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STACK EMISSIONS SURVEY
OF
FEDERAL AMERICAN PARTNERS
GAS HILLS MILL
GAS HILLS, WYOMING
DECEMBER 1978

FILE NUMBER EA 7820-68

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STACK EMISSIONS SURVEY
FEDERAL AMERICAN PARTNERS
GAS HILLS MILL
GAS HILLS, WYOMING
FILE NUMBER EA 7820-68

INTRODUCTION

Ecology Audits, Inc., Casper, Wyoming, conducted a stack emissions survey at the Federal American Partners, Gas Hills Mill, located near Gas Hills, Wyoming, on Wednesday, December 20, 1978 and Friday, December 22, 1978. The purpose of this survey was to determine emissions of particulates from the Yellow Cake Amerjet Baghouse Dust Collector Stack, the Yellow Cake Rotoclone Scrubber Stack, and the Rotoclone Crusher Dust Collector Stack.

The sampling followed the procedures set forth in the "Wyoming Air Quality Standards and Regulations, Wyoming Department of Environmental Quality, 1975"; the Appendix to the Code of Federal Regulations, Title 40, Chapter I, Part 60; and the United States Nuclear Regulatory Commission, Code of Federal Regulations, Title 10, Chapter I, Part 20.

SUMMARY OF RESULTS

Yellow Cake Amerjet Baghouse Dust Collector Stack

1. The emissions of particulate matter from the Yellow Cake Amerjet Baghouse Dust Collector Stack were 0.32 pounds per hour based on the "front-half" collection of the EPA-type sampling train.

2. The average allowable particulate emission rate is 0.97 pounds per hour based on the "Wyoming Air Quality Standards and Regulations". The particulate emissions were 33.0 percent of this standard based on the "front-half" collection of the test.

3. The concentration of uranium-natural was 4.6×10^{-10} μCi/ml based on the "front-half" collection of the EPA-type sampling train.

Yellow Cake Rotoclone Scrubber Stack

1. The emissions of particulate matter from the Yellow Cake Rotoclone Scrubber Stack were 1.02 pounds per hour based on the "front-half" collection of the EPA-type sampling train.

2. The average allowable particulate emission rate is 0.97 pounds per hour based on the "Wyoming Air Quality Standards and Regulations". The particulate emissions were 105.5 percent of this standard based on the "front-half" collection of the test.

3. The concentration of uranium-natural was 1.9×10^{-9} µCi/ml based on the "front-half" collection of the EPA-type sampling train.

Rotoclone Crusher Dust Collector Stack

1. The emissions of particulate matter from the Rotoclone Crusher Dust Collector Stack were 1.3 pounds per hour based on the "front-half" collection of the EPA-type sampling train.

2. The average allowable particulate emission rate is 42.7 pounds per hour based on the "Wyoming Air Quality Standards and Regulations". The particulate emissions were 3.0 percent of this standard based on the "front-half" collection of the test.

3. The concentration of uranium-natural was 3.8×10^{-10} μCi/ml based on the "front-half" collection of the EPA-type sampling train.

SUMMARY OF RESULTS

Yellow Cake Amerjet Baghouse Dust Collector Stack

Run Number	1		
Stack Flow Rate - ACFM	3316		
Stack Flow Rate - DSCFM*	2446		
% Water Vapor - % Vol.	3.21		
% CO_2 - % Vol.	0.0		
% O_2 - % Vol.	21.0		
% Excess Air @ Sampling Point	--		
Particulates Probe, Cyclone & Filter Catch grains/dscf*	0.0153		
grains/cf @ Stack Conditions	0.0112		
lbs/hr	0.32		
Total Catch grains/dscf*	0.0166		
grains/cf @ Stack Conditions	0.0126		
lbs/hr	0.35		
Production Rate lbs/hr U308 produced	240		

* 29.92 "Hg, 68°F

SUMMARY OF RESULTS

Yellow Cake Rotoclone Scrubber Stack

Run Number	1		
Stack Flow Rate - ACFM	2043		
Stack Flow Rate - DSCFM*	1291		
% Water Vapor - % Vol.	9.63		
% CO_2 - % Vol.	0.0		
% O_2 - % Vol.	21.0		
% Excess Air @ Sampling Point	--		
Particulates Probe, Cyclone & Filter Catch grains/dscf*	0.0925		
grains/cf @ Stack Conditions	0.0583		
lbs/hr	1.02		
Total Catch grains/dscf*	0.6004		
grains/cf @ Stack Conditions	0.3783		
lbs/hr	6.64		
Production Rate lbs/hr U3O8 produced	240		

* 29.92 "Hg, 68°F

SUMMARY OF RESULTS

Rotoclone Crusher Dust Collector Stack

Run Number	1		
Stack Flow Rate - ACFM	14178		
Stack Flow Rate - DSCFM*	10927		
% Water Vapor - % Vol.	1.93		
% CO_2 - % Vol.	0.0		
% O_2 - % Vol.	21.0		
% Excess Air @ Sampling Point	--		
Particulates Probe, Cyclone & Filter Catch grains/dscf*	0.0144		
grains/cf @ Stack Conditions	0.0111		
lbs/hr	1.3		
Total Catch grains/dscf*	0.0157		
grains/cf @ Stack Conditions	0.0120		
lbs/hr	1.5		
Production Rate tons/hr Ore processed	40.8		

* 29.92 "Hg, 68°F

SUMMARY OF RESULTS

Radionuclear Emissions
Yellow Cake Amerjet Baghouse Dust Collector Stack

Run Number		1
U_3O_8	mg	2.5
U_3O_8	perent	2.3
U natural/DSCM	μCi/ml	4.6×10^{-10}

Yellow Cake Rotoclone Scrubber Stack

Run Number		1
U_3O_8	mg	10.9
U_3O_8	perent	1.6
U natural/DSCM	μCi/ml	1.9×10^{-9}

Rotoclone Crusher Dust Collector Stack

Run Number		1
U_3O_8	mg	2.2
U_3O_8	percent	2.0
U natural/DSCM	μCi/ml	3.8×10^{-10}

Projected Emissions

Location	µCi/min.Natural Uranium
Yellow Cake Amerjet Baghouse Dust Collector Stack	3.2×10^{-2}
Yellow Cake Rotoclone Scrubber Stack	7.3×10^{-2}
Rotoclone Crusher Dust Collector Stack	1.2×10^{-1}

Projected Yearly Emissions

Location	Ci/year U natural
Yellow Cake Amerjet Baghouse Dust Collector Stack	4.7×10^{-3}
Yellow Cake Rotoclone Scrubber Stack	1.1×10^{-2}
Rotoclone Crusher Dust Collector Stack	2.6×10^{-2}

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DISCUSSION OF RESULTS

The tests for particulates appeared to be valid representations of the actual emissions. The moisture percentages for the Yellow Cake Amerjet Baghouse Dust Collector Stack was [illegible].2 percent. The measured flow rate (Q_s) was 2446 dry standard cubic feet per minute. The rate of sampling for the three-hour test was within the specified limits of the isokinetic rate, the deviation being 2.8 percent.

The total calculated emission was 0.4 pounds per hour.

The moisture percentage for the Yellow Cake Rotoclone Scrubber Stack was 9.6 percent. The measured flow rate (Q_s) was 1291 dry standard cubic feet per minute. The rate of sampling for the three-hour test was within the specified limits of the isokinetic rate, the deviation being 1.0 percent.

The total calculated emission was 6.6 pounds per hour.

The moisture percentage for the Rotoclone Crusher Dust Collector Stack was 1.9 percent. The measured flow rate (Q_s) was 10927 dry standard cubic feet per minute. The rate of sampling for the three-hour test was within the specified limits of the isokinetic rate, the deviation being 2.6 percent.

The total calculated emission was 1.5 pounds per hour.

DESCRIPTION OF PROCESS OPERATION

In a uranium milling operation, uranium is extracted from ore, purified, and converted to U_3O_8. The raw ore is crushed and mixed with sulfuric acid to leach out the uranium. This mixture goes through a sand-slime separation to remove and wash the sand. The de-sanded pulp is collected and transferred to the resin-in-pulp circuit where ion-exchange resin is moved countercurrent to the solution flow.

