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STACK EMISSIONS SURVEY
PETROTOMICS COMPANY
URANIUM MILL
SHIRLEY BASIN, WYOMING

MARCH 1985

FILE NUMBER 8510-10[illegible]

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STACK EMISSIONS SURVEY
PETROTOMICS COMPANY
URANIUM MILL
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INTRODUCTION

Western Environmental Services and Testing, Inc. (WEST, Inc.) of Casper, Wyoming,conducted a Stack Emissions Survey at the Petrotomics Company Uranium Mill located near Shirley Basin, Wyoming, on March 14, 1985. The purpose of this survey was to determine emissions of particulates, Uranium-natural (U), Radium-226, Thorium-230, Lead-210, and Radon-222 from the Yellow Cake Dryer Stack, Packaging Room Exhaust Stack, and Cooler Exhaust Stack.

The sampling followed the procedures set forth in the "Wyoming Air Quality Standards and Regulations," Wyoming Department of Environmental Quality, 1982; 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

The principal conclusions are:

Yellow Cake Dryer Stack

1. The emissions of particulate matter from the Yellow Cake Dryer Stack were 0.698 pounds per hour (0.0476 grains per dry standard cubic foot), based on the test using the 'front-half' collections of the EPA-type sampling train.
2. The concentration of Uranium-natural (U) was 3.01×10^{-9} µCi/ml, based on the test using the 'front-half' collections of the EPA-type sampling train.
3. The U_3O_8 emission rate is 0.0336 pounds per hour, based on the test using the 'front-half' collections of the EPA-type sampling train.

Packaging Room Exhaust Stack

1. The emissions of particulate matter from the Packaging Room Exhaust Stack were 0.034 pounds per hour (0.0070 grains per dry standard cubic foot), based on the test using the 'front-half' collections of the EPA-type sampling train.

2. The concentration of Uranium-natural (U) was 6.88×10^{-10} µCi/ml, based on the test using the 'front-half' collections of the EPA-type sampling train.
3. The U_3O_8 emission rate is 0.0019 pounds per hour, based on the test using the 'front-half' collections of the EPA-type sampling train.

Cooler Exhaust Stack

1. The emissions of particulate matter from the Cooler Exhaust Stack were 0.027 pounds per hour (0.0056 grains per dry standard cubic foot), based on the test using the 'front-half' collections of the EPA-type sampling train.
2. The concentration of Uranium-natural (U) was 4.11×10^{-11} µCi/ml, based on the test using the 'front-half' collections of the EPA-type sampling train.
3. The U_3O_8 emission rate is 0.0002 pounds per hour, based on the test using the 'front-half' collections of the EPA-type sampling train.

SUMMARY OF RESULTS

	Yellow Cake	Packaging Room	Cooler Exhaust
Run Number	1	1	1
Stack Flow Rate - ACFM	3061	823	994
Stack Flow Rate - DSCFM*	1712	559	569
% Water Vapor - % Volume	15.65	6.05	2.62
% CO_2 - % Volume	1.4	0.0	0.0
% O_2 - % Volume	18.0	21.0	21.0
% Excess Air At Sampling Point	536	----	----
Particulates			
Probe,Cyclone & Filter Catch (C_{an}) grains/dscf*	0.0476	0.0070	0.0056
grains/cf at Stack Conditions (C_{at})	0.0265	0.0047	0.0032
lbs/hr (C_{aw})	0.698	0.034	0.027
Total Catch (C_{ao}) grains/dscf*	----	----	----
grains/cf at Stack Conditions (C_{au})	----	----	----
lbs/hr (C_{ax})	----	----	----
Uranium-natural µCi/ml	3.01×10^{-9}	6.88×10^{-10}	4.11×10^{-11}
U_3O_8 Emissions lbs/hr	0.0335	0.0019	0.0002

* 68°F., 29.92 "Hg (20°C., 760 mm Hg)

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RADIOCHEMISTRY LABORATORY RESULTS
AS REPORTED BY ALPHA ENERGY LABORATORIES, INC.
ON JUNE 6, 1985

YELLOW CAKE DRYER STACK

Sample Date: March 14, 1985

Radon-222*	pCi/l	3.7 ± 0.6
	LLD - pCi/l	0.2
Uranium-natural (U)	µg/sample	4250
	µCi/ml	$3.01 \times 10^{-9} \pm 0.07 \times 10^{-9}$
	LLD - µCi/ml	4×10^{-13}
Radium-226		
	µCi/ml	$4.80 \times 10^{-13} \pm 3.68 \times 10^{-13}$
	LLD - µCi/ml	5×10^{-13}
Therium-230		
	µCi/ml	$2.45 \times 10^{-12} \pm 1.05 \times 10^{-12}$
	LLD - µCi/ml	7×10^{-13}
Lead-210		
	µCi/ml	$0.00 \times 10^{-12} \pm 4.86 \times 10^{-12}$
	LLD - µCi/ml	8×10^{-12}

* Radon-222 analyzed by CORE Laboratories.

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RADIOCHEMISTRY LABORATORY RESULTS
AS REPORTED BY ALPHA ENERGY LABORATORIES, INC.
ON JUNE 6, 1985

PACKAGING ROOM EXHAUST STACK

Sample Date: March 14, 1985

Radon-222*	pCi/l	0.5 ± 0.3
	LLD - pCi/l	0.2
Uranium-natural (U)	µg/sample	840
	µCi/ml	$6.88 \times 10^{-10} \pm 0.05 \times 10^{-10}$
	LLD - µCi/ml	4×10^{-13}
Radium-226		
	µCi/ml	$7.47 \times 10^{-13} \pm 3.73 \times 10^{-13}$
	LLD - µCi/ml	5×10^{-13}
Thorium-230		
	µCi/ml	$6.61 \times 10^{-12} \pm 1.10 \times 10^{-12}$
	LLD - µCi/ml	8×10^{-13}
Lead-210		
	µCi/ml	$1.22 \times 10^{-12} \pm 3.80 \times 10^{-12}$
	LLD - µCi/ml	6×10^{-12}

* Radon-222 analyzed by CORE Laboratories.

