filter to the extent possible. Following recovery of the filter, the filter holder and frit are brushed and rinsed with acetone to recover any particulate and filter residue that could not be recovered by physical means. This portion of the particulate is included in the acetone rinse fraction. The portion of filter material not recovered with the filter fraction is reflected in the weight gain of the acetone rinse. The sample from this test run showed a positive total particulate weight gain.