This mixture goes to the clarifier where a filter removes solids and routes the pregnant solution to the solvent extraction circuit. The uranium-sulfuric acid mixture is removed from the organic phase by ammonium sulfate. The solution then goes to a precipitation tank where yellow cake is precipitated upon addition of ammonia. The yellow cake is [illegible]d, converted to U_3O_8, and conveyed to a storage hopper where it is loaded into 55-gallon drums for shipment.

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DESCRIPTION OF SAMPLING LOCATIONS

The sampling ports of the Yellow Cake Amerjet Baghouse Dust Collector Stack are located approximately 50 feet above the ground. The sampling was performed from four ports on the rectangular stack located approximately 9 feet (6.4 equivalent stack diameters) downstream of the stack inlet and 2 feet 10-1/2 inches (2.0 equivalent stack diameters) upstream from the outlet of the stack.

The sampling ports of the Yellow Cake Rotoclone Scrubber Stack are located approximately 50 feet above the ground. The sampling was performed from two ports on the rectangular stack located approximately 4 feet 6-1/2 inches (4.4 equivalent stack diameters) downstream of the stack inlet and 3 feet (2.9 equivalent stack diameters) upstream from the outlet of the stack.

The sampling ports of the Rotoclone Crusher Dust Collector Stack are located approximately 15 feet above the ground. The sampling was performed from four ports on the rectangular stack located approximately 5 feet 6 inches (2.2 equivalent stack diameters) downstream of the stack inlet and 1 foot 6 inches (0.7 equivalent stack diameters) upstream from the outlet of the stack.

SAMPLING AND ANALYTICAL PROCEDURES

The sampling and analytical procedure used followed the procedures outlined in the "Wyoming Air Quality Standards and Regulations, Wyoming Department of Environmental Quality, 1975"; the Appendix to the Code of Federal Regulations, Title 40, Chapter I, Part 60; and the United States Nuclear Regulatory Commission, Code of Federal Regulations, Title 10, Chapter I, Part 20.

A preliminary velocity traverse was made at each of the three stacks in order to determine the uniformity of flow in each stack. Particulate samples of nine-minute duration were taken at each of the traverse points on the Yellow Cake Amerjet Baghouse Dust Collector Stack. Particulate samples of eighteen-minute duration were taken at each of the traverse points on the Yellow Cake Rotoclone Scrubber Stack. Particulate samples of four and one-half minute duration were taken at each of the traverse points on the Rotoclone Crusher Dust Collector Stack.

Before each test, the sampling train was leak-checked at 15 inches of mercury. After each test, the train was again leak-checked at the highest recorded vacuum reading during the test. Final leak-checking was performed in order to determine the possibility of a diluted sample.

Before and after each test period, the pitot tube lines were checked for leaks under both a vacuum and pressure using the method described in the Federal Register, Volume 42, Number 160, Method 2, Section 3.1. The lines were also checked for clearance and the zero manometer reading verified before and after each test.

The total emissions were calculated from gravimetric analysis using both the "front-half" and "back-half" collections of the EPA-type sampling train. The uranium analysis was performed on the "front-wash" of the EPA-type sampling train by fluorometric determination. Additional analyses of the stacks included Ra-226, Th-230, Pb-210, and Gross Alpha and Beta.

DESCRIPTION OF TESTS

Personnel from Ecology Audits, Inc., arrived at the mill at 0800 hours on Wednesday, December 20, 1978. The equipment was moved onto the Yellow Cake Rotoclone Scrubber Stack; preliminary data were taken by 0950 hours. Testing began at 1000 hours and continued without difficulty until a three-hour test was completed at 1300 hours. The equipment was moved off the Yellow Cake Rotoclone Scrubber Stack and onto the Yellow Cake Amerjet Baghouse Dust Collector Stack; preliminary data were taken by 1340 hours. Testing began at 1340 hours and continued without difficulty until a three-hour test was completed at 1645 hours. The equipment was moved off the Yellow Cake Amerjet Baghouse Dust Collector Stack and loaded into the mobile laboratory. The work was completed at 1730 hours.

On Friday, December 22, 1978, work began at 0800 hours; preliminary data were taken on the Rotoclone Crusher Dust Collector Stack by 0900 hours. Testing began at 0905 hours and continued without difficulty until a three-hour test was completed at 1205 hours.

The equipment was moved off the Rotoclone Crusher Dust Collector Stack and loaded into the mobile laboratory. The samples were recovered and taken to Ecology Audits' laboratory in Casper, Wyoming, for analyses and evaluation.

Operations at the Federal American Partners, Gas Hills Mill, located near Gas Hills, Wyoming, were completed at 1300 hours on Friday, December 22, 1978.

Gregory D'Dee Smith
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APPENDICES

A. Locations of Sampling Points

B. Source Emissions Calculations

C. Calibration of Equipment

D. Field Testing Data

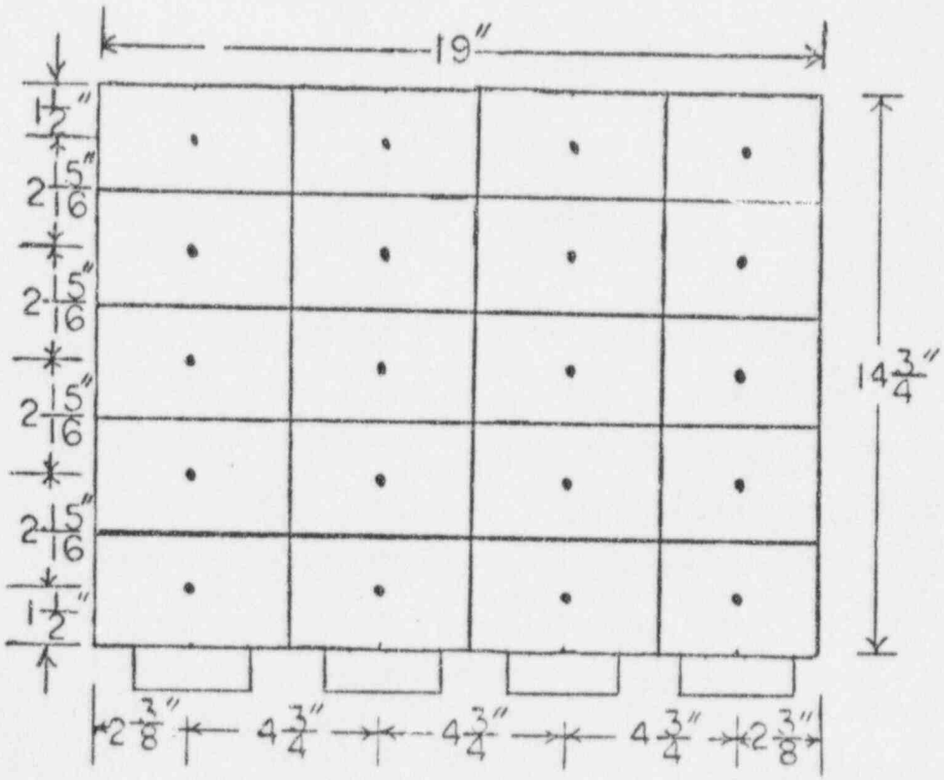
E. Analytical Data

APPENDIX A

Locations of Sampling Points
Yellow Cake Amerjet Baghouse Dust Collector Stack

The sampling ports are located approximately 9 feet (6.4 equivalent stack diameters) downstream of the stack inlet and approximately 2 feet 10 1/2 inches (2.0 equivalent stack diameters) upstream of the outlet of the stack. The locations of the sampling points were calculated as follow:

Looking into the Flow



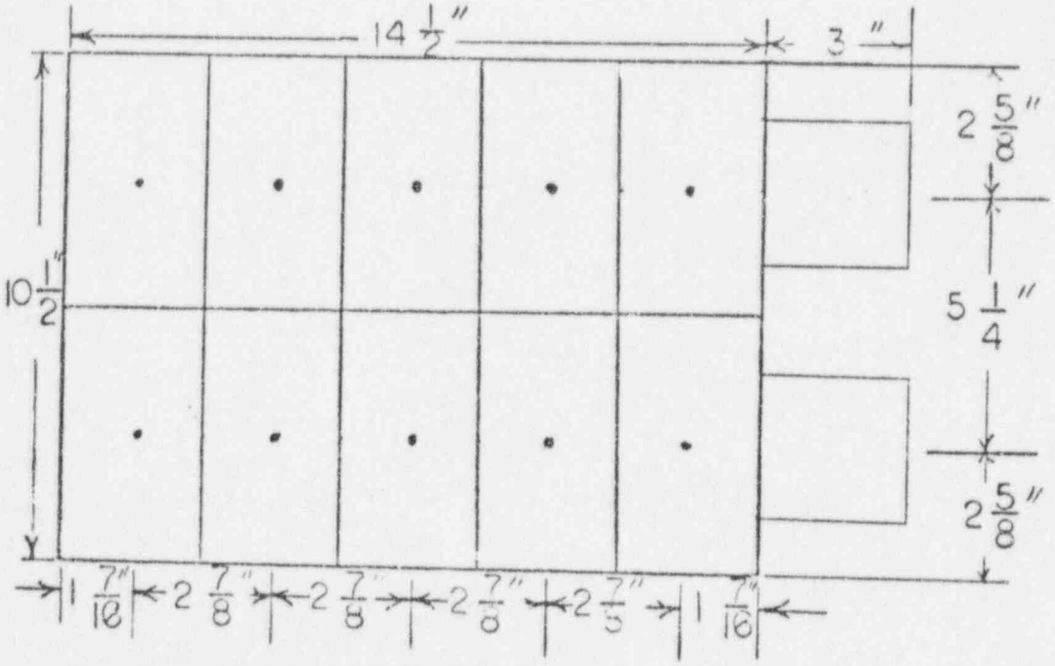
SCALE 1" = 6"

APPENDIX A

Locations of Sampling Points
Yellow Cake Rotoclone Scrubber Stack

The sampling ports are located approximately 4 feet 6 1/2 inches (4.4 equivalent stack diameters) downstream of the stack inlet and approximately 3 feet (2.9 equivalent stack diameters) upstream of the outlet of the stack. The locations of the sampling points were calculated as follow:

Looking into the Flow



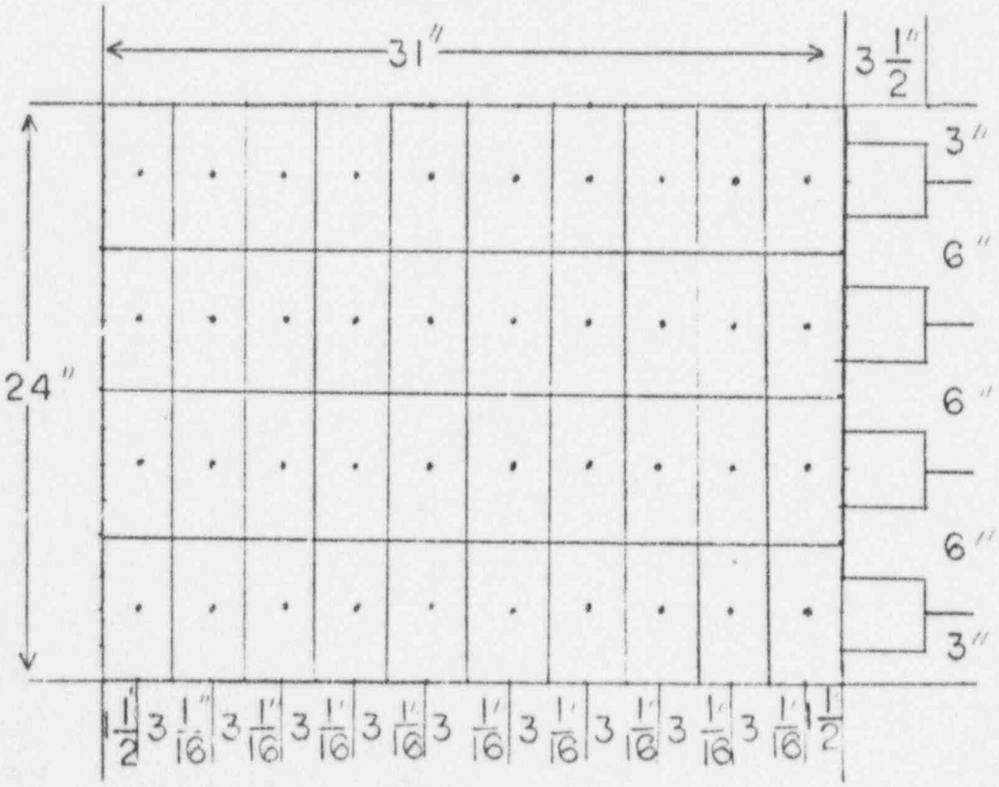
SCALE 1" = 4"

APPENDIX A

Locations of Sampling Points
Rotoclone Crusher Dust Collector Stack

The sampling ports are located approximately 5 feet 6 inches (2.2 equivalent stack diameters) downstream of the stack inlet and approximately 1 foot 6 inches (0.7 equivalent stack diameters) upstream of the outlet of the stack. The locations of the sampling points were calculated as follow:

Looking into the Flow



SCALE 1" = 8"

APPENDIX B

Nomenclature and Equations
for
Calculation of Source Emissions

Nomenclature for Particulate Calculations

Symbol	English Units	Metric Units	Description
A_s	in.^{2}	m^2	Stack Area
C_{an}	gr/dscf	g/dscm	Particulate - probe, cyclone and filter
C_{ao}	gr/dscf	g/dscm	Particulate - total
C_{at}	gr/CF @ stack conditions	g/m^3	Particulate - probe, cyclone and filter
C_{au}	gr/CF @ stack conditions	g/m^3	Particulate - total
C_{aw}	lbs/hr	kg/hr	Particulate - probe, cyclone and filter
C_{ax}	lbs/hr	kg/hr	Particulate - total
C_p			Pitot Tube Calibration Factor
D_n	in.	m	Sampling Nozzle Diameter
%EA			Percent Excess Air at sampling point
g	32.2 ft/sec^2		Acceleration of gravity
%I			Percent isokinetic
%M			Percent moisture in the stack gas by volume
M_d			Mole fraction of dry gas
m_f	mg	mg	Particulate - probe, cyclone and filter
M_{H_2O}	18 lb/lb-mole		Molecular Weight of Water

* 528°R, 29.92 "Hg (20°C, 760 mm Hg)

Symbol	English Units	Metric Units	Description
m_t	mg	mg	Particulate - total
MW	lb/lb-mole	g/g-mole	Molecular Weight of stack gas
MW_{air}	28.95 lb/ lb-mole		Molecular Weight of air
MW_d	lb/lb-mole	g/g-mole	Molecular Weight of dry stack gas
P_b	"Hg Absolute	mm Hg	Barometric pressure
P_m	"H_2O	mm H_2O	Orifice Pressure drop
P_s	"Hg Absolute	mm Hg	Stack Pressure
ΔP_s	"H_2O	mm H_2O	Velocity Head of stack gas
P_{std}	29.92 "Hg	760 mm Hg	Standard Barometric Pressure
Q_a	ACFM	m^3/hr	Stack Gas Volume at Actual Stack Conditions
Q_s	DSCFM	dscm/hr	Stack Gas Volume at 29.92 "Hg, 528°R, dry
R	21.83 "Hg-ft^3/lb-mole-°R		Universal Gas Constant
T_m	°F	°C	Average Gas Meter Temperature
T_t	min	min	Net time of test
T_s	°F	°C	Stack Temperature
T_{std}	528°R	293°K	Standard Temperature
V_m	ft^3	m^3	Volume of dry gas sampled @ meter conditions
$V_{m_{std}}$	dscf	dscm	Volume of dry gas sampled @ standard conditions
V_s	fpm	m/sec	Stack velocity @ stack conditions
V_w	ml	ml	Total Water Collected in Impingers and Silica Gel