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RADIOCHEMISTRY LABORATORY RESULTS
AS REPORTED BY ALPHA ENERGY LABORATORIES, INC.
ON JUNE 6, 1985

COOLER EXHAUST STACK

Sample Date: March 14, 1985

Radon-222*	pCi/l	5.2 ± 0.7
	LLD - pCi/l	0.2
Uranium-natural (U)	µg/sample	63
	µCi/ml	$4.11 \times 10^{-11} \pm 0.27 \times 10^{-11}$
	LLD - µCi/ml	3×10^{-13}
Radium-226		
	µCi/ml	$3.61 \times 10^{-13} \pm 3.25 \times 10^{-13}$
	LLD - µCi/ml	5×10^{-13}
Thorium-230		
	µCi/ml	$6.83 \times 10^{-12} \pm 1.12 \times 10^{-12}$
	LLD - µCi/ml	8×10^{-13}
Lead-210		
	µCi/ml	$1.60 \times 10^{-13} \pm 26.3 \times 10^{-13}$
	LLD - µCi/ml	4×10^{-12}

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RADON-222 RESULTS

Sample Date: March 14, 1985

Yellow Cake Dryer Stack	pCi/l	3.7 ± 0.6
	LLD - pCi/l	0.2
Packaging Room Exhaust Stack	pCi/l	0.5 ± 0.3
	LLD - pCi/l	0.2
Cooler Exhaust Stack	pCi/l	5.2 ± 0.7
	LLD - pCi/l	0.2

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DISCUSSION OF RESULTS

The one test for particulates taken on each stack appeared to be valid representations of the actual emissions. The indicative parameters calculated from the field data were in close agreement to previous tests. The rates of sampling for the tests were well within the specified limits of the isokinetic rate, the greatest deviation being 9.5.

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. The 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 removed counter-current 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 dried, converted to U_3O_8, and conveyed to a storage hopper where it is loaded into 55-gallon drums for shipment.

DESCRIPTION OF SAMPLING LOCATIONS

Ye Cake Dryer Stack

The sampling ports on the Yellow Cake Dryer Stack are located approximately 35 feet above the ground. The sampling was performed from two ports on the circular stack located approximately 10 feet (10.0 stack diameters) downstream from the stack inlet and approximately 2 feet (2.0 stack diameters) upstream from the stack outlet.

Packaging Room Exhaust Stack

The sampling ports on the Packaging Room Exhaust Stack are located approximately 35 feet above the ground. The sampling was performed from two ports on the circular stack located approximately 8 feet 11 inches (10.44 stack diameters) downstream from the stack inlet and approximately 4 feet 1 inch (4.78 stack diameters) upstream from the stack outlet.

Cooler Exhaust Stack

The sampling ports on the Cooler Exhaust Stack are located approximately 35 feet above the ground. The sampling was performed from two ports on the circular stack located approximately 5 feet 10 inches (4.5 stack diameters) downstream from the stack inlet and approximately 3 feet (2.3 stack diameters) upstream of the stack outlet.

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SAMPLING AND ANALYTICAL PROCEDURES

The sampling and analytical procedures used followed the procedures set forth in the "Wyoming Air Quality Standards and Regulations", Wyoming Department of Environmental Quality, 1982; 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 port in order to determine the uniformity of flow in the Yellow Cake Dryer Stack. Particulate samples of 5-minute duration at each of the six traverse points were taken from each port using an EPA-type, heated, glass-lined probe. The first and sixth points were not sampled because they were less than 1 inch from the stack wall. Instead, points 2 and 5 were sampled twice.

A preliminary velocity traverse was made at each port in both the Packaging Room Scrubber and Cooler Exhaust Stacks. Particulate samples of 5-minute duration at each of the six traverse points were taken from each port on the Packaging Room Scrubber Stack. Particulate samples of 3-minute duration at each of the 12 traverse points were taken from each port on the Cooler

Exhaust Stack. All samples taken from the Packaging Room Scrubber and Cooler Exhaust Stacks utilized an EPA-type, heated, glass-lined probe.

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

Before and after each test, the pitot tube lines were checked for leaks under both a vacuum and pressure; the lines were checked for clearance; and the zero manometer reading verified.

The emissions were calculated from gravimetric analysis using the 'front-half' collections of the EPA-type sampling train. The 'front-half' particulate and filters were analyzed by Alpha Energy Laboratories, Inc., Dallas, Texas.

DESCRIPTION OF TESTS

Personnel from WEST, Inc. arrived at the Petrotomics Company Uranium Mill near Shirley Basin, Wyoming, at 1000 hours on Thursday, March 14, 1985. The sampling equipment was moved onto the Yellow Cake Dryer Stack and prepared for testing by 1110 hours. Testing began at 1116 hours and was completed by 1218 hours.

The equipment was moved onto the Packaging Room Exhaust Stack. Testing began at 1242 hours and continued until completion at 1344 hours. The equipment was moved onto the Cooler Exhaust Stack. Testing began at 1400 hours and continued until completion at 1516 hours.

The equipment was moved off the stack and loaded into the mobile laboratory. The samples were recovered and taken to WEST, Inc.'s laboratory in Casper, Wyoming for further analyses and evaluation.

Testing at Petrotomics Company's Uranium Mill was completed at 1545 hours on Thursday, March 14, 1985.

Bruce A. Hinchey
President

Alan D. Roylance
Laboratory Supervisor

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APPENDICES

A. Location of Sampling Points

B. Source Emission Calculations

C. Calibration of Equipment

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E. Analytical Data

F. Chain of Custody and Analysis Request

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APPENDIX A

Location of Sampling Points

APPENDIX A

Location of Sampling Points

Yellow Cake Dryer Stack

The sampling ports are located approximately 10 feet (10.0 stack diameters) downstream from the stack inlet and approximately 2 feet (2.0 stack diameters) upstream of the stack outlet. The first and sixth sample points were not sampled because they were less than one inch from the stack wall; instead, points two and five were double sampled. The locations of the sampling points were calculated as follows:

Inside Stack Diameter = 12 inches

Port and Wall Thickness = 4 inches

Point No.	Percent of Diameter From Wall	Distance From Wall
1	4.4	-----
2	14.7	1-3/4"
3	29.5	3-1/2"
4	70.5	8-1/2"
5	85.3	10-1/4"
6	95.6	-----

Packaging Room Exhaust Stack

The sampling ports are located approximately 8 feet 11 inches (10.44 stack diameters) downstream from the stack inlet and approximately 4 feet 1 inch (4.78 stack diameters) upstream from the stack outlet. The locations of the sampling points were calculated as follows:

Inside Stack Diameter = 10-1/4 inches

Port and Wall Thickness = 4-1/2 inches

Point No.	Percent of Diameter From Wall	Distance From Wall
1*	4.4	1/2"
2	14.7	1-1/2"
3	29.5	3"
4	70.5	7-1/4"
5	85.3	8-3/4"
6*	95.6	9-3/4"

* Points 1 and 6 were adjusted to within 1/2" due to their proximity to the stack wall.

Cooler Exhaust Stack

The sampling ports are located approximately 5 feet 10 inches (4.5 stack diameters) downstream from the stack inlet and approximately 3 feet (2.3 stack diameters) upstream of the stack outlet. The first and twelfth points were not sampled because they were less than one inch from the stack wall; instead, points two and eleven were double sampled. The locations of the sampling points were calculated as follow:

Inside Stack Diameter = 15 1/2 inches
Port and Wall Thickness = 4 1/2 inches

Point No.	Percent of Diameter From Wall	Distance From Wall
1	2.1	-----
2	6.7	1"
3	11.8	1 13/16"
4	17.7	2 3/4"
5	25.0	3 7/8"
6	35.5	5 1/2"
7	64.5	10"
8	75.0	11 5/8"
9	82.3	12 3/4"
10	88.2	13 11/16"
11	93.3	14 1/2"
12	97.9	-----

APPENDIX B

Nomenclature and Equations for Calculation of Source Emissions

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.

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

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

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

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.

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

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

* 528°R, 29.92 "Hg (20°C, 760 mm Hg)

12. Percent Isokinetic

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

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

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)

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

* 528° R, 29.92 "Hg (20°C, 760 mm Hg)

Symbol	English Units	Metric Units	Description
M_d			Mole Fraction of Dry Gas
mf	mg	mg	Particulate - Probe, Cyclone and Filter
M_{H_2O}	18 lb/lb-mole		Molecular Weight of Water
m_t	mg	mg	Particulate - Total
MW_{air}	lb/lb-mole	g/g-mole	Molecular Weight Of Stack Gas
MW	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

* 528°R, 29.92 "Hg (20°C, 760 mm Hg)

Symbol	English Units	Metric Units	Description
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
$V_{w_{gas}}$	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)

STACK EMISSIONS SURVEY
PETROTOMICS COMPANY
URANIUM MILL
SHIRLEY BASIN, WYOMING

MARCH 1985

FILE NUMBER 8510-105

SOURCE EMISSIONS CALCULATIONS

Symbol	Description	Units	YCD	PKG EXHST	COOL EXHST
Run No.			1	1	1
Date			03/14/85	03/14/85	03/14/85
Begin			1116 MST	1242 MST	1400 MST
End			1218 MST	1344 MST	1516 MST
P_b	barometric pressure	"Hg Abs.	23.20	23.22	23.22
		(mm Hg)	589.28	589.79	589.79
P_m	orifice pressure drop	"H_2O	1.46	1.01	1.14
		(mm H_2O)	37.04	25.61	28.90
V_m	volume dry gas sampled @ meter conditions	$ft.^3$	41.202	35.942	45.33
		(m^3)	1.167	1.018	1.284
T_m	avg. gas meter temp	°F	42	46	48
		(°C)	5	8	9
$V_{m_{std}}$	volume dry gas sampled @ standard conditions*	dscf	33.778	29.192	36.693
		(dscm)	.956	.827	1.039
V_w	total H_2O collected, impingers & silica gel	ml	132.8	39.8	20.9
$V_{w_{gas}}$	volume water vapor collected @ standard conditions*	scf	6.268	1.879	.986
		(scm)	.177	.053	.028
%M	moisture in stack gas by volume	%	15.65	6.05	2.62

* 68°F, 29.92 "Hg (20°C, 760 mm Hg)

PETROTOMICS COMPANY
URANIUM MILL
FILE NUMBER 8510-105

Source Emission Calculations

Symbol	Description	Units	YCD	PKG EXHST	COOL EXHST
			1	1	1
M_d	mole fraction of dry gas	-----	.8435	.9395	.9738
CO_2		%	1.4	0	0
O_2		%	18	21	21
N_2		%	80.6	79	79
%EA	excess air @ sampling point	%	536	---	---
MW_d	molecular weight of dry stack gas	lb/lb-mole	28.94	28.84	28.84
		(g/g-mole)	28.94	28.84	28.84
MW	molecular weight of stack gas	lb/lb-mole	27.23	28.18	28.56
		(g/g-mole)	27.23	28.18	28.56
ΔPs	velocity head of stack gas	"H_2O	.876	.136	.031
		(mm H_2O)	22.25	3.45	0.79
T_s	stack temperature	°F	160	109	240
		(°C)	72	43	116
P_s	stack pressure	"Hg Abs.	23.21	23.22	23.22
		(mm Hg)	589.43	589.88	589.71
V_s	stack velocity @ stack conditions	fpm	3901	1445	757
		(m/sec)	19.82	7.34	3.85
A_s	stack area	$in.^2$	113	82	185
		(m^2)	0.07	0.05	0.12
Q_s	dry stack volume @ standard conditions*	DSCFM	1712	559	569
		(dscm/hr)	2907.89	949.71	966.39
Q_a	actual stack gas volume @ stack conditions	ACFM	3061	823	994
		(m^3/hr)	5200.88	1397.92	1688.40