* 528°R, 29.92 "Hg (20°C, 760 mm Hg)

Symbol	English Units	Metric Units	Description
$V_{w_{gas}}$	scf	scm	Volume of Water Vapor Collected @ standard conditions
ρ_{air}	0.0748 lbs/ft^3		Density of Air
ρ_{H_2O}	1 g/ml		Density of Water
ρ_{man}	51.63 lbs/ft^3		Density of Manometer Oil

Standard Conditions: 68°F, 29.92 "Hg (20°C, 760 mm Hg)

* 528°R, 29.92 "Hg (20°C, 760 mm Hg)

Example Particulate Calculations

1. Volume of dry gas sampled at standard conditions.*

$$V_{m_{std}} = V_m \left(\frac{T_{std}}{T_m + 460} \right) \left[\frac{P_b + \frac{P_m}{13.6}}{P_{std}} \right]$$

$$V_{m_{std}} = 17.65\ V_m \left(\frac{P_b + \frac{P_m}{13.6}}{T_m + 460} \right) = \text{dscf}$$

$$V_{m_{std}} = \text{dscf} \times 0.028317 = \text{dscm}$$

2. Volume of water vapor collected at standard conditions.*

$$V_{w_{gas}} = \frac{(V_w - \text{gms } SO_2 - \text{gms } H_2S)\ \rho_{H_2O}\ R\ T_{std}}{P_{std}\ M_{H_2O}\ 453.6}$$

$$V_{w_{gas}} = 0.0472\ (V_w - \text{gms } SO_2 - \text{gms } H_2S) = \text{scf}$$

$$V_{w_{gas}} = \text{scf} \times 0.028317 = \text{scm}$$

3. Percent moisture in stack gas

$$\%M = \frac{V_{w_{gas}}}{V_{m_{std}} + V_{w_{gas}}} \times 100 = \%$$

* 528°R, 29.92 "Hg (20°C, 760 mm Hg)

4. Mole fraction of dry gas

$$M_d = \frac{100 - \%M}{100}$$

5. Average molecular weight of dry stack gas.

$$MW_d = \left(\%CO_2 \times \frac{44}{100}\right) + \left(\%O_2 \times \frac{32}{100}\right) + \left(\%N_2 \times \frac{28}{100}\right) + \left(\%CO \times \frac{28}{100}\right) = \text{lb/lb-mole}$$

$$= \text{g/g-mole}$$

6. Molecular weight of stack gas.

$$MW = MW_d \times M_d + 18\ (1-M_d) = \frac{\text{lb}}{\text{lb-mole}} = \text{g/g-mole}$$

7. Percent excess air at sampling point.

$$\%EA = \frac{100\ (\%O_2 - 0.5\%\ CO)}{0.265\ (\%N_2) - (\%O_2) + 0.5\ (\%CO)}$$

8. Stack Pressure

$$P_s = P_b + \frac{\text{stack pressure "}H_2O}{13.6} = \text{"Hg Absolute}$$

$$P_s = \text{"Hg Abs.} \times 25.4 = \text{mm Hg}$$

* 528°R, 29.92 "Hg (20°C, 760 mm Hg)

9. Stack velocity at stack conditions.

$$V_s = C_p\ 60 \left[\frac{2g \times \rho_{man} \times P_{std} \times MW_{air} \times (T_s + 460) \times \Delta P_s}{12 \times \rho_{air} \times P_s \times MW \times T_{std}} \right]^{1/2}$$

$$V_s = 5123.8\ C_p \left[\frac{(T_s + 460) \times \Delta P_s}{P_s \times MW} \right]^{1/2} = \text{fpm}$$

$$V_s = \text{fpm} \times 0.00508 = \text{m/sec}$$

10. Dry stack gas volume at standard conditions.

$$Q_s = \frac{1}{144} V_s \times A_s \times M_d \times \frac{T_{std}}{T_s + 460} \times \frac{P_s}{P_{std}}$$

$$Q_s = \frac{0.123\ V_s \times A_s \times M_d \times P_s}{T_s + 460} = \text{DSCFM}$$

$$Q_s = \text{DSCFM} \times 1.6990 = \text{dscm/hr}$$

11. Actual stack gas volume at stack conditions.

$$Q_a = \frac{V_s \times A_s}{144} = \text{ACFM}$$

$$Q_a = \text{ACFM} \times 1.6990 = m^3/\text{hr}$$

* 528°R, 29.92 "Hg (20°C, 760 mm Hg)

12. Percent isokinetic

$$\%I = \frac{V_{m_{std}} \times (T_s + 460) \times P_{std} \times 100 \times 144}{M_d \times T_{std} \times P_s \times T_t \times V_s \times \frac{\pi D_n^2}{4}}$$

$$\%I = \frac{1039\ V_{m_{std}} \times (T_s + 460)}{M_d \times P_s \times T_t \times V_s \times D_n^2}$$

13. Particulate - probe, cyclone and filter.

$$C_{an} = \frac{m_f}{V_{m_{std}}} \times \frac{1\ gr}{64.8\ mg}$$

$$C_{an} = 0.0154\ \frac{m_f}{V_{m_{std}}} = gr/dscf$$

$$C_{an} = gr/dscf \times 2.290 = g/dscm$$

14. Particulate total.

$$C_{ao} = 0.0154 \times \frac{m_t}{V_{m_{std}}} = gr/dscf$$

$$C_{ao} = gr/dscf \times 2.290 = g/dscm$$

* 528°R, 29.92 "Hg (20°C, 760 mm Hg)

15. Particulate - probe, cyclone and filter at stack conditions.

$$C_{at} = C_{an} \times \frac{P_s}{P_{std}} \times \frac{(T_{std})}{(T_s + 460)} \times M_d$$

$$C_{at} = \frac{17.65 \times C_{an} \times P_s \times M_d}{T_s + 460} = gr/CF$$

$$C_{at} = gr/CF \times 2.290 = g/m^3$$

16. Particulate - total, at stack conditions.

$$C_{au} = \frac{17.65 \times C_{ao} \times P_s \times M_d}{T_s + 460} = gr/CF$$

$$C_{au} = gr/CF \times 2.290 = g/m^3$$

17. Particulate - probe, cyclone and filter.

$$C_{aw} = C_{an} \times Q_s \times \frac{60 \text{ min}}{1 \text{ hr}} \times \frac{1 \text{ lb}}{7000 \text{ gr}}$$

$$C_{aw} = 0.00857 \times C_{an} \times Q_s = lbs/hr$$

$$C_{aw} = lbs/hr \times 0.4536 = kg/hr$$

18. Particulate - total.

$$C_{ax} = 0.00857 \times C_{ao} \times Q_s = lbs/hr$$

$$C_{ax} = lbs/hr \times 0.4536 = kg/hr$$

* 528°R, 29.92 "Hg (20°C, 760 mm Hg)

Thorium 230 Calculations

pCi Th 230 x 1/dscm	=	pCi/dscm Th 230
pCi/dscm Th 230 x 10^{-6}	=	µCi/dscm Th 230
µCi/dscm Th 230 x 10^{-6}	=	µCi/ml Th 230

Lead 210 Calculations

pCi Pb 210 x 1/dscm	=	pCi/dscm Pb 210
pCi/dscm Pb 210 x 10^{-6}	=	µCi/dscm Pb 210
µCi/dscm Pb 210 x 10^{-6}	=	µCi/ml Pb 210

Uranium Calculations

% U_3O_8 in Front Wash	=	$\frac{\text{milligrams } U_3O_8}{\text{milligrams of sample}}$
% U_3O_8 x g/dscm in Front Wash	=	g/dscm U_3O_8
g/dscm U_3O_8 x 10^{-6}	=	g/ml U_3O_8
g/ml U_3O_8 x .84802	=	g/ml U
g/ml U x (6.77×10^{-7})	=	Ci/ml U
µCi/ml U x 10^6	=	µCi/ml U