* 68°F, 29.92 "Hg (20°C, 760 mm Hg)

Source Emission Calculations

PETROTOMICS COMPANY
URANIUM MILL
FILE NUMBER 8510-105

Symbol	Description	Units	YCD	PKG EXHST	COOL EXHST
			1	1	1
T_t	net time of test	min.	60	60	72
D_n	sampling nozzle diam.	in.	.226	.311	.489
		(m)	.006	.008	.012
%I	percent isokinetic	%	93.00	94.30	90.50
m_f	particulate - probe, cyclone and filter	mg	104.3	13.3	13.3
m_t	particulate - total	mg	0	0	0
C_{an}	particulate - probe, cyclone and filter	gr/dscf*	.0476	.007	.0056
		(g/dscm)	.109	.016	.0128
C_{ao}	particulate - total	gr/dscf*	0	0	0
		(g/dscm)	0	0	0
C_{at}	particulate - probe, cyclone and filter @ stack conditions	gr/cf	.0265	.0047	.0032
		(g/m^3)	.0607	.0108	.0073
C_{au}	particulate total @ stack conditions	gr/cf	0	0	0
		(g/m^3)	0	0	0
C_{aw}	particulate - probe, cyclone and filter	lbs/hr	.598	.034	.027
		(kg/hr)	.317	.015	.012
C_{ax}	particulate - total	lbs/hr	0	0	0
		(kg/hr)	0	0	0

* 68°F, 29.92 "Hg (20°C, 760 mm Hg)

APPENDIX C

Calibration of Equipment

APPENDIX C

Calibration Data

March 29, 1985

NOZZLES

Set #A

Nozzle No.	Diameter (inches)
2A	0.197
3A	0.258
4A	0.305
5A	0.356
6A	0.384
7A	0.446
8A	0.497
9A	0.496
10A	0.579

Set #B

Nozzle No.	Diameter (inches)
1B	0.126
2B	0.177
3B	0.235
4B	0.299
5B	0.356
6B	0.368
7B	0.498

Set I

Nozzle No.	Diameter (inches)
I-1	0.127
I-2	0.193
I-3	0.247
I-4	0.302
I-5	0.374
I-6	0.413
I-7	0.489
I-8	0.471
I-9	0.615

Set II

Nozzle No.	Diameter (inches)
II-1	0.122
II-2	0.197
II-3	0.249
II-5	0.375
II-6	0.435
II-7	0.498
II-8	0.556
II-9	0.612

Set III

Nozzle No.	Diameter (inches)
III-1	0.126
III-3	0.252
III-4	0.366
III-5	0.366
III-6	0.428
III-7	0.500
III-8	0.559
III-9	0.607

APPENDIX C

Calibration Data

March 29, 1985

PITOT TUBES

Pitot Length (effective length)	Calibration Factor		Pitot Length (effective length)	Calibration Factor	
28-1	High	0.825	122-1	High	0.829
	Low	0.823		Low	0.823
32-1	High	0.838	128-1	High	0.824
	Low	0.829		Low	0.830
46-1	High	0.815	132-1	High	0.825
	Low	0.815		Low	0.830
49-1	High	0.828	132-2	High	0.843
	Low	0.837		Low	0.836
72-1	High	0.828	156-1	High	0.804
	Low	0.834		Low	0.809
72-2	High	0.818	156-2	High	0.836
	Low	0.823		Low	0.827
73-1	High	0.841			
	Low	0.840			
74-1	High	0.833			
	Low	0.836			
96-1	High	0.825			
	Low	0.826			

APPENDIX C

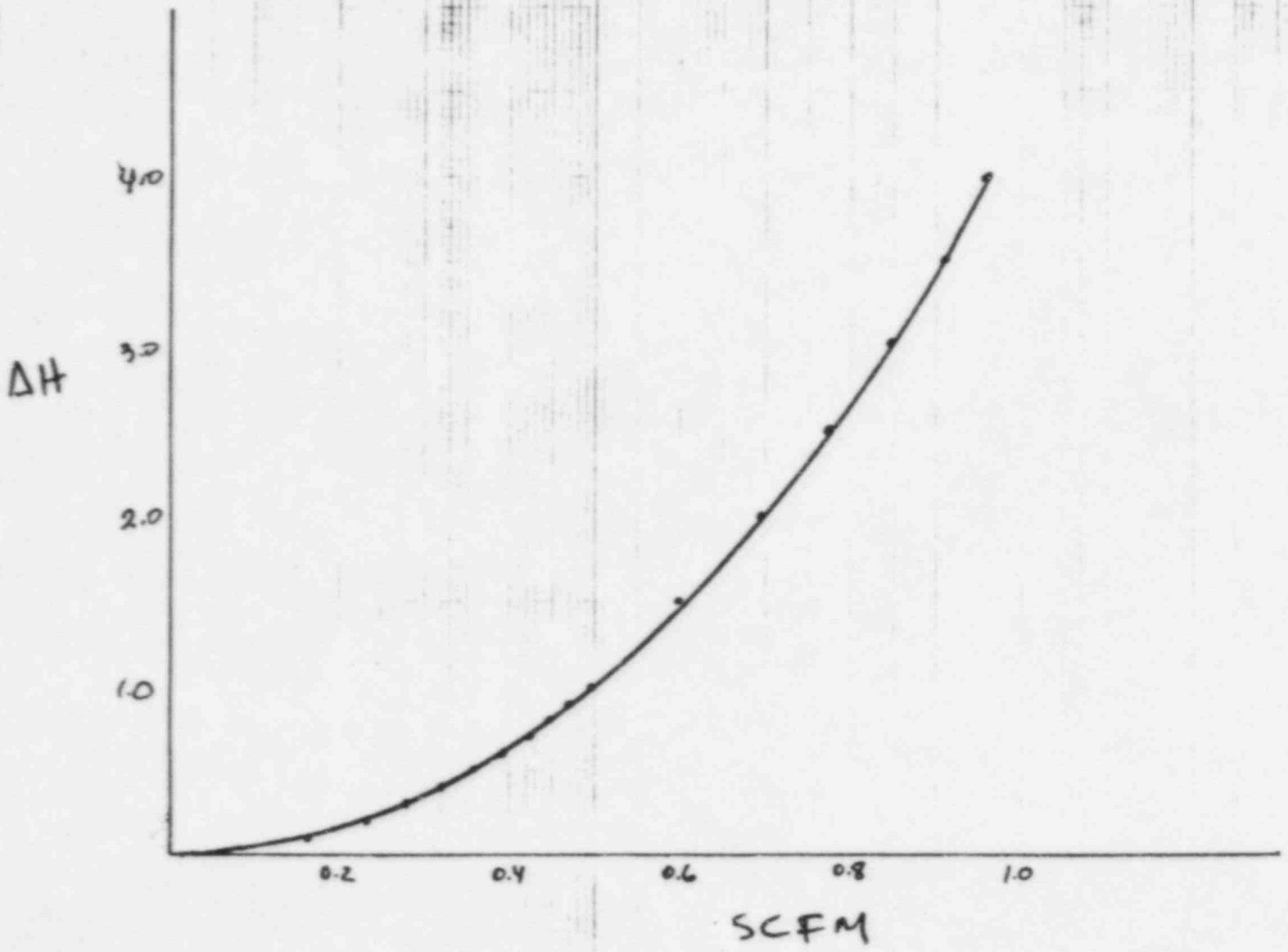
Calibration Data

March 29, 1985

DRY GAS METER

Unit Number	Calibration Factor
1	0.993
2	1.008
3	1.012
4	1.010

W.E.S.T. INC.
ORIFICE CURVE
CONTROL MODULE #3
3/29/95
M. A. VINCENT



APPENDIX D

Field Testing Data

Job No. 8510-105

Job Name Petrotomics

Run No. 1

Location MCP

Date 3-14-85

Operator Mason - Twedt

Sample Box No. 5 Meter Box No. 3

Particulate FIELD DATA

Read and Record at the Start of Each Test Point.

Nomograph Setting ΔP ~~0.365~~ 0.878 ΔH ~~1.75~~ 1.47

Ambient Temp. °F 40

Assumed Moisture % 17

Probe Length 46"

Pitot Tube Leak Check Before ~~off~~ after OK

Initial Leak @ 15.0 "Hg = 0.000 cfm

Final Leak @ 10.0 "Hg = 0.000 cfm

ΔPs Pm Ts Tm

Point	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	Remarks
A6	1116	974.553	0.95	1.60	1.60	6.0	162	271	255	58	40	36	
5	21	978.10	0.95	1.60	1.60	6.0	165	252	266	58	40	35	
4	26	981.57	0.93	1.55	1.55	6.5	160	251	270	63	40	35	
3	31	985.09	0.92	1.50	1.50	7.5	160	249	268	83	41	35	
2	36	988.67	0.89	1.50	1.50	7.0	163	252	266	90	45	36	
1	41	991.41	0.87	1.45	1.45	7.0	160	251	267	90	46	37	
end	1146	995.767	—	—	—	—	—	—	—	—	—	—	
B6	1148	995.767	0.87	1.45	1.45	6.5	160	254	265	80	47	38	
5	53	999.20	0.89	1.50	1.50	6.5	160	258	264	77	48	39	
4	58	1002.75	0.88	1.45	1.45	6.5	160	260	261	76	49	40	
3	1203	1006.23	0.82	1.35	1.35	6.5	160	253	263	79	50	41	
2	08	1009.68	0.78	1.30	1.30	6.5	156	250	261	77	50	42	
1	13	1012.98	0.76	1.25	1.25	6.5	157	251	262	79	51	42	
end	1218	1016.297	—	—	—	—	—	—	—	—	—	—	

Pitot Tube Calibration Factor C_p ~~0.822~~ 0.822 Pitot Tube No. ~~46-1~~ 46-1

Volume Collected V_m 41.201 ft^3 %CO_2 1.4% %CO 0.0%

Water Collected V_w 132.8 ml %O_2 18.0% %N_2 80.6%

Time of Test T_t 60 min Area Stack A_2 113 in^2

Baro. Press. P_b 23.20 "Hg Stack Press. +0.08 in. H_2O

Sample Purge: Initial — Final —

Probe Tip No. ~~4B~~ III-2 Probe Tip Dia. ~~0.259~~ 0.226 in

V_m = Dry Gas Meter Calibration Factor 0.987 X 41.744

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

M_P = 104.3 M_T = —

IMPINGER CATCH

SAMPLE NO.: Y.C.D. 1

IMPINGER NO.	SOLUTION USED	AMOUNT OF SOLUTION (ml)	IMP. TIP CONFIGURATION	WEIGHT (grams)
1	DI	100	MODIF	Final 611.5 Initial 566.2 Wt. Gain 45.3
2	DI	100	G SMITH	Final 594.0 Initial 553.5 Wt. Gain 40.5
3	Dry	—	MODIF	Final 500.0 Initial 482.5 Wt. Gain 17.5
4	SILICA GEL	—	MODIF	Final 806.0 Initial 776.5 Wt. Gain 29.5
5				Final Initial Wt. Gain
6				Final Initial Wt. Gain
Flask				Final Initial Wt. Gain