Radium 226 Calculations

pCi Ra 226 x 1/dscm	=	pCi/dscm Ra 226
pCi/dscm Ra 226 x 10^{-6}	=	µCi/dscm Ra 226
µCi/dscm Ra 226 x 10^{-6}	=	µCi/ml Ra 226

STACK EMISSIONS SURVEY
FEDERAL AMERICAN PARTNERS
GAS HILLS MILL
FILE NUMBER EA 7820-68

SOURCE EMISSIONS CALCULATIONS

Yellow Cake Amerjet Baghouse Dust Collector Stack

Symbol	Description	Units	
Run No.			1
Date			12/20/78
Begin			1345
End			1645
P_b	barometric pressure	"Hg Abs. (mm Hg)	23.20 (589)
P_m	orifice pressure drop	"H_2O (mm H_2O)	1.560 (39.6)
V_m	volume dry gas sampled @ meter conditions	$ft.^3$ (m^3)	143.035 (4.050)
T_m	avg. gas meter temp.	°F (°C)	76 (24.5)
$V_{m_{std}}$	volume dry gas sampled @ standard conditions*	dscf (dscm)	109.789 (3.109)
V_w	total H_2O collected, impingers & silica gel	ml	77.2
$V_{w_{gas}}$	volume water vapor collected @ standard conditions*	scf (scm)	3.644 (.103)
%M	moisture in stack gas by volume	%	3.21

* 68°F, 29.92 "Hg (20°C, 760 mm Hg)

Source Emissions Calculations
Federal American Partners
Yellow Cake Amerjet Baghouse Dust Collector Stack
File Number EA 7820-68

Symbol	Description	Units	
M_d	mol fraction of dry gas	---	.9679
CO_2		%	0.0
O_2		%	21.0
N_2		%	79.0
%EA	excess air @ sampling point	%	--
MW_d	molecular weight of dry stack gas	lb/lb-mole (g/g-mole)	28.84 (28.84)
MW	molecular weight of stack gas	lb/lb-mole (g/g-mole)	28.49 (28.49)
ΔPs	velocity head of stack gas	"H_2O (mm H_2O)	.231 (5.9)
T_s	stack temperature	°F (°C)	79 (26)
P_s	stack pressure	"Hg Abs. (mm Hg)	23.19 (589)
V_s	stack velocity @ stack conditions	fpm (m/sec)	1705 (8.66)
A_s	stack area	$in.^2$ (m^2)	280 (.18)
Q_s	dry stack gas volume @ standard conditions*	DSCFM (dscm/hr)	2446 (4156.37)
Q_a	actual stack gas volume @ stack conditions	ACFM (m^3/hr)	3316 (5634.12)

* 68°F, 29.92 "Hg (20°C, 760 mm Hg)

Source Emissions Calculations
Federal American Partners
Yellow Cake Amerjet Baghouse Dust Collector Stack
File Number EA 7820-68

Symbol	Description	Units	
T_t	net time of test	min.	180
D_n	sampling nozzle diam.	in. (m)	.303 (.008)
%I	percent isokinetic	%	97.2
m_f	particulate - probe, cyclone and filter	mg	109.3
m_t	particulate - total	mg	118.2
C_{an}	particulate - probe, cyclone and filter	gr/dscf* (g/dscm)	.0153 (.0351)
C_{ao}	particulate - total	gr/dscf* (g/dscm)	.0166 (.0379)
C_{at}	particulate - probe, cyclone and filter @ stack conditions	gr/cf (g/m^3)	.0112 (.0258)
C_{au}	particulate total @ stack conditions	gr/cf (g/m^3)	.0126 (.0289)
C_{aw}	particulate - probe, cyclone and filter	lbs/hr (kg/hr)	.32 (15)
C_{ax}	particulate - total	lbs/hr (kg/hr)	.35 (.16)

* 68°F, 29.92 "Hg (20°C, 760 mm Hg)

STACK EMISSIONS SURVEY
FEDERAL AMERICAN PARTNERS
GAS HILLS MILL
FILE NUMBER EA 7820-68

SOURCE EMISSIONS CALCULATIONS

Yellow Cake Rotoclone Scrubber Stack

Symbol	Description	Units	
Run No.			1
Date			12/20/78
Begin			1000
End			1300
P_b	barometric pressure	"Hg Abs. (mm Hg)	23.20 (589)
P_m	orifice pressure drop	"H_2O (mm H_2O)	1.614 (41.0)
V_m	volume dry gas sampled @ meter conditions	$ft.^3$ (m^3)	141.619 (4.010)
T_m	avg. gas meter temp.	°F (°C)	65 (18.6)
$V_{m_{std}}$	volume dry gas sampled @ standard conditions*	dscf (dscm)	110.938 (3.141)
V_w	total H_2O collected, impingers & silica gel	ml	250.5
$V_{w_{gas}}$	volume water vapor collected @ standard conditions*	scf (scm)	11.824 (.335)
%M	moisture in stack gas by volume	%	9.63

* 68°F, 29.92 "Hg (20°C, 760 mm Hg)

Source Emissions Calculations
Federal American Partners
Yellow Cake Rotoclone Scrubber Stack
File Number EA 7820-68

Symbol	Description	Units	
M_d	mol fraction of dry gas	---	.9037
CO_2		%	0.0
O_2		%	21.0
N_2		%	79.0
%EA	excess air @ sampling point	%	--
MW_d	molecular weight of dry stack gas	lb/lb-mole (g/g-mole)	28.84 (28.84)
MW	molecular weight of stack gas	lb/lb-mole (g/g-mole)	27.80 (27.80)
ΔPs	velocity head of stack gas	"H_2O (mm H_2O)	.249 (6.3)
T_s	stack temperature	°F (°C)	128 (54)
P_s	stack pressure	"Hg Abs. (mm Hg)	23.23 (590)
V_s	stack velocity @ stack conditions	fpm (m/sec)	1936 (9.83)
A_s	stack area	$in.^2$ (m^2)	152 (.10)
Q_s	dry stack gas volume @ standard conditions*	DSCFM (dscm/hr)	1291 (2193.88)
Q_a	actual stack gas volume @ stack conditions	ACFM (m^3/hr)	2043 (3471.61)

* 68°F, 29.92 "Hg (20°C, 760 mm Hg)

Source Emissions Calculations
Federal American Partners
Yellow Cake Rotoclone Scrubber Stack
File Number EA 7820-68

Symbol	Description	Units	
T_t	net time of test	min.	180
D_n	sampling nozzle diam.	in. (m)	.303 (.008)
%I	percent isokinetic	%	101.0
m_f	particulate - probe, cyclone and filter	mg	666.1
m_t	particulate - total	mg	4325.1
C_{an}	particulate - probe, cyclone and filter	gr/dscf* (g/dscm)	.0925 (.2117)
C_{ao}	particulate - total	gr/dscf* (g/dscm)	.6004 (1.3749)
C_{at}	particulate - probe, cyclone and filter @ stack conditions	gr/cf (g/m^3)	.0583 (.1335)
C_{au}	particulate total @ stack conditions	gr/cf (g/m^3)	.3783 (.8664)
C_{aw}	particulate - probe, cyclone and filter	lbs/hr (kg/hr)	1.02 (.4642)
C_{ax}	particulate - total	lbs/hr (kg/hr)	6.64 (3.0131)

* 68°F, 29.92 "Hg (20°C, 760 mm Hg)

STACK EMISSIONS SURVEY
FEDERAL AMERICAN PARTNERS
GAS HILLS MILL
FILE NUMBER EA 7820-68

SOURCE EMISSIONS CALCULATIONS

Rotoclone Crusher Dust Collector Stack

Symbol	Description	Units	
Run No.			1
Date			12/22/78
Begin			0905
End			1205
P_b	barometric pressure	"Hg Abs. (mm Hg)	23.10 (587)
P_m	orifice pressure drop	"H_2O (mm H_2O)	1.810 (46.0)
V_m	volume dry gas sampled @ meter conditions	$ft.^3$ (m^3)	150.480 (4.261)
T_m	avg. gas meter temp.	°F (°C)	66 (18.7)
$V_{m_{std}}$	volume dry gas sampled @ standard conditions*	dscf (dscm)	117.388 (3.324)
V_w	total H_2O collected, impingers & silica gel	ml	49.0
$V_{w_{gas}}$	volume water vapor collected @ standard conditions*	scf (scm)	2.313 (.065)
%M	moisture in stack gas by volume	%	1.93