TOTAL WEIGHT GAIN OF IMPINGERS (grams) 132.8

DATE: 3-14-85

SIGNATURE: Penny L Mason

ORSAT ANALYSIS RESULTS

Gas Fractional Part

CO_2 1.4 %

O_2 18.0 %

CO 0.07 %

N_2 80.6 %

SIGNATURE: Penny L Mason DATE: 3-14-85

TIME: 1200

Job No. 8510-105 — Petrotanks FIELD DATA

Job Name Petrotanks

Run No. # 1

Location Cooler Exhaust

Date 3-14-85

Operator MASON - TWEDT

Sample Box No. 7 Meter Box No. 3

Read and Record at the Start of Each Test Point.

Nomograph Setting ΔP 0.036 ΔH 1.30

Ambient Temp. °F 40

Assumed Moisture % 4

Probe Length 96" initial final

Pitot Tube Leak Check OK OK

Initial Leak @ 15.0 "Hg = 0.000 cfm

Final Leak @ 10.0 "Hg = 0.000 cfm

Point	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	Remarks
A 12	1900	52.284	0.04	1.45	1.45	4.5	240	232	269	95	47	45	
11	03	54.23	0.04	1.45	1.45	5.0	239	231	248	42	48	44	
10	6	56.38	0.04	1.45	1.45	5.0	241	233	244	38	49	44	
9	9	58.52	0.04	1.45	1.45	5.0	242	234	245	38	49	43	
8	12	60.65	0.04	1.45	1.45	5.0	242	237	245	39	49	43	
7	15	62.77	0.03	1.10	1.10	4.5	239	238	251	39	50	45	
6	18	64.90	0.03	1.10	1.10	4.5	239	239	252	39	50	45	
5	21	67.01	0.03	1.10	1.10	4.5	241	238	256	41	51	45	
4	24	68.91	0.02	0.73	0.73	4.0	240	240	255	41	51	45	
3	27	70.52	0.02	0.73	0.73	3.5	233	243	260	42	51	45	
2	30	72.03	0.02	0.73	0.73	3.0	235	240	260	43	51	45	
1	33	73.53	0.02	0.73	0.73	3.0	232	236	255	44	51	46	
end	1436	74.980	—	—	—	—	—	—	—	—	—	—	
B 12	1440	74.980	0.04	1.45	1.45	5.0	241	233	268	44	49	46	
11	43	77.11	0.04	1.45	1.45	5.0	241	230	262	44	49	46	
10	46	79.28	0.04	1.45	1.45	5.0	240	232	260	40	50	46	
9	49	81.32	0.04	1.45	1.45	5.0	242	240	266	40	50	46	
8	52	83.61	0.04	1.45	1.45	3.0	242	240	267	41	50	46	

Pitot Tube Calibration Factor C_p 0.822 Pitot Tube No. 46-1

Volume Collected V_m 45.330 ft^3 $\%CO_2$ 0.0 %CO 0.0

Water Collected V_w 20.9 ml $\%O_2$ 21.0 $\%N_2$ 79.0

Time of Test T_t 72 min Area Stack A_2 109 in^2

Baro. Press. P_b 23.22 "Hg Stack Press. -0.04 in. H_2O

Sample Purge: Initial — Final —

Probe Tip No. I-7 Probe Tip Dia. 0.489 in

V_m = Dry Gas Meter Calibration Factor 0.987 X 45.927

Dry Gas Meter Reading ____ ft^3 - (T_t ____ min x Leak Rate ____ cfm)

M_P = 13.3 M_T = —

Run No. 1

Location Cooler Exhaust

Date 3-14-85

PARTICULATE FIELD DATA

			ΔPs	Pm		Ts					Tm		
Point	Clock Time	Dry Gas Meter, CF	Pitot in. H_2O	Orifice ΔH in. H_2O		Pump Vacuum In. Hg Gauge	Stack Temp °F	Probe Temp °F	Oven Temp °F	Effluent Temp °F	Dry Gas Temp °F		Remarks
				Desired	Actual						Inlet	Outlet	
B7	1455	85.76	0.03	1.10	1.10	4.5	239	232	270	42	52	46	
6	58	87.62	0.03	1.10	1.10	4.0	240	236	266	43	52	46	
5	1501	89.61	0.03	1.10	1.10	4.0	240	237	260	43	53	46	
4	04	91.40	0.03	1.10	1.10	4.0	239	238	260	43	53	47	
3	07	93.26	0.02	0.73	0.73	3.5	242	240	257	44	54	47	
2	10	95.21	0.02	0.73	0.73	3.5	242	242	243	46	54	47	
1	13	96.72	0.02	0.73	0.73	3.5	240	232	238	48	55	48	
end	1516	98.211	—	—	—	—	—	—	—	—	—	—	

IMPINGER CATCH

SAMPLE NO.: Cooler Exhaust 1

IMPINGER NO.	SOLUTION USED	AMOUNT OF SOLUTION (ml)	IMP. TIP CONFIGURATION	WEIGHT (grams)
1	DI	100	MODIF	Final 547.0 Initial 554.0 Wt. Gain -7.0
2	DI	100	G SMITH	Final 571.0 Initial 567.8 Wt. Gain 3.2
3	Dry	—	MODIF	Final 492.5 Initial 490.8 Wt. Gain 1.7
4	Silica Gel	—	MODIF	Final 747.5 Initial 738.5 Wt. Gain 9.0
5				Final Initial Wt. Gain
6				Final Initial Wt. Gain
Flask				Final Initial Wt. Gain

TOTAL WEIGHT GAIN OF IMPINGERS (grams) 6.9

DATE: 3-14-85

SIGNATURE: K Mason

ORSAT ANALYSIS RESULTS

Gas Fractional Part

CO_2 ambient air

O_2

CO

N_2

Job No. 8510-105 — Particulate — FIELD DATA

Job Name Petrotomics

Run No. 1

Location Packaging exhaust

Date 3-14-95

Operator Mason - Twedt

Sample Box No. 6 Meter Box No. 3

Read and Record at the Start of Each Test Point.