* 68°F, 29.92 "Hg (20°C, 760 mm Hg)

Source Emissions Calculations
Federal American Partners
Rotoclone Crusher Dust Collector Stack
File Number EA 7820-68

Symbol	Description	Units	
M_d	mol fraction of dry gas	---	.9807
CO_2		%	0.0
O_2		%	21.0
N_2		%	79.0
%EA	excess air @ sampling point	%	--
MW_d	molecular weight of dry stack gas	lb/lb-mole (g/g-mole)	28.84 (28.84)
MW	molecular weight of stack gas	lb/lb-mole (g/g-mole)	28.63 (28.63)
ΔPs	velocity head of stack gas	"H_2O (mm H_2O)	.645 (16.4)
T_s	stack temperature	°F (°C)	60 (16)
P_s	stack pressure	"Hg Abs. (mm Hg)	23.09 (587)
V_s	stack velocity @ stack conditions	fpm (m/sec)	2847 (14.47)
A_s	stack area	$in.^2$ (m^2)	717 (.46)
Q_s	dry stack gas volume @ standard conditions*	DSCFM (dscm/hr)	10927 (18564.30)
Q_a	actual stack gas volume @ stack conditions	ACFM (m^3/hr)	14178 (24088.54)

* 68°F, 29.92 "Hg (20°C, 760 mm Hg)

Source Emissions Calculations
Federal American Partners
Rotoclone Crusher Dust Collector Stack
File Number EA 7820-68

Symbol	Description	Units	
T_t	net time of test	min.	180
D_n	sampling nozzle diam.	in. (m)	.237 (.006)
%I	percent isokinetic	%	97.4
m_f	particulate - probe, cyclone and filter	mg	109.7
m_t	particulate - total	mg	119.4
C_{an}	particulate - probe, cyclone and filter	gr/dscf* (g/dscm)	.0144 (.0330)
C_{ao}	particulate - total	gr/dscf* (g/dscm)	.0157 (.0359)
C_{at}	particulate - probe, cyclone and filter @ stack conditions	gr/cf (g/m^3)	.0111 (.0253)
C_{au}	particulate total @ stack conditions	gr/cf (g/m^3)	.0120 (.0275)
C_{aw}	particulate - probe, cyclone and filter	lbs/hr (kg/hr)	1.3 (.6)
C_{ax}	particulate - total	lbs/hr (kg/hr)	1.5 (.7)

* 68°F, 29.92 "Hg (20°C, 760 mm Hg)

APPENDIX C

Calibration of Equipment

Equipment	Calibration Factor	Calibration Date
Pitot Tube #11	0.793	9/13/78
Probe Tip #3	0.237	12/5/78
Probe Tip #4	0.303	12/5/78
Dry Gas Meter #2	0.960	9/13/78
Stack Unit Orifice #2		9/18/78

APPENDIX D

Field Testing Data

EA 7820-68

Na[illegible]

Run No. Run 1 only 7

Location Yellow Cake Ambrovet Baghouse Dust Collector

Date 12-20-78

Operator Gimmeson, Penn

Sample Box No. 1 Meter Box No. 2

Read and record at the start of each test point.

Ambient Temp °F 13/w 30 mph wind

Assumed Moisture % 2

Probe Length 3'

C Factor — — to reference

Initial Leak @ 15.0 "Hg = 0.000 cfm

Final Leak @ 6.0 "Hg = 0.000 cfm

Point	Clock Time	Dry Gas Meter, CF	Pitot in. H_2O (Δ Ps)	Orifice ΔH in. H_2O (Pm) Desired	Orifice ΔH in. H_2O (Pm) Actual	Pump Vacuum In. Hg Gauge	Stack Temp °F (Ts)	Probe Temp °F	Oven Temp °F	Effluent Temp °F	Dry Gas Temp °F (Tm) Inlet	Dry Gas Temp °F (Tm) Outlet	Stack Press. In. H_2O (Ps)
A 5	1345	713.280	0.35	2.20	2.20	3.75	80	266	254	41	80	74	-0.16
5		718.105	0.35	2.40	2.40	3.75	83	254	250	40	80	75	-0.16
4	1354	723.845	0.40	2.70	2.70	5.00	82	250	266	41	81	75	-0.16
4		729.865	0.43	2.90	2.90	5.00	79	245	268	41	79	71	-0.16
3	1403	734.975	0.45	3.00	3.00	6.00	79	246	269	41	80	71	-0.16
3		739.995	0.40	2.70	2.70	5.00	79	245	272	40	80	70	-0.16
2	1412	744.635	0.42	2.85	2.85	5.00	81	242	268	40	81	72	-0.16
2		749.525	0.40	2.70	2.70	5.00	79	240	240	43	80	73	-0.16
1 1	1421	754.575	0.38	2.60	2.60	3.75	78	236	276	41	79	72	-0.16
1		758.475	0.40	2.70	2.70	3.75	77	234	244	42	78	72	-0.16
END	1430	761.735	—										
B 5	1430	761.735	0.20	1.35	1.35	2.50	76	230	237	41	79	72	-0.16
5		765.235	0.23	1.55	1.55	2.50	74	229	267	39	79	72	-0.16
4	1439	768.475	0.28	1.90	1.90	2.50	75	232	252	37	79	72	-0.16
4		772.330	0.28	1.90	1.90	2.50	75	235	251	37	80	72	-0.16
3	1448	776.660	0.33	2.20	2.20	3.50	78	232	258	36	81	73	-0.16
3		782.055	0.35	2.40	2.40	3.75	77	240	265	38	81	73	-0.16

Pitot Tube Calibration Factor C_p 0.793

Volume Collected V_m [illegible] ft^3

Water Collected V_w 77.2 ml

Time of Test T_t 180 min.

Baro. Press. P_b 23.20 "Hg

Probe Tip Dia. D_n 0.3035 in.