Nomograph Setting ΔP 0.183 ΔH 1.37

Ambient Temp. °F 40

Assumed Moisture % 7

Probe Length 46" initial OK final OK

Pitot Tube Leak Check

Initial Leak @ 15.0 "Hg = 0.000 cfm

Final Leak @ 10.0 "Hg = 6.000 cfm

Point	Clock Time	Dry Gas Meter, CF	Pitot in. H_2O ΔPs	Orifice ΔH in. H_2O Desired	Orifice ΔH in. H_2O Actual	Pump Vacuum In. Hg Gauge Pm	Stack Temp °F Ts	Probe Temp °F	Oven Temp °F	Effluent Temp °F	Dry Gas Temp °F Inlet Tm	Dry Gas Temp °F Outlet Tm	Remarks
A 6	1242	16.570	0.15	1.10	1.10	4.5	112	247	255	49	49	46	
5	47	19.63	0.16	1.20	1.20	4.5	112	250	256	42	48	45	
4	52	22.86	0.15	1.10	1.10	4.5	111	237	248	41	48	48	
3	57	26.00	0.15	1.10	1.10	4.5	112	242	246	44	49	45	
2	1302	29.20	0.12	0.90	0.90	4.5	104	255	251	46	49	45	
1	07	31.87	0.12	0.90	0.90	4.5	105	251	251	48	49	45	
end 1	1312	34.645	—	—	—	—	—	—	—	—	—	—	
B 6	1314	34.695	0.14	1.05	1.05	4.5	100	237	254	51	46	42	
5	19	37.55	0.15	1.10	1.10	5.0	110	254	258	48	47	42	
4	24	41.25	0.15	1.10	1.10	5.0	110	230	258	51	49	42	
3	29	43.71	0.12	0.90	0.90	4.5	110	231	259	51	49	42	
2	34	46.22	0.12	0.90	0.90	4.5	110	230	262	55	49	43	
1	39	49.28	0.10	0.75	0.75	4.5	110	234	262	57	49	43	
end all	1344	52.985	—	—	—	—	—	—	—	—	—	—	

Pitot Tube Calibration Factor C_p 0.822 Pitot Tube No. 46-1

Volume Collected V_m 35.942 ft^3 %CO_2 0.0 %CO 0.0

Water Collected V_w 39.8 ml %O_2 21.0 %N_2 79.0

Time of Test T_t 60 min Area Stack A_2 82 in^2

Baro. Press. P_b 23.22 "Hg Stack Press. +0.05 in. H_2O

Sample Purge: Initial — Final —

Probe Tip No. 4A Probe Tip Dia. 0.311 in

V_m = Dry Gas Meter Calibration Factor 0.987 X 36.415

Dry Gas Meter Reading ____ ft^3 - (T_t ____ min x Leak Rate ____ cfm)

M_F = 13.3 M_T = —

IMPINGER CATCH

SAMPLE NO.: Packaging Exhaust 1

IMPINGER NO.	SOLUTION USED	AMOUNT OF SOLUTION (ml)	IMP. TIP CONFIGURATION	WEIGHT (grams)
1	DI	100	MODIF	Final 581.5 Initial 567.3 Wt. Gain 14.2
2	DI	100	G SMITH	Final 571.2 Initial 558.5 Wt. Gain 12.7
3	Dry	—	MODIF	Final 508.4 Initial 507.9 Wt. Gain 0.5
4	Silica Gel	—	MODIF	Final 761.4 Initial 749.0 Wt. Gain 12.4
5				Final Initial Wt. Gain
6				Final Initial Wt. Gain
Flask				Final Initial Wt. Gain

TOTAL WEIGHT GAIN OF IMPINGERS (grams) 39.8

DATE: 3-19-85

SIGNATURE: [signature]

ORSAT ANALYSIS RESULTS

Gas Fractional Part

CO_2 _____

O_2 _____ ambient air

CO _____

N_2 _____

APPENDIX E

Analytical Data

WEST, Inc.

PARTICULATE ANALYSIS

Date 3-25-85

Job No. 8510-105

Name Petrotomics

Location Packaging Exh, YCD, Cooler Exh.

Run No. 1-Packaging Exh.

	Filter No. K-52	Front Wash 200 ml	Impinger 1	Impinger 2
Final	0.6777	106.3128		
Initial	0.6774	106.2988		
	0.0003 = 0.3	0.0140 = 14.0		
	13.0	-1.0 blank		
	13.3	13.0		

MF 13.3 mg MT - mg

Run No. 1-YCD

	Filter No. K-53	Front Wash 200 ml	Impinger 1	Impinger 2
Final	0.7185	102.2411		
Initial	0.6740	102.1803		
	0.0445 = 44.5	0.0608 = 60.8		
	59.8	-1.0 blank		
	104.3	59.8		

MF 104.3 mg MT - mg

Run No. 1-Cooler Exhaust

	Filter No. K-51	Front Wash 275 ml	Impinger 1	Impinger 2
Final	0.6754	107.2731		
Initial	0.6752	107.2586		
	0.0002 = 0.2	0.0145 = 14.5		
	13.1	-1.4 blank		
	13.3	13.1		

MF 13.3 mg MT - mg

Acetone Blank:

Volume 200 ml

Final 98.1212

Initial 98.1202

0.0010

Blank: 0.005 mg/ml Total Weight 1.0

D.I. Water Blank

Volume _____ ml

Final

Initial _____

Blank: _____ mg/ml Total Weight _____

ALPHA
NUCLEAR
LABORATORIES INC.
A DIVISION OF ALPHA ENERGY LABORATORIES, INC.

REPORT OF ANALYSIS

ANL JOB# 85-111

WESTERN ENVIRONMENTAL

3 AIRS FOR PB U TH AND RA 8510-105

SAMPLE I. D.	ISOTOPE	CONCENTRATION (UCI/ML)	LLD (UCI/ML)
3/14/85 PETROTOMIC	PB-210	$(1.22 \pm 3.80) \times 10^{-12}$	6×10^{-12}
PE FRONT RUN 1	U-NAT	$(6.88 \pm 0.05) \times 10^{-10}$	4×10^{-13}
7293	TH-230	$(6.61 \pm 1.10) \times 10^{-12}$	8×10^{-13}
	RA-226	$(7.47 \pm 3.73) \times 10^{-13}$	5×10^{-13}
3/14/85 PETROTOMIC	PB-210	$(0.00 \pm 4.86) \times 10^{-12}$	8×10^{-12}
YCD FRONT WASH	U-NAT	$(3.01 \pm 0.07) \times 10^{-9}$	4×10^{-13}
7294	TH-230	$(2.45 \pm 1.05) \times 10^{-12}$	7×10^{-13}
	RA-226	$(4.80 \pm 3.68) \times 10^{-13}$	5×10^{-13}
3/14/85 PETROTOMIC	PB-210	$(1.60 \pm 26.3) \times 10^{-13}$	4×10^{-12}
CE FRONT	U-NAT	$(4.11 \pm 0.27) \times 10^{-11}$	3×10^{-13}
7295	TH-230	$(6.83 \pm 1.12) \times 10^{-12}$	8×10^{-13}
	RA-226	$(3.61 \pm 3.25) \times 10^{-13}$	5×10^{-13}

9982 MONROE DRIVE SUITE 405 DALLAS, TEXAS 75220 (214) 351-6092

CORE LABORATORIES, INC.
ANALYTICAL REPORT

RECEIVED APR 1 6 1985

REC. 3-18-85 PAGE 1 OF 1

WESTERN ENVIRONMENTAL

6756 WEST URANIUM ROAD
CASPER WY 82604
ATT. ALAN ROYLANCE

JOB: W50103
CHEMIST: DLD
LOCATION: CASPER RADIOCHEM

SMPL NO.	SAMPLE ID.	RN222 PCI/L	ERROR PCI/L	LLD PCI/L
103-1	CE	5.2	0.7	0.2
103-2	YCD	3.7	0.6	0.2
103-3	PE	0.5	0.3	0.2

APPENDIX F

Chain of Custody and Analysis Request

WEST, Inc.

Chain of Custody and Analysis Request

Job Number 8510-105 Date(s) Sampled 3-14-85

Job Name PETROTOMICS Number of Runs 3

Source Location SHIRLEY BASIN, Wy

Unit Tested Y.C.D., PACKAGING EXHAUST, COOLER EXHAUST

Absorbing Solution/Analysis For

Run	Filter Number	Imp 1	Imp 2	Imp 3	Imp 4	Probe Wash
YCD #1	K 53	DI / MOIST	DI / MOIST	Dry / MOIST	SILICA GEL / MOIST	ACETONE / PART.
PACKAGING EXHAUST #1	K 52	"	"	"	"	"
COOLER EXHAUST #1	K 51	"	"	"	"	"
4						

NO_x: _____

Other _____

Total Number of Sample Bottles: 6

Total Number of Filters: 3

Comments: _____

Person Responsible for Samples: RMarson

Sample No.	Recovered by	Date	Time	Location
1	RMarson	3-14-85	1230	on Site
2	RMarson	3-14-85	1400	on Site
3	RMarson	3-14-85	1530	on Site
4				

Samples Received By RMarson for transport Date: 3-14-85 Time: 1545

Samples Received at lab by: Alan D. Rayhance Date: 3-14-85 Time: 1715

Samples Analyzed by: Alan D. Rayhance Date: 3-25-85 Time: —

APPENDIX G

Resumes of Test Personnel

RUSSELL F. MASON

CURRENT:
6/1/81 to present

Senior Technician, Western Environmental Services and Testing, Inc., Casper, Wyoming and Dallas, Texas; an environmental monitoring and consulting firm. Conducted over 50 source emissions surveys, and assisted in more than 175 surveys. Presently involved in overseeing various ambient air networks.

EXPERIENCE:
12/1/80 to 5/31/81

Air Quality Department, Kumpe and Associates, P.C., Casper, Wyoming, an engineering and consulting firm. Headed several ambient air monitoring stations. Assisted with stack sampling, contributing to over 45 source studies.

EDUCATION:

Received an Associate of Science degree in Physiology from Casper, College, Casper, Wyoming (1977). Two years Environmental Biology, University of Wyoming, Laramie, Wyoming.

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CURRENT:

3/4/85 to Present	Senior Technician Western Environmental Services & Testing, Inc. Casper, Wyoming and Dallas, Texas An environmental consulting and monitoring firm.
4/20/84 to 3/3/85	Technician Western Environmental Services & Testing, Inc.
EDUCATION:	Graduate of Stevensville High School Stevensville, Montana 1983
TECHNICAL EXPERIENCE:	Assisted in over 30 stack sampling tests.