% CO_2 0.0 %CO 0.0

% O_2 21. % N_2 79.0

Area Stack A_s 250 in^2

Pitot Tube No. 11

Probe Tip No. 1-4

V_m = Dry Gas Meter Calibration Factor 0.960 X 148.995

Dry Gas Meter Reading — ft^3 - (T_t — min X Leak Rate —

M_F = 666.1 M_T = 4325.1

Revised 10/20/76

Run 1 + only

PARTICULATE FIELD DATA

Location VCABDC

Date 12/20/78

Point	Clock Time	Dry Gas Meter, CF	Δ Ps Pitot in. H_2O	Pm Orifice ΔH in. H_2O Desired	Pm Orifice ΔH in. H_2O Actual	Pump Vacuum In. Hg Gauge	Ts Stack Temp °F	Probe Temp °F	Oven Temp °F	Effluent Temp °F	Tm Dry Gas Temp °F Inlet	Tm Dry Gas Temp °F Outlet	Ps Stack Press. In. H_2O
B 2	1457	785.185	0.32	2.15	2.15	3.75	78	236	244	37	84	75	-0.16
2		789.655	0.32	2.15	2.15	3.75	77	236	251	38	84	75	-0.16
1	1506	794.025	0.24	1.60	1.60	3.75	78	238	242	40	84	76	-0.16
1		798.137	0.27	1.80	1.80	3.75	78	241	253	41	84	76	-0.16
END	1515	801.955											
L 5		801.955	0.11	0.72	0.72	2.50	79	247	257	40	84	76	-0.16
5		805.132	0.13	0.85	0.85	2.50	80	243	259	40	85	75	-0.16
4		808.025	0.16	1.15	1.15	2.50	81	244	255	40	85	75	-0.16
4		813.345	0.16	1.15	1.15	2.50	82	246	257	41	86	75	-0.16
3		815.615	0.15	1.00	1.00	2.00	81	248	250	40	84	74	-0.16
3		817.595	0.15	1.00	1.00	2.50	80	243	247	39	83	73	-0.16
2		819.470	0.13	0.85	0.85	2.50	81	247	242	40	84	73	-0.16
2		822.327	0.14	0.95	0.95	2.50	82	245	248	41	83	73	-0.16
1		825.655	0.10	0.67	0.67	2.00	79	240	253	39	82	72	-0.16
1		829.735	0.12	0.80	0.80	2.50	78	241	255	38	80	71	-0.16
END		833.015											
5	1600	833.015	0.11	0.72	0.72	2.00	78	250	258	40	78	70	-0.16
5		836.010	0.10	0.67	0.67	2.00	78	251	259	41	76	70	-0.16
4		839.115	0.13	0.85	0.85	2.50	79	257	261	42	76	70	-0.16
4		843.270	0.14	0.95	0.95	2.5	80	235	261	40	74	71	-0.16
3		847.935	0.14	0.95	0.95	2.50	79	237	263	41	75	70	-0.16
3		851.355	0.14	0.95	0.95	2.50	81	238	265	39	74	69	-0.16
2		854.425	0.10	0.67	0.67	2.50	78	242	267	40	74	69	-0.16
2		856.630	0.09	0.60	0.60	2.00	78	243	240	39	75	69	-0.16
1		858.525	0.08	0.54	0.54	2.00	79	247	240	40	73	70	-0.16
1		860.315	0.09	0.60	0.60	2.00	78	230	232	40	70	68	-0.16
END	1645	862.275											

Job No. [illegible]

Job [illegible] FIELD DATA ECOLOGY AUDITS,

Run No. #1 + only 6 [illegible]

Location Rotadome Scrubber

Date 12/20/78

Operator Penn + Gunnesson

Sample Box No. 3 Meter Box No. 2

Read and record at the start of each test point.

Ambient Temp °F 15 w/ 3 mph wind

Assumed Moisture % 16

Probe Length 3'

C Factor — — to reference

Initial Leak @ 15.0 "Hg = 0.000 cfm

Final Leak @ 9.0 "Hg = 0.000 cfm

Point	Clock Time	Dry Gas Meter, CF	Pitot in. H_2O (Δ Ps)	Orifice ΔH in. H_2O (Pm) Desired	Orifice ΔH in. H_2O (Pm) Actual	Pump Vacuum In. Hg Gauge	Stack Temp °F (Ts)	Probe Temp °F	Oven Temp °F	Effluent Temp °F	Dry Gas Temp °F (Tm) Inlet	Dry Gas Temp °F (Tm) Outlet	Stack Press In. H (Ps)
A 5	1000	564.505	0.26	1.70	1.70	3.75	124	266	237	35	56	46	[illegible]
5		567.425	0.26	1.70	1.70	3.75	129	265	239	35	56	46	[illegible]
5	1009	571.235	0.25	1.60	1.60	3.50	129	264	242	35	57	46	[illegible]
5		575.102	0.28	1.80	1.80	3.75	133	261	249	37	59	47	[illegible]
4	1018	579.995	0.25	1.60	1.60	3.75	134	261	258	37	60	48	[illegible]
4		583.910	0.25	1.60	1.60	3.75	137	263	244	37	60	49	[illegible]
4	1027	587.655	0.26	1.70	1.70	3.75	133	265	255	33	61	49	[illegible]
4		591.125	0.24	1.55	1.55	3.25	135	264	267	32	63	50	[illegible]
3	1036	594.715	0.25	1.60	1.60	3.00	132	262	264	31	65	51	[illegible]
3		598.025	0.26	1.70	1.70	3.75	130	262	271	31	67	52	[illegible]
3	1045	601.775	0.26	1.70	1.70	3.75	131	264	267	33	68	54	[illegible]
3		605.400	0.25	1.60	1.60	4.25	136	263	270	32	70	56	[illegible]
2	1054	608.927	0.26	1.70	1.70	3.00	134	264	268	33	71	57	[illegible]
2		612.655	0.24	1.70	1.70	3.00	136	266	261	32	70	57	[illegible]
2	1103	616.395	0.25	1.60	1.60	5.00	129	264	263	33	72	58	[illegible]
2		620.055	0.25	1.60	1.60	5.00	125	266	271	34	71	56	[illegible]

Pitot Tube Calibration Factor C_p 0.793

Volume Collected V_m 141.119 ft^3

Water Collected V_w 250.5 ml

Time of Test T_t 131 min.

Baro. Press. P_b 23.10 "Hg

Probe Tip Dia. D_n 0.303 in.

% CO_2 0.0 %CO 0.0

% O_2 21.0 % N_2 79.0

Area Stack A_s 15 in^2

Pitot Tube No. 11

Probe Tip No. 14

V_m = Dry Gas Meter Calibration Factor 1.960 x 147.520

[Dry Gas Meter Reading — ft^3 - (T_t — min x Leak Rate —]

M_F = 109.3 M_T = 118.2

Revised 10/20/76

Run 1 Fouly

PARTICULATE FIELD DATA

Location Pölvlone Scrubber

Date 12/20/78

* Filter C-13

Point	Clock Time	Dry Gas Meter, CF	Δ Ps Pitot in. H_2O	Pm Orifice ΔH in. H_2O Desired	Pm Orifice ΔH in. H_2O Actual	Pump Vacuum In. Hg Gauge	Ts Stack Temp °F	Probe Temp °F	Oven Temp °F	Effluent Temp °F	Tm Dry Gas Temp °F Inlet	Tm Dry Gas Temp °F Outlet	Ps Stack Press. In. H_2O
1	1112	623.703	0.25	1.60	1.60	5.00	127	265	271	34	73	58	+0.45
1		627.280	0.24	1.60	1.60	5.00	127	268	270	33	72	57	+0.45
1	1121	630.925	0.24	1.60	1.60	5.00	125	266	260	32	71	60	+0.45
1		633.252	0.25	1.60	1.60	5.0	115	264	253	35	71	61	+0.45
END	1130	638.325											+0.45
5	1130	638.3[illegible]	0.27	1.80	1.80	5.00	116	266	247	33	72	62	+0.45
5	#	641.105	0.27	1.80	1.80	5.00	128	272	245	32	73	62	+0.45
5	1139	645.925	0.26	1.70	1.70	6.00	124	271	249	31	73	63	+0.45
5		649.915	0.25	1.60	1.60	6.00	126	270	255	33	73	64	+0.45
4	1148	653.765	0.25	1.60	1.60	6.00	124	268	260	34	74	64	+0.45
4		657.125	0.24	1.55	1.55	6.00	124	270	266	34	76	65	+0.45
4	1157	660.568	0.24	1.55	1.55	6.50	125	270	268	33	76	67	+0.45
4		664.563	0.23	1.50	1.50	7.50	125	268	266	34	77	67	+0.45
3	1206	667.950	0.23	1.50	1.50	7.50	128	267	268	34	76	66	+0.45
3		671.705	0.24	1.55	1.55	7.50	125	269	268	33	79	70	+0.45
3	1215	675.633	0.24	1.55	1.55	7.70	126	270	267	33	78	69	+0.45
3		678.995	0.23	1.50	1.50	7.80	131	272	236	43	79	71	+0.45
2	1224	682.555	0.24	1.55	1.55	3.50	127	257	251	43	77	72	+0.45
2		685.725	0.25	1.60	1.60	3.75	127	274	256	40	75	72	+0.45
2	1233	689.895	0.26	1.70	1.70	3.75	134	276	265	42	74	71	+0.45
2		693.625	0.24	1.55	1.55	5.00	127	274	260	42	73	70	+0.45
1	1242	697.370	0.24	1.55	1.55	5.00	128	273	234	40	74	67	+0.45
1		701.075	0.23	1.50	1.50	5.00	132	274	231	41	75	70	+0.45
1	1251	705.215	0.23	1.50	1.50	5.00	130	273	234	40	76	70	+0.45
1		708.825	0.24	1.55	1.55	5.00	131	260	234	39	77	70	+0.45
END ALL	1300	712.025											

Job No. 7820 63 FIELD DATA ECOLOGY AUDITS

Name [illegible]

Run No. 1 & only 8 U Th Ra [illegible] αβ

Location Crusher

Date 12/22/78

Operator Pam Jimmerson & Smith

Sample Box No. 1 Meter Box No. 2

Read and record at the start of each test point.

Ambient Temp °F 15 [illegible] 40 mph

Assumed Moisture % 2

Probe Length 5'

C Factor — — to reference

Initial Leak @ 15.0 "Hg = 0.000 cfm

Final Leak @ 6.0 "Hg = 0.000 cfm

Point	Clock Time	Dry Gas Meter, CF	Pitot in. H_2O (Δ Ps)	Orifice ΔH in. H_2O (Pm) Desired	Orifice ΔH in. H_2O (Pm) Actual	Pump Vacuum In. Hg Gauge	Stack Temp °F (Ts)	Probe Temp °F	Oven Temp °F	Effluent Temp °F	Dry Gas Temp °F (Tm) Inlet	Dry Gas Temp °F (Tm) Outlet	Stack Press. In. H_2O (Ps)
A 10	905	867.935	0.90	2.50	2.50	3.75	54	230	246	31	50	47	-0.10
9		871.255	0.80	2.30	2.30	3.75	55	232	242	31	53	45	-0.10
8	914	875.035	0.65	1.85	1.85	2.50	56	236	243	41	54	46	-0.10
7		879.127	0.60	1.70	1.70	2.50	57	248	249	37	57	47	-0.10
6	923	882.565	0.50	1.40	1.40	2.50	54	253	246	30	58	49	-0.10
5		885.185	0.45	1.30	1.30	2.50	52	230	241	30	58	49	-0.10
4	932	889.715	0.40	1.10	1.10	2.50	51	236	244	31	60	51	-0.10
3		893.030	0.35	1.00	1.00	2.50	48	232	247	30	61	51	-0.10
2	941	896.365	0.35	1.00	1.00	2.50	48	236	242	30	62	52	-0.10
1		899.600	0.35	1.00	1.00	2.50	52	257	265	32	63	52	-0.10
END	950	902.945											
B 10		902.945	1.00	2.50	2.50	5.00	56	262	264	32	65	53	-0.10
9	954.5	907.485	0.75	2.10	2.10	6.00	60	258	263	34	71	58	-0.10
8	959	912.263	0.70	1.95	1.95	6.00	61	260	262	33	72	57	-0.10
7		916.680	0.60	1.70	1.70	4.50	62	258	260	35	73	58	-0.10
6	1008	921.145	0.50	1.40	1.40	4.00	61	260	263	37	72	59	-0.10
5		924.373	0.45	1.30	1.30	2.70	61	262	263	37	73	59	-0.10
4	1017	928.075	0.40	1.10	1.10	2.50	62	260	262	36	71	61	-0.10

Pitot Tube Calibration Factor C_p 0.793

Volume Collected V_m [illegible] ft^3

Water Collected V_w 49.0 ml

Time of Test T_t 190 min.

Baro. Press. P_b 23.10 "Hg

Probe Tip Dia. D_n 0.257 in.

% CO_2 0.0 %CO 0.0

% O_2 21.0 % N_2 79.0

Area Stack A_s 717 in^2

Pitot Tube No. 9

Probe Tip No. I-3

V_m = Dry Gas Meter Calibration Factor 0.960 x 156.750

[Dry Gas Meter Reading — ft^3 - (T_t — min x Leak Rate —]

M_F = 109.7 M_P = 119.4

Revised 10/20/76

Run [illegible] 1 only

PARTICULATE FIE[illegible]ATA

Location Crusher Stack

Date 12/22/78

			Δ Ps			Pm	Ts				Tm		Ps
[illegible]int	Clock Time	Dry Gas Meter, CF	Pitot in. H_2O	Orifice ΔH in. H_2O Desired	Orifice ΔH in. H_2O Actual	Pump Vacuum In. Hg Gauge	Stack Temp °F	Probe Temp °F	Oven Temp °F	Effluent Temp °F	Dry Gas Temp °F Inlet	Dry Gas Temp °F Outlet	Stack Press. In. H_2O
3		931.277	0.40	1.10	1.10	2.50	63	258	260	41	71	61	-0.10
2	1026	934.600	0.35	1.00	1.00	2.50	64	259	262	43	71	61	-0.10
1		937.550	0.35	1.00	1.00	2.50	64	261	264	43	72	61	-0.10
NO	1035	941.085											
10		941.085	1.00	2.80	2.80	6.00	63	263	260	44	71	61	-0.10
9		945.345	1.10	3.15	3.15	6.50	63	260	262	42	72	63	-0.10
8	1044	950.345	0.90	2.40	2.40	5.50	64	263	264	40	75	65	-0.10
7		954.962	0.80	2.30	2.30	5.30	66	265	260	41	76	65	-0.10
6	1053	959.580	0.70	1.95	1.95	4.90	66	262	261	40	76	66	-0.10
5		963.690	0.70	1.95	1.95	4.90	65	260	264	41	76	65	-0.10
4	1102	967.900	0.65	1.85	1.85	4.80	66	260	263	41	76	67	-0.10
3		971.950	0.60	1.70	1.70	4.00	66	262	264	42	75	67	-0.10
2	1111	975.995	0.50	1.40	1.40	3.50	67	260	262	41	76	68	-0.10
1		979.573	0.40	1.10	1.10	2.75	68	261	260	43	75	69	-0.10
NO	1120	982.785											
10		982.785	1.00	2.80	2.80	6.00	66	258	250	43	75	68	-0.10
9		987.475	1.00	2.80	2.80	6.00	67	255	251	44	77	69	-0.10
8	1129	991.280	1.00	2.80	2.80	6.00	67	250	242	44	79	70	-0.10
7		997.090	1.00	2.80	2.80	6.00	65	248	248	42	80	71	-0.10
6	1138	1001.915	0.95	2.70	2.70	6.00	65	250	247	45	83	72	-0.10
5		1006.775	0.90	2.40	2.40	5.00	63	253	244	42	81	71	-0.10
4	1147	1011.370	0.50	1.40	1.40	3.75	60	258	247	40	80	70	-0.10
3		1014.985	0.55	1.55	1.55	3.75	58	260	242	36	74	71	-0.10
2	1156	1018.655	0.40	1.10	1.10	2.50	58	262	240	36	76	71	-0.10
1		1022.115	0.30	0.85	0.85	1.25	55	258	235	35	77	71	-0.10
[illegible]OAL	1205	1024.685											

APPENDIX E

Analytical Data

Particulate Analysis

Date 12/28/78

Job No. 7820-68

Name Federal American Partners

Location GA Hills

Run No. 1 Amerjet Baghouse

Filter # C-14	Front Wash 155 ml	Impinger 1	Impinger 2
Final 0.7951	95.0967	97.8588	
Initial 0.7944	94.9847	97.8499	
0.0007	0.1120	0.0089	

MF 109.3 mg MT 112.2 mg 112.7 3.41

Run No. 1 Rotoclone Scrubber (Yellowcake)

Filter # C-15	Front Wash 375 ml	Impinger 1	Impinger 2
Final 1.3208	94.9576	97.1935	
Initial .8075	94.7816	93.5345	
0.4483	0.1760	3.6590	

MF 111.1 mg MT 1325.1 mg 114.3 8.25 663.05

Run No. 1 Rotoclone Crusher

Filter # C-16	Front Wash 170 ml	Impinger 1	Impinger 2
Final 0.8078	94.9791	93.5429	
Initial 0.7962	94.8773	93.5332	
0.0116	0.1018	0.0097	

MF 109.7 mg MT 119.4 mg 113.4 3.74 104.66

Acetone Blank:

Volume 225 ml Final 97.7150

Initial 97.7101

0.022 Total Weight .0049

12885